Question Bank

1st Secondary 1st term

Choose the correct answer from the given ones:

(1) The simplest form of the imaginary number i^{42} is ……….

a) 1 b) – 1 c) i d) – i

ans. $i^{42} = i^{4\times10+2} = i^2 = -1$ **(b)**

(2) If L, 2-L are the roots of the equation: $x^2 + k\,x + 6 = 0$, then k =…

a) 1 b) – 3 c) – 2 d) 5

ans. **S.R**

$$L + 2 - L = \frac{-k}{1} \rightarrow 2 = -k \rightarrow -2 = k \quad (c)$$

(3) The exterior bisector at the vertex of an isosceles triangle ……….. to the base.

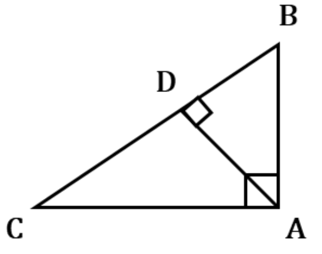
a) parallel b) perpendicular c) bisects d) equal

ans. **parallel (a)**

(4) ΔABC is a right – angled triangle at A , $\overline{AD} \perp \overline{BC}$ to intersect it at d then AB^2=……

a) BD × DC b) BD × BC c) CD × CB d) AB × AC

ans. $(AB)^2 = BD \times BC$ **(b)**



(5) If $\tan(180° + \theta) = 1$ where θ is the measure of the smallest positive angle then $\theta =$ ……..

a) 60° b) 30° c) 45° d) 135°

ans. $\tan(180+\theta)=1 \rightarrow$ **1^{st} quad.**

$180+\theta=45+180 \rightarrow \theta=45°$ **(c)**

(6) The solutions set $x(x-1)=0$ in R is …

a) {0} b) {1} c) {1, -1} d) {1. 0}

ans. $x(x-1)=0$

$x=0, x-1=0 \rightarrow x=1$

$\{0,+1\}$ **(d)**

(7) If L ,M are the two roots of the equation : : $x^2+3x-4=0$ then LM=…….

a) 4 b) – 4 c) 3 d) – 3

ans. $LM=\frac{-4}{1}=-4$ **(b)**

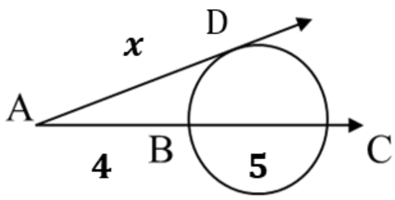
(8) If the ratio between the perimeters of two similar polygons 4 : 9 then the ratio between their two surface areas equals ……

a) 1:2 b) 2:3 c) 16:81 d) 8:18

ans. $\left(\frac{4}{9}\right)^2=\frac{16}{81}$ **(c)**

(9) In the opposite figure:

$x=\cdots$



a) $2\sqrt{5}$ b) 36 c) 20 d) 6

ans. $x^2=AB\times AC=4\times 9=36$

$x=\sqrt{36}=6$ **(d)**

(10) The radian measure of the central angle subtending an arc of length 5 cm in a circle whose radius length 5cm equals …….

a) $\left(\frac{1}{2}\right)^{rad}$ b) 1^{rad} c) 2^{rad} d) π

ans. $\theta^{rad} = \frac{l}{r} = \frac{5}{5} = 1^{rad}$

(11) If $3^{\sin\theta} = 1$, where $\theta \in]0, 2\pi[$, then $\theta = \ldots\ldots^\circ$

a) 45 b) 90 c) 180 d) 270

ans. $3^{\sin\theta} = 1 \quad \therefore \sin\theta = 0 \quad \therefore \theta = 0 \text{ or } \theta = 180, \quad \theta \in]0, 2\pi[$

$\therefore \theta = 180$ **(c)**

(12) The general solution of the equation $\tan\theta = \sqrt{3}$ is …… where $n \in Z$

a) $\frac{\pi}{2} + n\pi$ b) $\frac{\pi}{3} + 2n\pi$ c) $\frac{\pi}{6} + n\pi$ d) $\frac{\pi}{3} + n\pi$

ans. $\tan\theta = \sqrt{3} \quad \theta = 60^\circ = \frac{\pi}{3} \text{ or } \theta = 240^\circ = \frac{4\pi}{3}$

General solution $= \frac{\pi}{3} + n\pi, \; n \in Z$

(13) The value of expression: $5\cos\theta \times 3\sec\theta = \ldots\ldots$

a) 1 b) 2 c) 8 d) 15

ans. $5\cos\theta \times 3\sec\theta = 15\cos\theta \times \frac{1}{\cos\theta} = 15$

(14) If the two roots of the equation $(x-k)^2 + 4x = 0$ are additive inverse to each other, then $k = \ldots.$

a) – 2 b) zero c) 2 d) 4

ans. $(x-k)^2 + 4x = 0 \qquad x^2 - 2kx + k^2 + 4x = 0$

$x^2 + (4-2k)x + k^2 = 0$ **the two roots are additive inverse to each**

(15) If the sign of $f(x) = kx - 10$ is positive on the interval $]5, \infty[$ and negative on the interval $]-\infty, 5[$ then $k = \ldots\ldots$

a) 5 b) – 2 c) 2 d) – 10

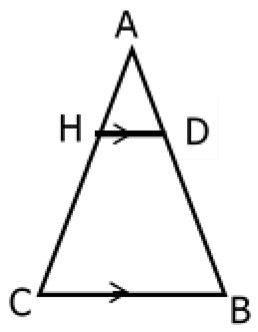
ans. **at x=5 ∴ kx – 10 =0 ∴ 5k -10=0 ∴ k=2**

(16) The angle whose measure is 490º lies in the ………. quad.

a) first b) second c) third d) fourth

ans. **490° – 360° =130°, 90°<130°<180° ∴the lies in the second quadrant**

(17) In the opposite figure $\overline{DH} \mathbin{//} \overline{BC}$, $\frac{DH}{BC} = \frac{3}{8}$, then $AD : DB = \cdots$



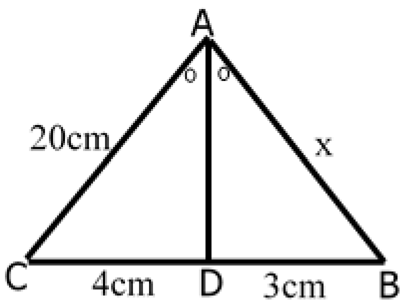
a) $\frac{8}{3}$ b) $\frac{5}{3}$

c) $\frac{3}{5}$ d) $\frac{11}{8}$

ans. $\overline{DH} \mathbin{//} \overline{BC}$ ∴ $\Delta ADH \sim \Delta ABC$,

$$\frac{AD}{AB} = \frac{DH}{BC} = \frac{3}{8} \quad \therefore \frac{AD}{AB - AD} = \frac{3}{8 - 3} \quad \therefore \frac{AD}{DB} = \frac{3}{5}$$

(18) In the opposite figure, If $\overline{AD}$ bisects $\angle(BAC)$, $AC = 20$ cm, $BD = 3$ cm, $DC = 4$ cm, then $x = \ldots\ldots. cm.$



a) 7 b) 3

c) 15 d) 15

ans. $\overline{AD}$ **bisects** $\angle(BAC)$ $\therefore \frac{BD}{DC} = \frac{AB}{AC} \quad \therefore \frac{3}{4} = \frac{AB}{20} \quad \therefore AB = 15$ **cm**

(19) If one of the roots of the equation $mx^2 - 3x + 1 = 0$ is multiplicative inverse of the other, then $m = \ldots\ldots$

a) – 3 b) – 1 c) 1 d) 2

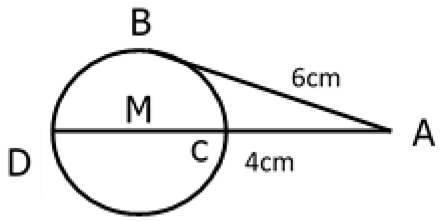
ans. **The roots of the equation are multiplicative inverse of each other, then product of the roots = 1 ∴ $\frac{1}{m}$ =1 ∴ m= 1**

(20) The function which has a positive sign in R~{2} is $f(x) = \ldots\ldots\ldots$

a)$(x-2)(x+2)$ b) $x^2 - 4x + 4$ c) $x - 2$ d) $(x + 2)$

ans. **in R − {2} means that the function is quadratic and has only one root , only $f(x) = x^2 - 4x + 4$ (b) from the alternatives satisfies**

(21) In the opposite figure if $\overline{AB}$ is a tangent to the circle M whose area …….. cm^2



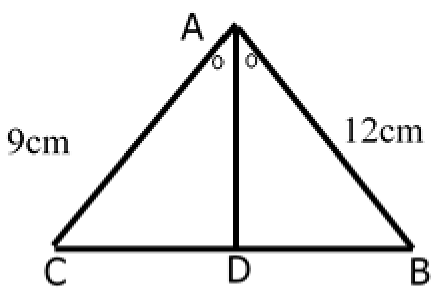
a) 6.25π b) 62.5π

c) 25π d) 10π

ans. **$\overline{AB}$ is a tangent ∴ $(AB)^2$ = BC ×BD ∴ 36= 4 ×(4 + 2r)**

∴ r = 2.5 cm, area of the circle = πr^2 =$\pi(2.5)^2$ = 6.25 π cm^2

(22) In the opposite figure, If the perimeter of the triangle ABC = 28 cm, AB = 12 cm, AC = 9 cm, $\overline{AD}$ bisects ∠(BAC), then BD × DC =……



a) 9 b) 12 c) 7 d) 16

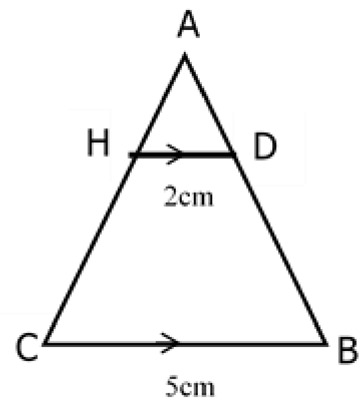
ans. **CB=28-(9+12)=7 cm, AD bisects ∠A, then $\frac{BD}{DC} = \frac{AB}{AC}$,**

then $\frac{BD}{DC} = \frac{12}{9}$, $\frac{BD}{DC+BD} = \frac{12}{9+12}$, $\frac{BD}{BC} = \frac{12}{21}$, $\frac{BD}{7} = \frac{12}{21}$

$\therefore$ **BD= 4 cm ,DC=3 cm** $\qquad$ $\therefore$ **BD × DC=12**

(23) In the opposite figure, If the area of triangle (ADH) $= 24\ \text{cm}^2$,

$\overline{DH}$ // $\overline{BC}$ then the area of the shape DBCH =....... cm^2



a) 36 $\qquad$ b) 126

c) 136 $\qquad$ d) 100

ans. $\overline{HD}$ **//** $\overline{CB}$ **then** $\Delta ADH \sim \Delta ABC$ $\therefore$ $\frac{a.\Delta ADH}{a.\Delta ABC} = (\frac{DH}{BC})^2$

$\therefore$ $\frac{24}{a.\Delta ABC} = (\frac{2}{5})^2$ $\therefore$ $\frac{24}{a.\Delta ABC} = \frac{4}{25}$ $\therefore$ $a.\Delta ABC = 150\ cm^2$

$\therefore$ **area of DCBH = 150- 24=126 cm^2**

(24) The central angle with measure 120° and includes an arc with length L cm in a circle with radius 6 cm, then L $\simeq$... cm.

a) 12.57 $\qquad$ b) 10 $\qquad$ c) 125.4 $\qquad$ d) 1.254

ans. $\theta^{rad} = \frac{120}{180}\pi \simeq$ $\qquad$, $\theta^{rad} = \frac{L}{r}$ $\quad$ $\therefore$ **L = r**θ^{rad} **=(6)(⬚) ≃12.57** $\boldsymbol{cm}$**.**

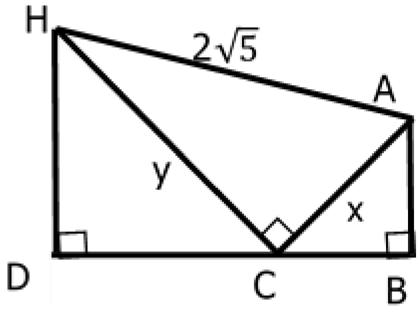
(25) If the terminal side of the angle θ in its standard position, cuts the unit circle at point $(\frac{3}{5}, y)$ where $y > 0$, then $\tan(\theta) = \ldots\ldots$

a) $\frac{4}{3}$ $\qquad$ b) $\frac{3}{4}$ $\qquad$ c) $\frac{5}{4}$ $\qquad$ d) 1

ans. $\left(\frac{3}{5}\right)^2 + (y)^2 = 1$ $\therefore y^2 = \frac{16}{25}$, $y > 0$ $\therefore y = \frac{4}{5}$ $\therefore$ $\tan\theta = \frac{y}{x} = \frac{4}{3}$

(26) In the opposite figure, Δ ABC ~ Δ CDH,

BC $= \frac{1}{2}$DH, then $x \times y =$.......



a) 3 b) 6

c) 8 d) 10

ans. $\Delta \textbf{ABC} \sim \Delta \textbf{CDH} \therefore \frac{AB}{CD} = \frac{BC}{DH} = \frac{AC}{CH}$, $\textbf{BC} = \frac{1}{2}\textbf{DH} \therefore \frac{BC}{DH} = \frac{1}{2} \therefore \frac{AB}{CD} = \frac{1}{2} = \frac{x}{y}$

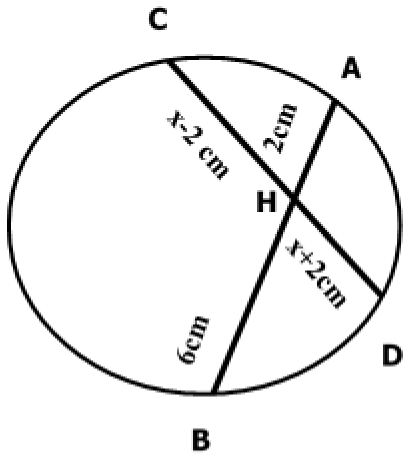
$\therefore y = 2x$, **in** Δ **ACH** $x^2 + y^2 = \left(2\sqrt{5}\right)^2 \therefore 5x^2 = 20$

$\therefore x = 2, y = 4, xy = 8$

(27) In the opposite figure, AH = 2cm,

BH = 6cm, DH = (x + 2) cm, HC = (x − 2)cm,

then $x =$...... cm.



a) 6 b) 2

c) 4 d) 10

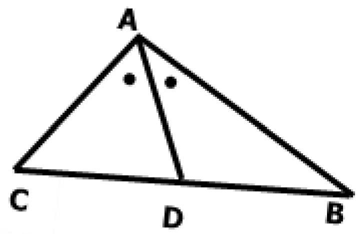
ans. $\textbf{2} \times \textbf{6} = \textbf{HC} \times \textbf{HD} \therefore \textbf{HA} \times \textbf{HB} = (x + 2) \times (x - 2) \therefore 2 \times 6 = x^2 - 4$

$\therefore x^2 = 16 \therefore x = 4$ **cm**

(28) In the opposite figure, Δ ABC in which

AB = 12 cm, AC = 10 cm,

$\overline{AD}$ bisects angle ($\angle$A) = then BD...... DC.



a) > b) < c) = d) $\frac{1}{2}$

ans. $\frac{BD}{DC} = \frac{AB}{AC} = \frac{12}{10} > 1$, **then BD > DC**

(29) If $\sin(A+15)=\cos(A+25)$ where, $0<A<90°$, then $A=\ldots°$

a) 15 b) 25 c) 40 d) 10

ans. $\mathbf{\sin(A+15)=\cos(A+25) \therefore (A+15)+(A+25)=90}$

$\mathbf{\therefore 2A+40=90 \therefore A=25°}$

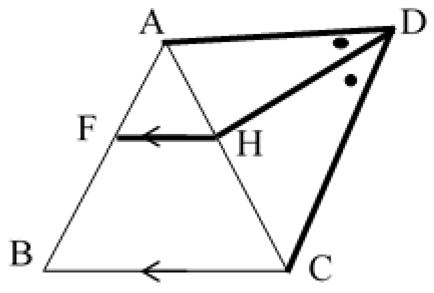
(30) $\tan 497°=\ldots\ldots$

a) 1 b) -1 c) $\frac{\sqrt{2}}{2}$ d) $\frac{1}{2}$

ans. $\mathbf{\tan 495°=\tan(495-360°)=\tan 135°=-\tan 45°=-1}$

(31) In the opposite figure $\overline{DH}$ bisects $(\angle D)$,

$\overline{HF} \parallel \overline{CB}$, then $\frac{AF}{FB}=\ldots\ldots$



a) $\frac{HF}{CB}$ b) $\frac{CH}{HA}$

c) $\frac{CD}{DA}$ d) $\frac{AD}{DC}$

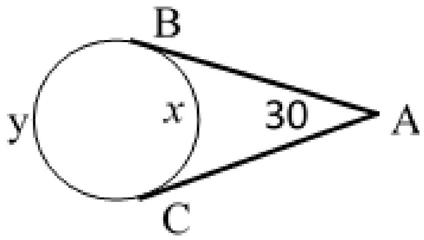
ans. **In Δ ABC, $\overline{HF} \parallel \overline{CB}$ $\therefore \frac{AF}{FB}=\frac{AH}{HC}$ ……(1) ,In Δ ADC, $\overline{DH}$ bisects**

$(\angle D)$ $\therefore \frac{AH}{HC}=\frac{AD}{DC}$………(2) , from (1),(2) $\therefore \frac{AF}{FB}=\frac{AD}{DC}$

(32) In the opposite figure $\overline{AB}$, $\overline{AC}$ are two tangents

to the circle.

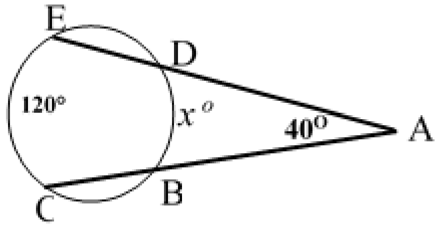
$m(\angle A)=30°$, Then $y-x=\ldots\ldots$ rad



a) π b) $\frac{\pi}{2}$ c) $\frac{\pi}{3}$ d) 2π

ans. $\mathbf{y-x=60°=\frac{\pi}{3}^{rad}}$

(33) In the opposite figure $m(\angle A) = 40°$, $m(\widehat{EC}) = 120°$ then $x = \dots°$



a) 40 b) 60

c) 120 d) 170

ans. **120° - x°= 80°** **∴ x= 40°**

(34) If L & M are two roots of the equation $x^2 - x - 2 = 0$ where L > M, then $2L + 5M^2 = \dots\dots$

a) 10 b) 5 c) 9 d) 11

ans. $\boldsymbol{x^2 - x - 2 = 0 \therefore (x+1)(x-2) = 0 \therefore \textit{the two roots are } -1 , 2}$

, $\boldsymbol{L > m}$ **∴ L = 2 , m = - 1∴** $\boldsymbol{2L + 5M^2 = 2(2) + 5(-1)^2 = 9}$

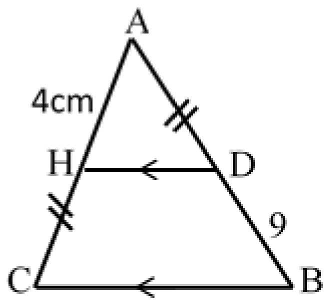
(35) If $\sin(\theta) = \frac{3}{5}$ where θ is a positive acute angle, then $\sin(180° + \theta) - \cos(360° - \theta) + \sin(90° + \theta) = \dots\dots$

a) $\frac{4}{5}$ b) $\frac{5}{4}$ c) $-\frac{3}{5}$ d) zero

ans. $\boldsymbol{\sin(180° + \theta) - \cos(360° - \theta) + \sin(90° + \theta)}$

$\boldsymbol{= -\sin(\theta) - \cos(\theta) + \cos(\theta) = -\sin(\theta) = -\frac{3}{5}}$

(36) In the opposite figure AD = HC, $\overline{DH} \parallel \overline{BC}$, AH = 4cm, BD = 9cm, then AC = …… cm.



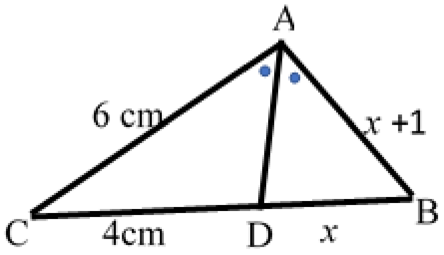
a) 4 b) 9

c) 10 d) 13

ans. **In Δ ABC,** $\boldsymbol{\overline{HD} \parallel \overline{CB} \therefore \frac{AH}{HC} = \frac{AD}{DB} \therefore \frac{4}{HC} = \frac{HC}{9}}$ **∴ HC= 6 cm**

∴ AC = 4+6=10 cm

(37) In the opposite figure if $\overline{AD}$ bisects angle (A), AC = 6cm, DC = 4cm, BD = x, AB = $x + 1$, then x =……



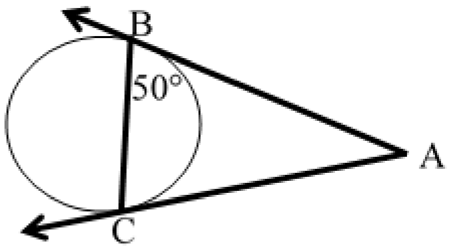
a) 3 b) 4

c) 2 d) 1

ans. **In Δ ABC, $\overline{AD}$ bisects ∠A ∴ $\frac{BD}{DC} = \frac{BA}{CA}$ ∴ $\frac{x}{4} = \frac{x+1}{6}$ ∴ 6x = 4x + 4**

∴ 2x = 4 ∴ x = 2

(38) In the opposite figure $\overrightarrow{AB}, \overrightarrow{AC}$ are two tangents to the circle. m(∠ABC) = 50° then the measure of the greatest arc $\overset{\frown}{BC}$ =……°



a) 200 b) 260 c) 160 d) 80

ans. **Im(∠ABC)=50° ∴ measure of arc BC =100°**

measure of greatest aecarc BC =360° - 100°= 260°

(39) If θ is a positive acute angle, $\frac{\sin(\theta+10)}{\cos(40)} = 1$, then θ = …°

a) 40 b) 50 c) 10 d) 70

ans. $\frac{\sin(\theta+10)}{\cos(40)} = 1$ **∴ $\sin(\theta + 10) = \cos(40)$ ∴ θ + 10+40=90∴ θ = 40°**

(40) If (3 + i) is one of the roots of the equation $x^2 + kx + 10 = 0$ where the coefficient of its terms are real numbers, then k =……

a) 6 b) – 6 c) 9 d) – 9

ans. **(3 + i) is one of the roots of the equation , then the other root is(3 + i) ∴ sum of the roots = - k ∴ 3+i + 3 – i = -k ∴ k= - 6**

(41) If L & M are the roots of the equation $x^2 - 3x = -5$, then the equation with roots L + 1 & M + 1 is ……

a) $x^2 - 9x + 5 = 0$ b) $x^2 - 5x + 9 = 0$

c) $x^2 - 5x - 3 = 0$ d) $x^2 + 3x + 5 = 0$

ans. $\boldsymbol{x^2 - 3x + 5 = 0 \rightarrow a = 1\,, b = -3, c = 5}$

$$\mathbf{L+M} = \frac{-b}{2} = \frac{-(-3)}{1} = 3\,,\ \mathbf{L\,M} = \frac{c}{a} = \frac{5}{1} \Longrightarrow \mathbf{L\,M} = 5$$

Sum of the two roots = (L+1) + (M+1) = L + M + 2 = 3 + 2 = 5

Product of the two roots = (L+1)(M+1) = L M + (L+M) + 1

= 5 + 3 + 1 = 9, the equation is $\boxed{x^2 - 5x + 9 = 0}$

(42) Two similar polygons, the ratio between their areas is 4 : 25 then the ratio between their perimeter is….

a) 2 : 5 b) 5 : 2 c) 4 : 5 d) 8 : 50

ans. $\because$ **The ratio between their areas** $= \frac{4}{25}$

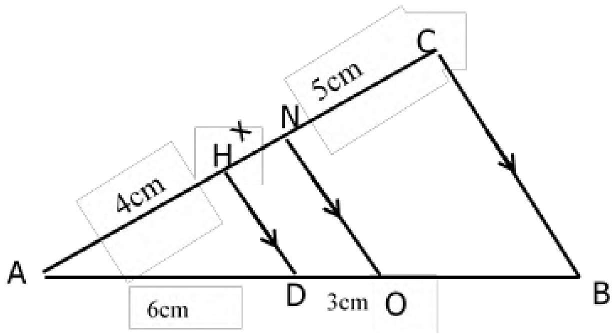
$\therefore$ **the ratio between their perimeters** $= \sqrt{\frac{4}{25}} = \frac{2}{5}$

(43) In the opposite figure , $\overline{DH} \,//\, \overline{ON}$,

CN = 5cm, OD = 3cm,

AD = 6cm, AH = 4cm, NH = x,

BO = y, then $x + y =$…… cm.



a) 9.5 b) 7.5 c) 8.5 d) 10

ans. **In Δ ABC**

$\because \overline{DH} // \overline{ON} // \overline{BC} \quad \therefore \frac{AH}{AD} = \frac{HN}{DO} = \frac{NC}{OB}$

$\Rightarrow \frac{4}{6} = \frac{x}{3} = \frac{5}{y} \quad , x = \frac{3 \times 4}{6} = 2 \text{ cm} , y = \frac{5 \times 6}{4} = 7.5 \text{ cm}$

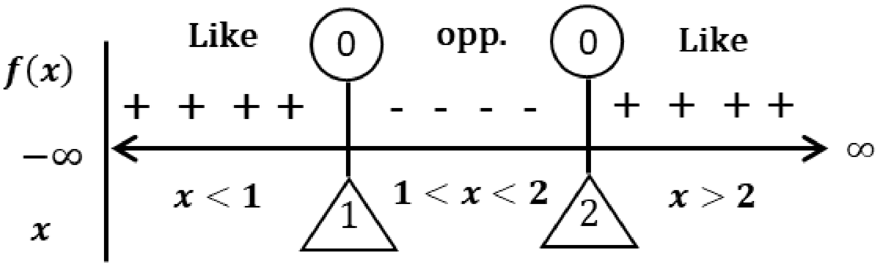
$x + y = 2 + 7.5 = 9.5 \text{ cm}$

(44) The solution set of the inequality $x^2 - 3x + 2 \geq 0$ is ……

a) $[1, 2]$ b) $R -]-2, -1[$ c) $R -]1, 2[$ d) $[-2, -1]$

ans. **Let** $f(x) = x^2 - 3x + 2 = 0 \Rightarrow (x - 2)(x - 1) = 0$

$\Rightarrow x = 2$ **or** $x = 1$



from the number line

the S.S> of the inequality $x^2 - 3x + 2 \geq 0$ **is** $R -]1, 2[$

(45) If $(2 + i)(3 - 5i^5) = (x + iy)$, then $x + y =$…….

a) 4 b) 5 c) 6 d) 7

ans. $\because (2 + i)(3 - 5i^5) = (2 + i)(3 - 5i)$

$= 6 - 7i - 5i^2 = 6 - 7i + 5 = 11 - 7i \Rightarrow \therefore x = 11 , y = -7$

$x + y = 11 + (-7) = 4$

(46) If the roots of the equation $2x^2 - 8x + K = 0$ are equal real, then

$K =$……

a) 2 b) 4 c) 10 d) 8

ans. $\because$ **the two roots are equal** $\therefore b^2 - 4ac = 0$

$(-8)^2 - 4(2)(K) = 0$

$64 - 8K = 0$

$\Longrightarrow 8k = 64$

$K = \dfrac{64}{8} = 8$

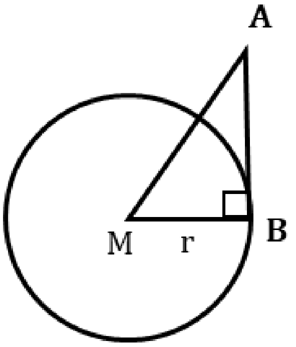
(47) If $P_M(A) = 3$ and $\overline{AB}$ is a tangent of the circle M then AB=…… *cm*

a) 18 b)9 c) 6 d) 36

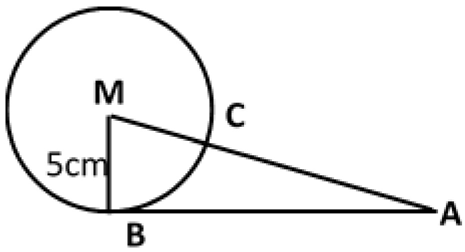
ans. $P_M(A) = 36$

$\because P_M(A) = (AB)^2 \Longrightarrow (AB)^2 = 36$

$AB = \sqrt{36} = 6$ cm



(48) In the opposite figure if $P_M(A) = 144$, $BM = 5$cm then AC =……cm



a) 18 b) 8

c) 12 d) 16

ans. $P_M(A) = 144$

$\Longrightarrow (MA)^2 - r^2 = 144$

$(MA)^2 - (5)^2 = 144$

$(MA)^2 = 169 \Longrightarrow MA = 13$

$\because MC = 5$ cm $\therefore AC = 13 - 5 = 8$ cm

(49) If $f(\text{x}) = x^2 + 9$, then the solution set of the inequality $f(x) \leq 0$ when R is……

a) $\{-3, 3\}$ b) $]3, \infty[$ c) $]-\infty, 3[$ d) $\emptyset$

ans. $\boldsymbol{f(x) = x^2 + 9}$

let $\boldsymbol{f(x) = 0 \Rightarrow x^2 + 9 = 0 \Rightarrow x^2 = -9}$ impossible in R

(there is no real solutions)

i.e $\boldsymbol{f(x) > 0}$, $\boldsymbol{x \in \mathrm{R}}$

$\therefore$ S.S. of the inequality $\boldsymbol{f(x) \leq 0}$ is $\emptyset$

(50) If the range of the function $f(x) = a\sin(x)$ where $x \in [0,2\pi]$ is $[-5,5]$ then $a \in$…….

a) $\{5\}$ b) $\{-5\}$ c) $]-5, 5[$ d) $\{-5, 5\}$

ans. $\boldsymbol{-1 \leq \sin x \leq 1}$

$\boldsymbol{\Rightarrow -a \leq a\sin x \leq a}$ if $\boldsymbol{a}$ is (+ve) , $\boldsymbol{a \leq a\sin x \leq -a}$ if $\boldsymbol{a}$ is (-ve)

$\because$ range $= [-5, 5] \Rightarrow \boldsymbol{a} \in \{-5, 5\}$

(51) The solution set of the equation $x^2 + 16 = 0$ in the complex number is……

a) $\{4i\}$ b) $\{-4i\}$ c) $\{+4i, -4i\}$ d) $\{4\}$

ans. $\boldsymbol{x^2 + 16 = 0}$

$\boldsymbol{\Rightarrow x^2 = -16 \rightarrow x^2 = 16i^2}$

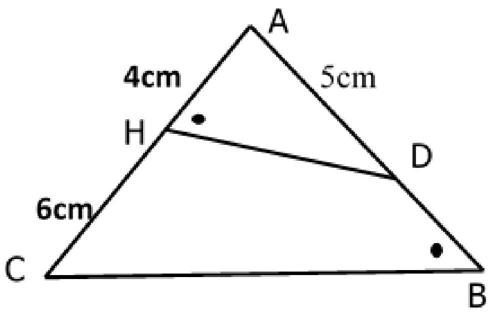
$\boldsymbol{\Rightarrow x = \pm 4i}$ **, S.S. =** $\boldsymbol{\{4i, -4i\}}$

(52) In the opposite figure:

$m(A\hat{H}D) = m(A\hat{B}C)$,

$AD = 5cm, AH = 4cm, HC = 6\ cm$

then $DB =$.........



a) 5 b) 4 c) 3 d) 8

ans. $\Delta\ AHD \sim \Delta\ ABC$

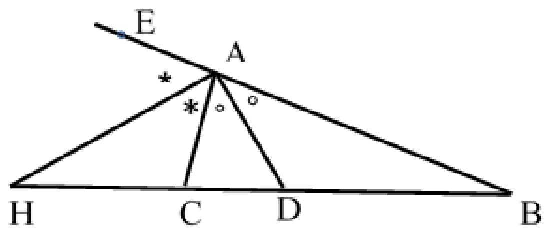
$$\Rightarrow \frac{AH}{AB} = \frac{AD}{AC} \Rightarrow \frac{4}{5 + DB} = \frac{5}{10}$$

$$\Rightarrow 5 + DB = \frac{4 \times 10}{5} = 8\ ,\ DB = 8 - 5 = 3\ cm$$

(53) In the opposite figure if $\overline{AD}$ bisects

$(B\hat{A}C)$ & $\overline{AH}$ bisects $(E\hat{A}C)$

then $\frac{BD}{DC} =$.........



a) $\frac{BH}{HC}$ b) $\frac{BD}{DH}$ c) $\frac{AH}{AC}$ d) $\frac{AB}{AH}$

ans. **In Δ ABC $\because \overline{AD}$ bisects $\angle$ BAC** $\therefore \frac{BD}{DC} = \frac{AB}{AC} \rightarrow (1)$

$\because \overline{AH}$ **bisects $\angle$ A externally** $\therefore \frac{HB}{HC} = \frac{AB}{AC} \rightarrow (2)$

from (1) , (2) we get

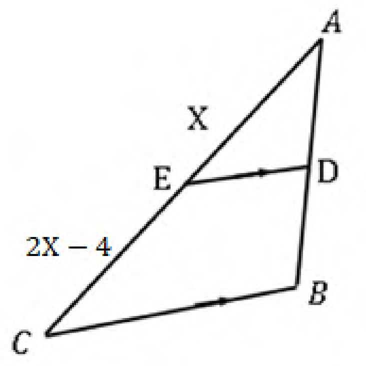
$$\frac{BD}{DC} = \frac{HB}{HC} \rightarrow (\boldsymbol{a})$$

(54) In the opposite figure : if $\overline{DE}$ // $\overline{BC}$,

AD : AB = 2 : 5 , then x =……

a) 8 b) 6

c) 4 d) 2



ans. $\frac{AD}{AB} = \frac{AE}{AC} \Rightarrow \frac{2}{5} = \frac{x}{3x-4}$

$6x - 8 = 5x$

$6x - 5x = 8$

$\boxed{x = 8}$

(55) The angle of measure 3932° lies in the …………… quadrant .

a) First b) Second c) Third d) Fourth

ans. $3942° = 360 \times 10 + 332°$

332° lies in the 4th quad.

(56) If x = - 1 is one of the two roots of the quadratic equation

$x^2 - k\,x - 6 = 0$, then the value k = …………

a) 5 b) – 5 c) 6 d) – 6

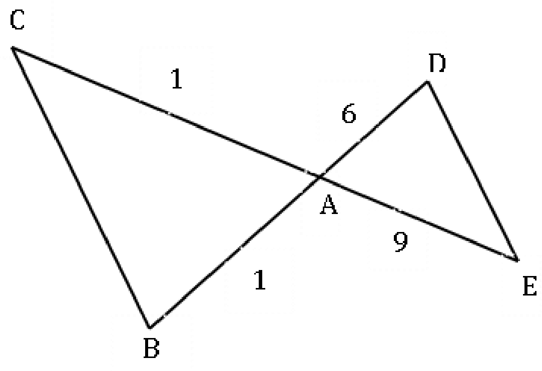
ans. $\because$ $x = -1$ **is one of the roots of the eq.**

$\therefore (-1)^2 - k(-1) - 6 = 0$

$1 + k - 6 = 0$

$\boxed{k = 5}$

(57) In the opposite figure :



$\overline{DB} \cap \overline{CE} = \{A\}$, AE = 9 cm ,

AB = 10 cm , AC = 15 cm , DA = 6 cm

Area (ΔADE) = 36 cm^2 , then

Area (ΔABC) = ………. cm^2

a) 60 b) 75 c) 100 d) 225

ans. Δ ADE ~ Δ ABC

$$\Rightarrow \frac{\text{area of } \Delta \text{ ADE}}{\text{area of } \Delta \text{ ABC}} = \left(\frac{AD}{AB}\right)^2 \Rightarrow \frac{36}{\text{area of } \Delta \text{ ABC}} = \left(\frac{6}{10}\right)^2$$

$$\Rightarrow \text{area of } \Delta \text{ ABC} = 100 \text{ cm}^2$$

(58) The solution set of the equation $x^2 = x$ in R is ……

a) $\{0\}$ b) $\{1\}$ c) $\{-1, 1\}$ d) $\{0.1\}$

ans. $x^2 = x$

$\Rightarrow x^2 - x = 0$

$x(x-1) = 0$

$x = 0 , x = 1$

S.S. $= \{0, 1\}$

(59) The simplest form of the expression: $\tan(180 - \theta) + \cot(270 - \theta)$ is …….

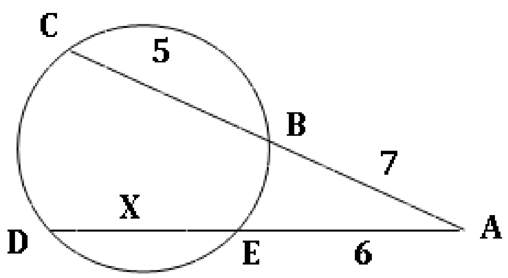
a) zero b) $2 \tan\theta$ c) $2 \cot\theta$ d) 2

ans. $\tan(180 - \theta) + \cot(270 - \theta) = -\tan\theta + \tan\theta = \text{zero}$

(60) In the opposite figure :

If AB = 7 cm , BC = 5 cm , AE = 6 cm

DE = x cm, then x = …..



a) 7 b) 8

c) 4 d) 6

ans. $AE \times AD = AB \times AC$

$6(6 + x) = 7 \times 12$

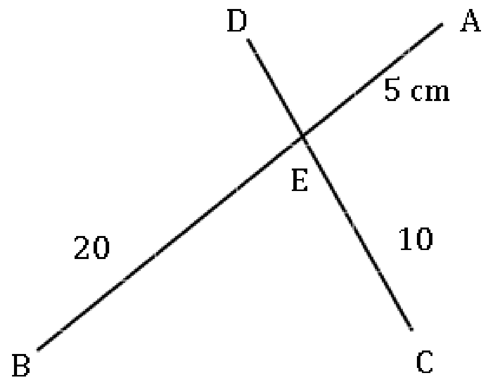
$6 + x = \frac{7 \times 12}{6} = 14$

$x = 14 - 6 = 7$ cm

(61) In the opposite figure :

$\overline{AB} \cap \overline{CD} = \{E\}$, the points A , B , C and D lie on the same circle when

ED = ………….. cm



a) 5 b) 8

c) 10 d) 20

ans. $EC \times ED = EA \times EB$

$10 \times ED = 5 \times 20$

$ED = 10$ cm

(62) The range of the function $f : f(\theta) = 3\sin(2\theta)$ is ……

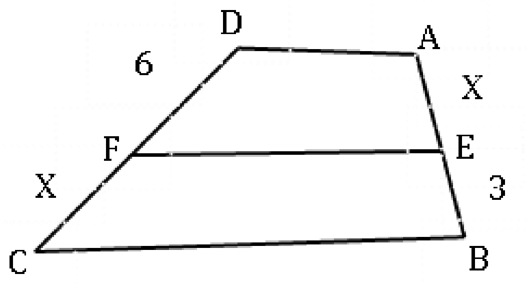
a) $[-2, 2]$ b) $]-2, 2[$ c) $[-3, 3]$ d) $]-3, 3[$

ans. $-1 \leq \sin(2\theta) \leq 1 \quad \times 3$

$\Rightarrow -3 \le 3\sin(2\theta) \le 3$

range = $[-3, 3]$

(63) In the opposite figure: X = ……



a) 6 b) $3\sqrt{2}$

c) $3\sqrt{3}$ d) 18

ans. $\because \overline{AD} \,//\, \overline{EF} \,//\, \overline{BC} \;\therefore \frac{AE}{DF} = \frac{EB}{FC}$

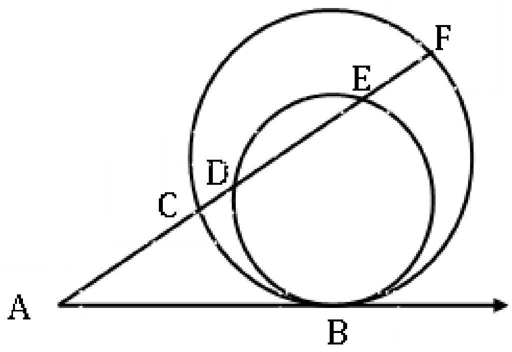
$\Rightarrow \frac{x}{6} = \frac{3}{2} \Rightarrow x^2 = 3 \times 6 \Rightarrow x = \sqrt{18} = 3\sqrt{2}$

(64) In the opposite figure :

If $\overline{AB}$ is a common tangent segment

to the two circles at B , then

AC : AD = ……



a) AB : AF b) 3 : 4

c) AD : AF d) AE : AF

ans. **For the smaller circle :** $(AB)^2 = AD \times AE \rightarrow (1)$

For the greather circle : $(AB)^2 = AC \times AF \rightarrow (2)$

From (1) , (2)

$AD \times AE = AC \times AF$

$\Rightarrow \frac{AC}{AD} = \frac{AE}{AF}$

(65) If the ratio between the surface areas of two similar polygons is $16 : 25$, then the ratio between lengths of two corresponding sides of them is ……

a) $2 : 5$ b) $4 : 5$ c) $16 : 25$ d) $16 : 41$

ans.

The ratio between two corresponding sides $= \sqrt{\frac{16}{25}} = \frac{4}{5}$

(66) The quadratic equation whose roots are $(1 + i)$ and $(1 - i)$ is ......

a) $x^2 - 2x + 2 = 0$ b) $x^2 + 2x - 2 = 0$

c) $x^2 + 2x + 2 = 0$ d) $x^2 - 2x - 2 = 0$

ans. **sum of the two roots** $= (1 + i) + (1 - i) = 2$

product of the two roots $= (1 + i)(1 - i) = 2$

The equation is $x^2 - 2x + 2 = 0$

(67) If $\tan(180 + \theta) = 1$, where θ is the smallest positive angle, then $\theta =$...... $^\circ$

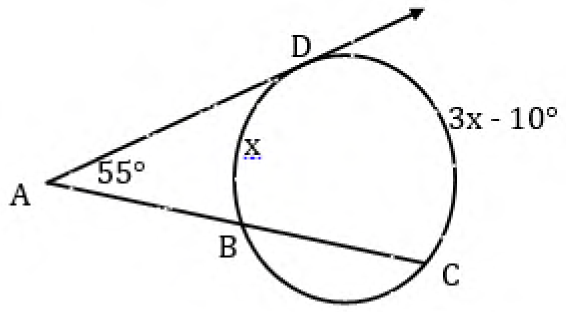
a) 60 b) 30 c) 45 d) 135

ans. $\tan(180^\circ + \theta) = 1 \Longrightarrow \tan\theta$

$\because$ **θ is the smallest (+ve)** $\therefore$ **θ lies in 1st quad**

$\theta = 45^\circ$

(68) In the opposite figure :



If $\overrightarrow{AD}$ is a tangent to the circle ,

$m(\angle A) = 55°$,

$m(\widehat{DC}) = (3x - 10)°$, $m(\widehat{DB}) = x°$

then x = ……..°

a) 120 b) 60 c) 30 d) 15

ans. $$\mathbf{m(\angle A) = \frac{m(\widehat{DC}) - m\,(\widehat{BD})}{2}}$$

$$\Rightarrow \mathbf{55° = \frac{(3x - 10) - x}{2}}$$

$$\Rightarrow \mathbf{110° = 2x - 10}$$

$$\mathbf{2x = 120° \Rightarrow x = 60°}$$

(69) The interior bisector of an angle of a triangle .... to the exterior bisector of the same angle.

a) Parallel b) Perpendicular c) Equal d) Congruent

ans. **Perpendicular**

(70) If $a = 1 + \sqrt{2}$, $b = 1 - \sqrt{2}\, i$, then a b = ...

a) – 1 b) 1 c) 2 d) 3

ans. $$\boldsymbol{a = 1 + \sqrt{2}\, i\,,\, b = 1 - \sqrt{2}\, i}$$

$$\boldsymbol{a\, b = \left(1 + \sqrt{2}\, i\right)\left(1 - \sqrt{2}\, i\right) = 1 - 2\, i^2 = 1 - 2(-1) = 3}$$

(71) If L, 2 – L are the two roots of the quadratic equation $x^2 + k\,x + 6 = 0$, then k = ...

a) 1 b) – 2 c) – 3 d) 5

ans. sum of the two roots $= \frac{-k}{1}$

$\Longrightarrow \mathbf{L + (2 - L) = -k}$

$\mathbf{2 = -k}$

$\boxed{k = -2}$

(72) If $\tan(4\theta) = \cot(5\theta)$, then $\sin(3\theta) =$......

a) $\frac{1}{2}$ b) 1 c) – 1 d) $\frac{\sqrt{3}}{2}$

ans. $\mathbf{\tan(4\theta) = \cot(5\theta)}$

$\Longrightarrow \mathbf{4\theta + 5\theta = 90°}$

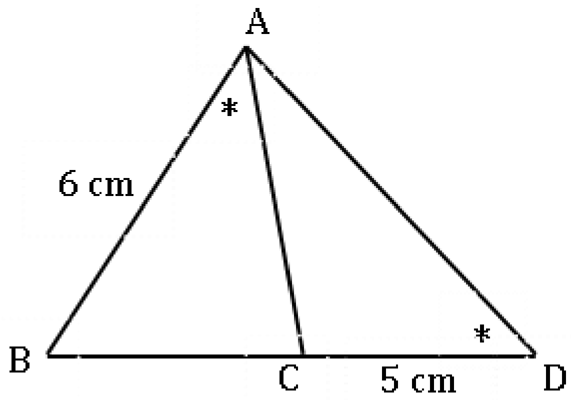
$\mathbf{9\theta = 90° \Longrightarrow \theta = 10°}$

$\mathbf{\sin(3\theta) = \sin(3 \times 10°) = \sin 30° = \frac{1}{2}}$

(73) In the opposite figure :

$C \in \overline{BD}$, m(∠D) = m(∠BAC)

AB = 6 cm , CD = 5 cm , then BC = …… cm



a) 3 b) 4

c) 5 d) 6

ans. $\mathbf{\Delta\ ABC \sim \Delta\ DBA}$

$\Longrightarrow \mathbf{\frac{AB}{DB} = \frac{BC}{BA} \Longrightarrow \frac{6}{5 + BC} = \frac{BC}{6}}$

$\mathbf{(BC)^2 + 5\ BC = 36}$

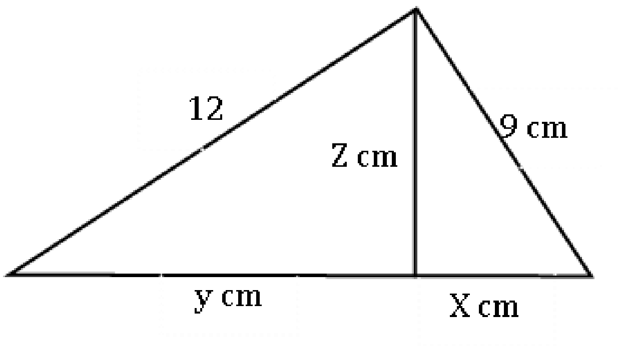
$\mathbf{(BC)^2 + 5(BC)2 - 36 = 0}$

$\mathbf{(BC - 4)(BC + 9) = 0}$

$BC = 4$ or $\underset{refused}{BC = -9}$

(74) In the opposite figure:

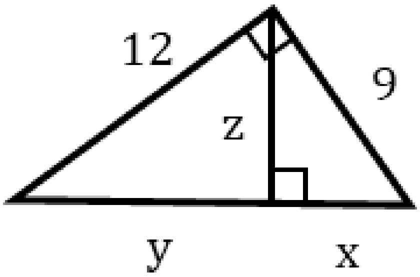
$X + y + z = ...$ cm



a) 15 b) 18.2

c) 22 d) 22.2

ans. $x + y = \sqrt{(9)^2 + (12)^2} = 15$



$z = \frac{9 \times 12}{15} = 7.2$ cm

$\therefore x + y + z = 15 + 7.2 = 22.2$ cm

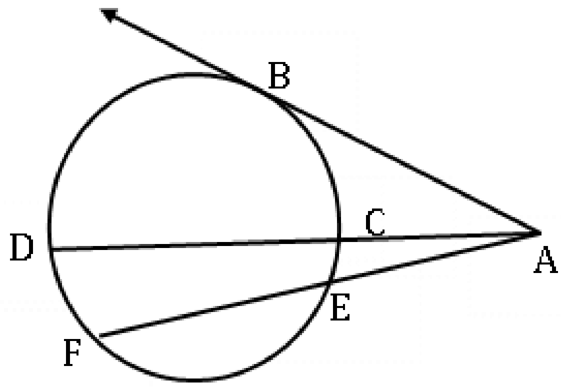
(75) The simplest form of the imaginary number i^{93} = ...

a) – 1 b) 1 c) i d) – i

ans. $i^{93} = i^{92+1} = i^{92} \times i = 1 \times i = i$

(76) In the opposite figure:

All the following expressions are true except ......



a) $(AB)^2 = AC \times AD$

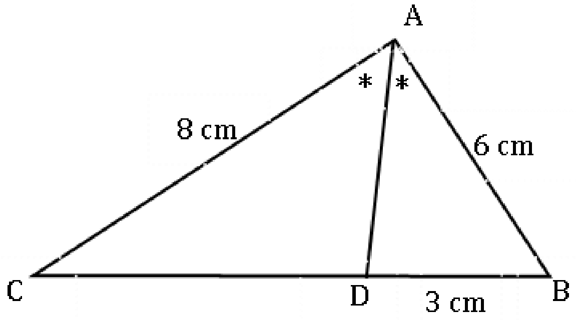
b) $(AB)^2 = AE \times AF$

c) $AC \times AD = AE \times AF$

d) $AC \times CD = AE \times EF$

ans. $AC \times CD = AE \times EF$

(77) In the opposite figure : if $\overrightarrow{AD}$ bisects $\angle BAC$, AB = 6 cm , AC = 8 cm , BD = 3 cm , then AD = ………. cm



a) 4 b) 5 c) 6 d) 8

ans. $\because \overline{AD}$ **bisects** $\angle BAC \quad \therefore \frac{DB}{DC} = \frac{AB}{AC}$

$$\Rightarrow \frac{3}{DC} = \frac{6}{8} \Rightarrow \frac{3 \times 8}{6} = 4 \text{ cm}$$

$$AD = \sqrt{AB \times AC - DB \times DC} = \sqrt{6 \times 8 - 3 \times 4} = 6 \text{ cm}$$

(78) If one of the two roots of the quadratic equation:

$x^2 - (m - 3)x + 3 = 0$ is additive inverse of the other root,

then m = …….

a) – 3 b) – 2 c) 2 d) 3

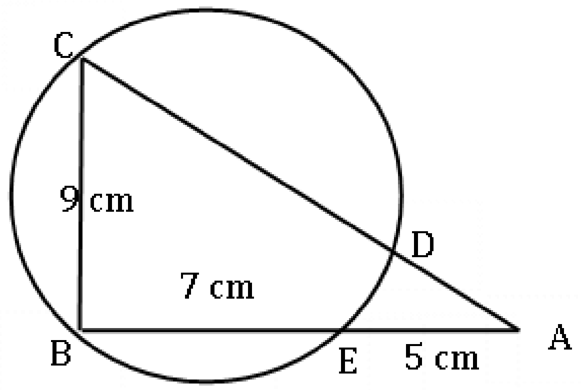
ans. $\because$ **one of the two roots is the additive inverse of the other root**

$\therefore$ **sum of the two roots = 0**

$$m - 3 = 0 \Rightarrow m = 3$$

(79) In the opposite figure:

DC = …… cm



a) 9 b) 10

c) 11 d) 12

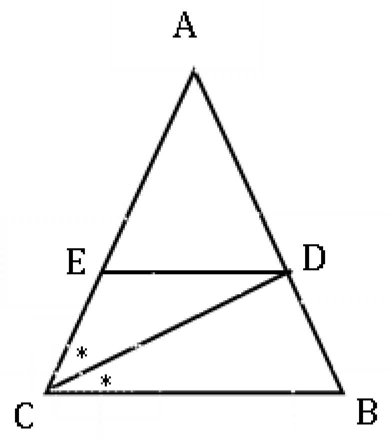
ans. $\because m(\angle B) = 90°$ $\therefore AC = \sqrt{(9)^2 + (7+5)^2} = 15$ cm

$AD \times AC = AE \times AB \Longrightarrow AD \times 15 = 5 \times 12$

$AD = \frac{5 \times 12}{15} = 4$ cm

$\Longrightarrow DC = 15 - 4 = 11$ cm

(80) In the opposite figure:



$\frac{AE}{EC} = ...$ cm

a) $\frac{DE}{BC}$ b) $\frac{AD}{AB}$

c) $\frac{AC}{CB}$ d) $\frac{AB}{BC}$

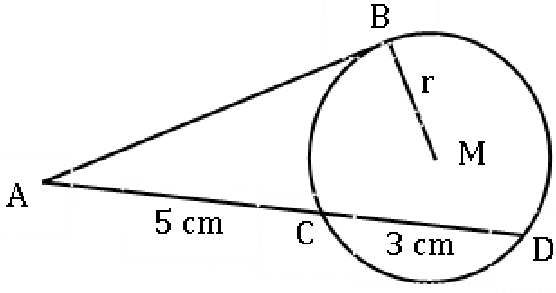
ans. $\because \overline{CD}$ bisects $\angle ACB$ $\therefore \frac{DA}{DB} = \frac{CA}{CB} \rightarrow (1)$

$\because \overline{DE} // \overline{BC}$ $\therefore \frac{EA}{EC} = \frac{DA}{DB} \rightarrow (2)$

from (1) , (2) we get

$\frac{AE}{EC} = \frac{AC}{CB}$ (c)

(81) In the opposite figure:



$P_m(A) = ...$

a) 25 b) $(AB)^2 - r^2$

c) 40 d) $(AM)^2 - (AB)^2$

ans. $\mathbf{P_M(A) = (AM)^2 - r^2 = (AB)^2 = AC \times AD = 5 \times 8 = 40}$

(82) The function $f: f(x) = ax^2 + bx + c$ has a unique sign in R when ......

a) $b^2 - 4ac > 0$ b) $b^2 - 4ac < 0$

c) $b^2 - 4ac = 0$ d) $b^2 - 4ac \geq 0$

ans. $\boldsymbol{b^2 - 4ac < 0}$

(83) The degree measure of the central angle in a circle whose diameter length 12 cm and subtended an arc of length 3π cm equals ......

a) 30° b) 60° c) 90° d) 120°

ans. $\mathbf{L = 3\pi\ cm\ ,\ r = 6\ cm}$

$$\boldsymbol{\theta^{rad} = \frac{L}{r} = \frac{3\pi}{6} = \frac{\pi}{2}}$$

$$\boldsymbol{x^\circ = \frac{\pi}{2} \times \frac{180^\circ}{\pi} = 90^\circ}$$

(84) If one the two roots of quadratic equation $ax^2 + 4x + 7 = 0$ is the multiplicative inverse of the other root, then a = ...

a) $\frac{1}{7}$ b) 7 c) 4 d) – 7

ans. **The product of the two roots = 1**

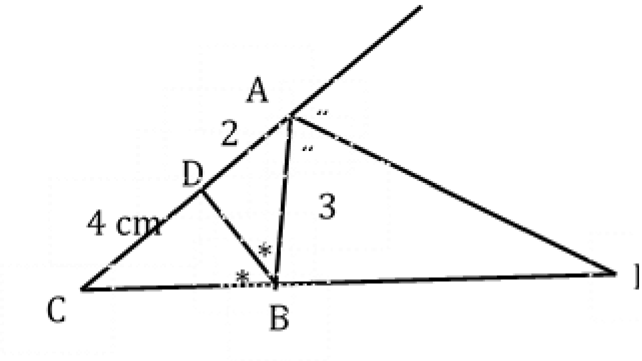
$$\boldsymbol{\Rightarrow \frac{7}{a} = 1 \Rightarrow \boxed{a = 7}}$$

(85) In the opposite figure:

BE = ... cm

a) 6 b) 8

c) 9 d) 10



ans. $\overline{\mathbf{BD}}$ **bisects** $\angle$ **ABC** $\therefore \frac{DA}{DC} = \frac{BA}{BC} \Longrightarrow \frac{2}{4} = \frac{3}{BC}$

$$\Longrightarrow BC = \frac{4 \times 3}{2} = 6 \text{ cm}$$

$\overline{\mathbf{AE}}$ **bisects** $\angle$**A externally** $\therefore \frac{EB}{EC} = \frac{AB}{AC} \Longrightarrow \frac{EB}{EB + 6} = \frac{3}{6}$

$$\Longrightarrow 6\text{ EB} = 3\text{ EB} + 18$$

$$3\text{ EB} = 18 \Longrightarrow \text{EB} = 6 \text{ cm}$$

(86) If the solution set of the inequality $x^2 - 10 < bx$ is $]-2, 5[$,

then b = ...

a) – 2 b) – 10 c) 3 d) 5

ans. $\boldsymbol{x^2 - bx - 10 < 0}$

$\because$ **S.S.** $=]-2, 5[$

$\therefore$ **the two roots of the equation** $\boldsymbol{x^2 - bx - 10 = 0}$ **are** $\boldsymbol{-2, 5}$

$$\Longrightarrow (-2)^2 - b(-2) - 10 = 0$$

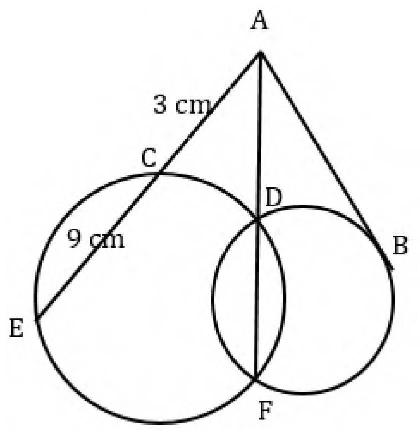
$$4 + 2b - 10 = 0$$

$$2b = 6 \Longrightarrow \boxed{b = 3}$$

(87) In the opposite figure:

If AC = 3 cm, CE = 9 cm,

then AB = ... cm



a) 27   b) 36

c) 9   d) 6

ans. $\mathbf{AD \times AF = AC \times AE = 3 \times 12 = 36}$

$\mathbf{(AB)^2 = AD \times AF = 36 \Longrightarrow 6\ cm}$

(88) If the two roots of the quadratic equation: $4x^2 - 12x + c = 0$ are equal,

then c = ...

a) 3   b) 4   c) 9   d) 16

ans. $\because$ **the two roots are equal** $\quad \therefore \boldsymbol{b^2 - 4ac = 0}$

$\boldsymbol{\Longrightarrow (-12)^2 - 4(4)(c) = 0}$

$\boldsymbol{144 - 16\,c = 0}$

$\boldsymbol{\Longrightarrow c = \frac{144}{16} = 9}$

(89) If $10 \sin x = 6$, where x is the greatest positive measure, $x \in [0, 2\pi[$ then the value of $\sec(3\pi + x) = ...$

a) $\frac{3}{5}$ b) $\frac{-5}{4}$ c) $\frac{5}{4}$ d) $\frac{-5}{3}$

ans. $10\sin x = 6 \Rightarrow \sin x = \frac{6}{10} = \frac{3}{5}$

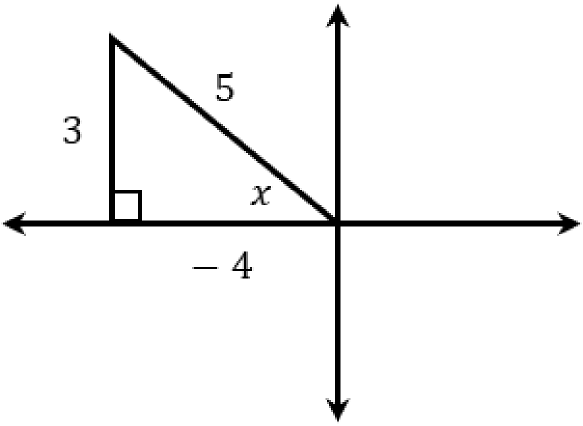
$\because$ x is the greatest (+ve) measure

$\therefore$ x lies in 2nd quad.

$\sec(3\pi + x) = \sec(\pi + x)$

$= \sec(\pi + x) = -\sec x$

$= -\left(\frac{5}{-4}\right) = \frac{5}{4}$



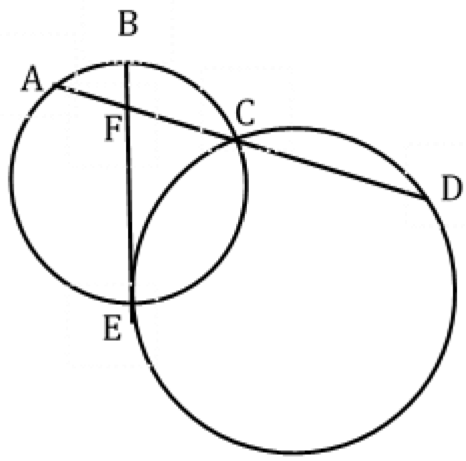
(90) In the opposite figure:

The two circles intersecting at C and E

$\overline{BE}$ is a tangent to the greater circle at E

AF = 3 cm, FC = 4 cm, CD = 5 cm,

then BE = ... cm



a) 9 b) 8

c) 7 d) 6

ans. $(FE)^2 = FC \times FD = 4 \times 9 = 36 \Rightarrow FE = \sqrt{36} = 6$ cm

$BF \times FE = AF \times FC$

$BF \times 6 = 3 \times 4$

$BF = 2$ cm

$\therefore BE = BF + FE = 2 + 6 = 8$ cm

(91) If $x + iy = i^{15} + 2\sqrt{-4}$, then $x + y =$ ......

a) 3 b) 4 c) zero d) – 3

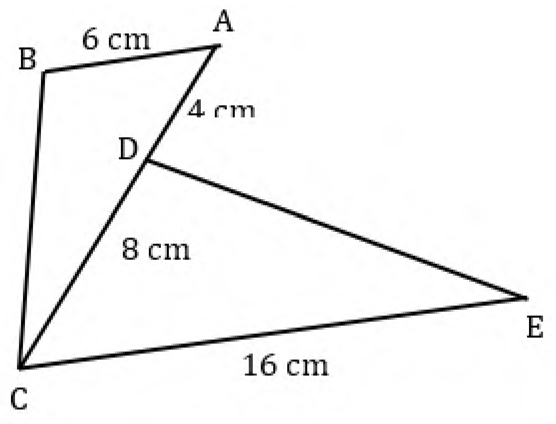
ans. $x + yi = i^{15} + 2\sqrt{-4} = -i + 2\sqrt{4i^2} = -i + 4i = 3i$

$\Rightarrow x = 0 , y = 0$

$$\boldsymbol{x + y = 0 + 3 = 3}$$

(92) In the opposite figure:

If $\overline{AB} \,//\, \overline{EC}$, then $\frac{DE}{BC} = ...$



a) $\frac{3}{4}$ b) $\frac{4}{3}$

c) $\frac{2}{3}$ d) $\frac{1}{2}$

ans. $\Delta\, ABC \sim \Delta\, CDE$

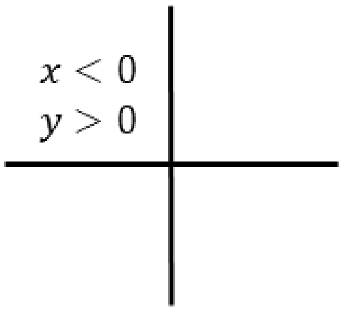
$$\Rightarrow \frac{DE}{BC} = \frac{CD}{AB}$$

$$\Rightarrow \frac{DE}{BC} = \frac{8}{6} = \frac{4}{3}$$

(93) If $\sin\theta > 0$, $\tan\theta < 0$, then θ lies in ...... quadrant

a) First b) Second c) Third d) Fourth

ans. $\sin\theta > 0 \Rightarrow y > 0$



$$\tan\theta < 0 \Rightarrow \frac{\sin\theta}{\cos\theta} < 0$$

$$\Rightarrow \cos\theta < 0 \Rightarrow x < 0$$

Second quadrant

(94) If the curve of the function $f: f(x) = ax^2 + bx + c$ intersects the x – axis at the two points (5, 0), (1, 0), then the solution set of the equation set of the equation: $2ax^2 + 2bx + 2c = 0$ is ......

a) {10, 2} b) {5, 0} c) {1, 0} d) {5 ,1}

ans. $f(x) = ax^2 + bx + c$ **intersects** $x -$ **axis at** $(5, 0)$, $(1, 0)$

$\therefore$ **the S.S. of the eq.** $\boldsymbol{ax^2 + bx + c = 0}$ **is** $\boldsymbol{\{5, 1\}}$

$\because \boldsymbol{2ax^2 + 2bx + 2c = 0\ (\div 2) \Rightarrow ax^2 + bx + c = 0}$

$\therefore$ **S.S.** $\boldsymbol{= \{5, 1\}}$

(95) If one of the roots of the equation : $3x^2 - (k+2)x + k^2 + 2k = 0$ is the multiplicative inverse of the other, then k = ...

a) $(-3, 1)$ b) $(-3, -1)$ c) $(3, -1)$ d) $(3, 1)$

ans. $\boldsymbol{a = 3, b = -(k+2), c = k^2 + 2k}$

$\because$ **one of the two roots is the multip. inverse of the other**

$\therefore$ **product of the two roots = 1**

$$\boldsymbol{\Rightarrow \frac{c}{a} = 1 \Rightarrow k^2 + 2k = 3}$$

$$\boldsymbol{k^2 + 2k - 3 = 0}$$

$$\boldsymbol{(k+3)(k-1) = 0}$$

$$\boldsymbol{k = -3 \mid k = 1}$$

(96) The ratio between lengths of two corresponding sides in two similar polygons equal 1 : 2, then which of the following statements is incorrect?

a) the ratio between their areas equals 1 : 4

b) the ratio between their perimeters equals 1 : 4

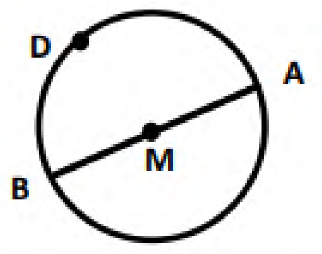
c) the ratio between the measures of their corresponding angles equals 1 : 1

d) the ratio of similarity equals 1 : 2

ans. **the ratio between their perimeters equals 1 : 4 (b)**

(97) In the opposite figure:

$\overline{AB}$ is the diameter of the circle M, if the length of the arc $(\widehat{ADB}) = 8\pi$ cm, then the radius length of its circle M equals ...... cm



a) 16 b) 8 c) 4 d) 2

ans. **length of $\widehat{ADB} = \pi r$**

$8\pi = \pi r$

$\Rightarrow r = 8$ **cm**

(98) If Δ ABC ~ Δ XYZ, the perimeter of Δ ABC : the perimeter of Δ XYZ = 1 : 4, then the area of Δ ABC : the area of Δ XYZ = ...

a) 1 : 2 b) 2 : 8 c) 1 : 16 d) 1 : 64

ans. **Δ ABC ~ Δ XYZ**

$\because \frac{\text{P. of } \Delta \text{ ABC}}{\text{P. of } \Delta \text{ XYZ}} = \frac{1}{4}$

$\therefore \frac{\text{area of } \Delta \text{ ABC}}{\text{area of } \Delta \text{ XYZ}} = \left(\frac{1}{4}\right)^2 = \frac{1}{16}$

(99) The degree measure of the central angle which subtends an arc of length 4 cm and the radius of its circle equals 5 cm equals ......

a) 45°50′ b) 55°50′ c) 144° d) 72°

ans. $\theta^{rad} = \frac{L}{r} = \frac{4}{5}$

$$\theta^\circ = \frac{4}{5} \times \frac{180}{\pi} = 45^\circ\, 50'$$

(100) If $\cos(270^\circ - \theta) = \frac{-1}{2}$ such that θ is the measure of the smallest positive angle, then = ... °

a) 30 b) 150 c) 210 d) 330

ans. $\cos(270^\circ - \theta) = \frac{-1}{2} \Rightarrow -\sin\theta = \frac{-1}{2} \Rightarrow \sin\theta = \frac{1}{2}$

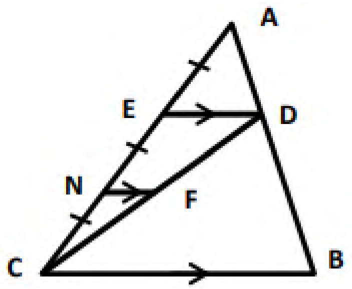
∵ θ is the smallest (+ve)

∴ θ lies in 1st quad.

$$\Rightarrow \theta = \sin^{-1}\left(\frac{1}{2}\right) = 30^\circ$$

(101) In the opposite figure:

$\overline{ED} \mathbin{//} \overline{NF} \mathbin{//} \overline{CB}$, FN = 2 cm, then length of $\overline{BC}$ = ... cm



a) 8 b) 9 c) 10 d) 12

ans. **ED = 4 cm**

$$\frac{AE}{AC} = \frac{ED}{BC} \rightarrow \frac{1}{3} = \frac{4}{BC} \rightarrow BC = 12 \text{ cm} \quad \text{(d)}$$

(102) If one of the two roots of the equation : $x^2 - (m+2)x + 3 = 0$ is the additive inverse of the other root , then m = ……

a) 3 b) 2 c) – 2 d) – 3

ans. **Sum roots = 0**

$$\frac{0}{1} = \frac{m+2}{1} \rightarrow \quad m + 2 = 0 \rightarrow m = -2 \quad \text{(c)}$$

(103) The exterior bisector at the vertex of an isosceles triangle ……….. to the base.

a) parallel b)perpendicular c) bisects d) equal

ans. **parallel (a)**

(104) The angle with measure 60° in standard position is equivalent to the angle with measure ……… °

a) 120 b) 240 c) 300 d) 420

ans. **60 + 360 = 420 (d)**

(105) If the ratio between the areas of the two similar polygons is 4 : 9 then the ratio between their two perimeters equals …. : ….

a) $4 : 9$ b) $2 : 3$ c) $16 : 81$ d) $3 : 2$

ans. $\frac{4}{9} = \left(\frac{\text{per } 1^{st}}{\text{per } 2^{nd}}\right)^2 \rightarrow \frac{\text{per } 1^{st}}{\text{per } 2^{nd}} = \frac{2}{3}$ **(b)**

(106) The conjugate of the number (5 – 3i) is ………..

a) $-3i - 5$ b) $3i - 5$ c) $5 - 3i$ d) $5 + 3i$

ans. $5 + 3i$ **(d)**

(107) In the equation : $ax^2 + bx + c = 0$, if the sum of the two roots = the product of the two roots , then b = …….

a) a b) – a c) c d) – c

ans. **sum roots = product roots**

$\frac{-b}{a} = \frac{c}{a} \rightarrow -b = c \rightarrow b = -c$ **(d)**

(108) If polygon M_1 is minimization of polygon M_2 and k is the ratio of minimization, then …………

a) $k > 0$ b) $k = 1$ c) $k > 1$ d) $0 < k < 1$

ans. **$0 < k < 1$ (d)**

(109) The range of the function $f(\theta) = \cos 5\theta$ is ……

a) $\{-5, 5\}$ b) $[-1, 1]$ c) $]-5, 5[$ d) $[-5, 5]$

ans. $[-1, 1]$ (b)

(110) If $\Delta abc \sim \Delta xyz$, $m(< a) = 50°$, $m(< y) = 70°$, then $m(< c) =$ ……°

a) 50 b) 60 c) 70 d) 120

ans. 60 (b)

(111) If $(1 + i^4)(1 - i^7) = x + y\,i$, then $x + y =$ ......

a) 4 b) 3 c) 2 d) 1

ans. $(\mathbf{1} + \boldsymbol{i})(\mathbf{1} - \boldsymbol{i}^{\mathbf{3}})$

$\mathbf{2 \times (1 + \boldsymbol{i}) = 2 + 2\boldsymbol{i}}$

$\boldsymbol{x + y = 4}$ **(a)**

(112) All .... are similar

a) triangles b) rectangles c) squares d) rhombuses

ans. **squares (c)**

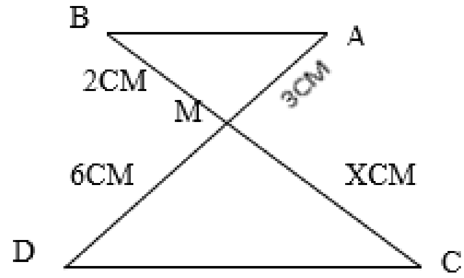
(113) If $\sin\theta = -1$, $\cos\theta = 0$, then $\theta =$ ......°

a) 90 b) 180 c) 270 d) 360

ans. $\mathbf{\sin\theta = -1, \cos\theta = 0}$

$\mathbf{\theta = 270}$ **(c)**

(114) In the opposite figure:



$x =$ ...... cm

a) 2 b) 3

c) 4 d) 9

ans. $\frac{3}{6} = \frac{2}{x} \rightarrow \quad x = 4$ **(c)**

(115) If the roots of the equation : $x^2 + 2x - m = 0$ are equal ,

then m = ……..

a) – 2 b) – 1 c) 1 d) 2

ans. **two roots L, L**

$L + L = 2$	$L^2 = -m$
$2L = 2$	$1 = -m$
$L = 1$	$m = -1$

(b)

(116) If AM = 4 cm, r = 3 cm, such that A is a point outside the circle M , then

$P_M(A)$ = ... cm

a) 7 b) 9 c) 16 d) 25

ans. $P_M = (A) = (AM)^2 - r^2 = 16 - 9 = 7$ **(a)**

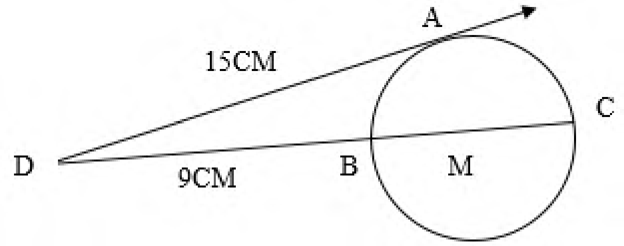
(117) The angle whose measure is $-120°$ lies in the ……... quadrant.

a) first b) second c) third d) fourth

ans. **second (b)**

(118) In the opposite figure:

MB = ...



a) 25 b) 16

c) 8 d) 4

ans. $\mathbf{15^2 = 9 \times (9 + 2r) \rightarrow 225 = 9(9 + 2r) \rightarrow 25 = 9 + 2r \rightarrow r = 8}$ **(c)**

(119) If $x = -1$ is one of the roots of the equation: $x^2 - ax - 2 = 0$, then

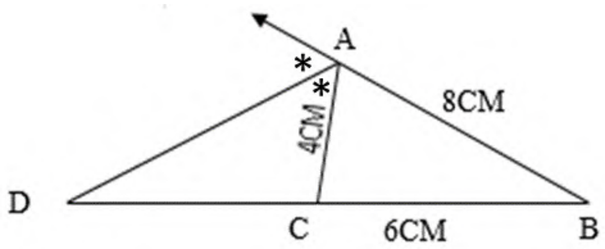
a = ...

a) – 3 b) – 1 c) 1 d) 3

ans. $\mathbf{(-1)^2 - a \times (-1) - 2 = 0 \rightarrow 1 + a - 2 = 0 \rightarrow a = 1}$ **(c)**

(120) In the opposite figure:

CD = ...



a) 12 b) 8

c) 6 d) 4

ans. $\mathbf{\frac{8}{4} = \frac{x + 6}{x} \rightarrow 2x = x + 6 \Rightarrow x = 6}$ **(c)**

(121) The radian measure of the central angle subtending an arc of length 8 cm, in a circle whose diameter length is 4 cm equals ....

a) 2^{rad} b) 4^{rad} c) 16^{rad} d) 32^{rad}

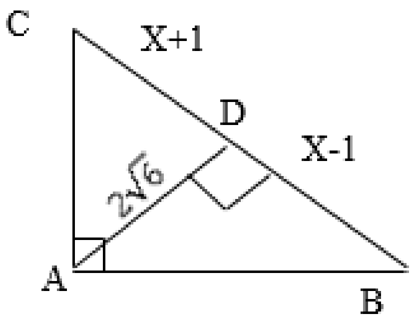
ans. $\mathbf{\theta^{\text{rad}} = \frac{l}{r} = \frac{8}{2} = 4^{\text{rad}}}$ **(b)**

(122) In the opposite figure:

$x = ...$

a) 5 b) 10

c) 12 d) 25



ans. $\left(2\sqrt{6}\right)^2 = (x-1)(x+1) \to 24 = x^2 - 1 \to 25 = x^2 \Rightarrow x = 5$ **(a)**

(123) The simplest form of the imaginary number i^{45} = ………..

a) i b) – i c) – 1 d) 1

ans. $i^{45} = i^{4\times 11+1} = i^1$ **(a)**

(124) The simplest form the expression :

$\tan(360° - \theta) + \cot(270° - \theta)$ is ………

a) $2\tan\theta$ b) $2\cot\theta$ c) 2 d) 0

ans. $\tan(360-\theta) + \cot(270-\theta) = -\tan\theta + \tan\theta = 0$ **(d)**

(125) The ratio between the length of two radii of two circles is 3 : 5, if the area of the smaller circle is 27 cm^2. , then the area of the greater circle equals ……….. cm^2

a) 45 b) $2\cot\theta$ c) 75 d) 100

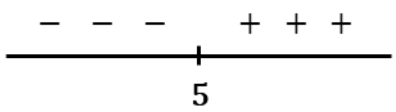
ans. $\frac{r_1}{r_2} = \frac{3}{5}$

$$\frac{27}{\pi r_2^2} = \frac{\pi r_1^2}{\pi r_2^2} = \frac{r_1^2}{r_2^2} = \frac{3^2}{5^2} \Rightarrow \pi r_2^2 = \frac{27\times 25}{9} = 75$$ **(c)**

(126) The sign of function $f : f(x) = x - 5$ is positive in the interval ……...

a) $]-\infty, 5[$ b) $]5, \infty[$ c) $[-5, \infty[$ d) $]-\infty, -5]$

ans. $\boldsymbol{f(x) = x - 5 \rightarrow x = 5}$



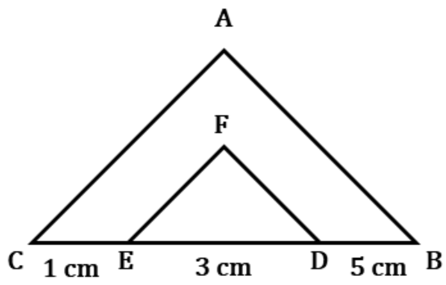
$]\mathbf{5}, \infty[$ **(b)**

(127) In the opposite figure:

If the area of Δ DEF = 6 cm^2

then the area of shaded area

= …… cm^2



a) 36 b) 48

c) 54 d) 81

ans. $\Delta \text{ABC} \sim \Delta \text{FDE} \rightarrow \dfrac{\text{a.}\Delta \text{ ABC}}{\text{a.}\Delta \text{ FDE}} = \left(\dfrac{\text{BC}}{\text{DE}}\right)^2 \rightarrow \dfrac{\text{a.}\Delta \text{ ABC}}{6} = \left(\dfrac{9}{3}\right)^2 = \dfrac{9}{1}$

a. ΔABC = 54 (c)

(128) The value of the expression :

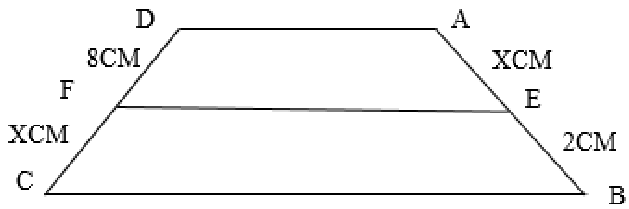
$\sin(600°)\cos(-30°) + \sin(150°)\cos(240°) = \ldots\ldots\ldots\ldots$

a) – 1 b) 0 c) 1 d) 2

ans. $\boldsymbol{\sin 240 \times \dfrac{\sqrt{3}}{2} + \dfrac{1}{2} \times \dfrac{-1}{2} \Rightarrow \dfrac{-\sqrt{3}}{2} \times \dfrac{\sqrt{3}}{2} - \dfrac{1}{4} = -1}$ **(a)**

(129) In the opposite figure:

x = ……



a) 2 b) 4

c) 8 d) 16

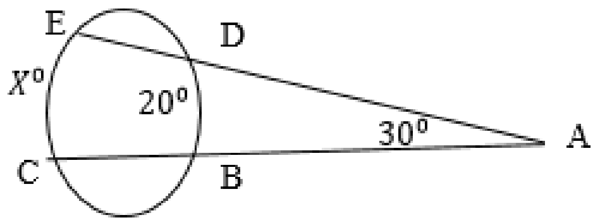
ans. $\frac{x}{8} = \frac{2}{x} \rightarrow x^2 = 16 \rightarrow x = 4$ **(b)**

(130) The solution set of the inequality $x^2 + 1 \leq 0$ in R is ………..

a) $\emptyset$ b) R c) $[-1, 1[$ d) $R-]-1, 1]$

ans. $x^2 + 1 \leq 0 \rightarrow x^2 \leq -1, \emptyset =$ **S.S. , in R (a)**

(131) In the opposite figure:



$X = ...°$

a) 40 b) 80

c) 90 d) 180

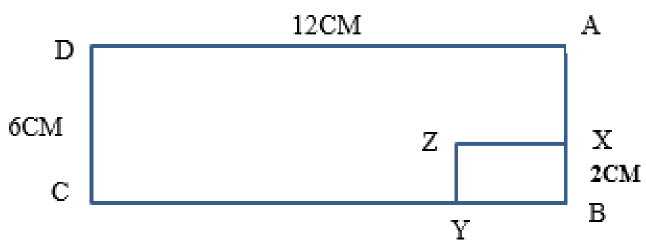
ans. $30 = \frac{1}{2}x - \frac{1}{2} \times 20 \rightarrow 40 = \frac{1}{2}x \rightarrow x = 80$ **(b)**

(132) If the power of point C with respect to the circle M is a negative amount, then C lies …… the circle.

a) inside b) on c) on the centre of d) outside

ans. **inside (a)**

(133) In the opposite figure:



▭ ABCD ~ ▭ XBYZ

then YC = ...

a) 6 b) 8

c) 10 d) 11

ans. $\frac{\text{a. ABCD}}{\text{a. XBYZ}} = \left(\frac{6}{1}\right)^2 \rightarrow \frac{12 \times 6}{\text{a. XBYZ}} = \frac{36}{1} \rightarrow \text{a. XBYZ} = 2$

$2 = xb \times yb \rightarrow 2 = 2 \times yb$

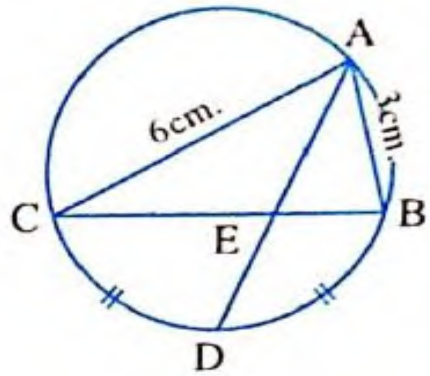
$yb = 1, yc = 12 - 1 = 11$ **(d)**

(134) If L and M are the two roots of the equation : $x^2 + 3x - 4 = 0$, the numerical value of the expression : $L^2 + 3L + 5 =$…………

a) – 9 b) – 4 c) – 1 d) 5

ans. $\text{L roots} \rightarrow L^2 + 3L - 4 = 0 \rightarrow L^2 + 3L - 4 + 9 = 0 + 9 = 9$ **(a)**

(135) In the opposite figure:



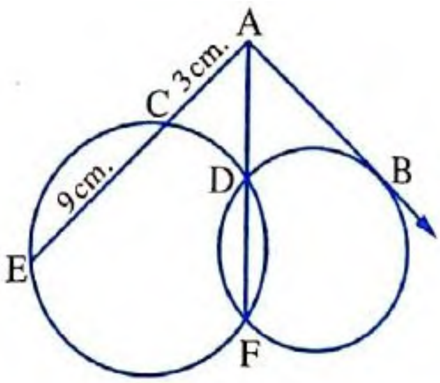
$\frac{BE}{BC} = ……$

a) 1 : 3 b) 1 : 2

c) 2 : 3 d) 3 : 2

ans. $\angle \overline{AD} \text{ bisects } \angle BAC \rightarrow \frac{AB}{AC} = \frac{BE}{EC} \rightarrow \frac{3}{6} = \frac{BE}{EC} = \frac{1}{2} \rightarrow \frac{BE}{BC} = \frac{1}{3}$ **(a)**

(136) In the opposite figure:



If AC = 3 cm, CE = 9 cm,

then AB = …… cm

a) 27 b) 36

c) 9 d) 6

ans. $(AB)^2 = AD \times AF = AC \times AE = 3 \times 12 = 36 \rightarrow AB = 6$ **(d)**

(137) The function $f : f(x) = ax^2 + bx + c = 0$ has one sign in R at ……….

a) $b^2 - 4\,ac > 0$

b) $b^2 - 4\,ac < 0$

c) $b^2 - 4\,ac = 0$

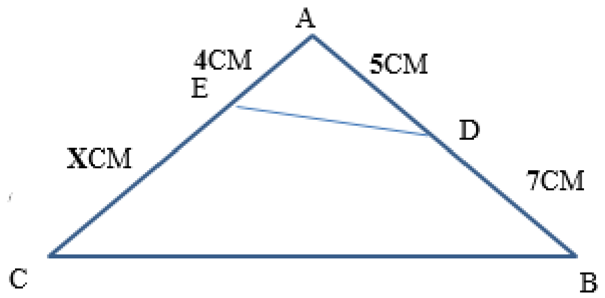
d) $b^2 - 4\,ac \geq 0$

ans. $\boldsymbol{b^2 - 4\,ac = 0}$ **(c)**

(138) In the opposite figure:

DBCE is cyclic quadrilateral then

EC = …… cm



a) 7 b) 11

c) 12 d) 15

ans. $\Delta\,ADE \sim \Delta\,ACB \rightarrow \frac{5}{4+x} = \frac{4}{5+7} \rightarrow \frac{5}{4+x} = \frac{4}{12} = \frac{1}{3}$

$$x + 4 = 15 \rightarrow x = 1 \quad \text{(b)}$$

(139) One of the values of , which satisfies the equation :

$\sin(3\theta + 15°) = \cos(2\theta - 5°)$,where $0° < \theta < 90°$ is …………..

a) 10° b) 16° c) 20° d) 36°

ans. $\sin(3\theta + 15) = \cos(2\theta - 5) \rightarrow 3\theta + 15 + 2\theta - 5 = 90 + 360 \times n$

$\rightarrow 5\theta + 10 = 90 + 360\,n \rightarrow 5\theta = 80 + 360\,n \rightarrow \theta = 16 + 72\,n$

$n = 0 \Rightarrow \theta = 16°\,, n = 1 \Rightarrow \theta = 88°$

(140) The solution set of the function: $x^2 + 9 = 0$ in the set of complex numbers is …………

a) $\{-3, 3\}$ b) $\{-3i\}$ c) $\{-3i, 3i\}$ d) $\emptyset$

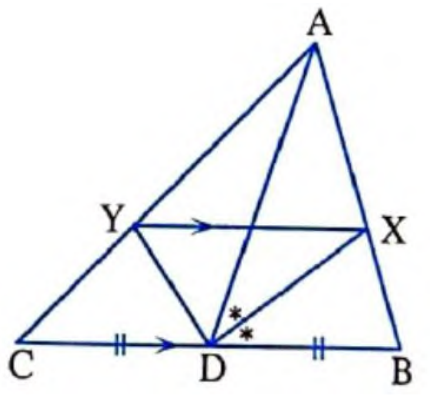
ans.

(141) In the opposite figure:

$m(\angle XDY) =$ ……

a) acute angle b) obtuse angle

c) right angle d) straight angle



ans. $\overline{DX}$ **bisects** $\angle ADB$ **then** $\frac{AD}{DB} = \frac{AX}{XB}$

$\overline{YX} = \overline{CB}$, $\frac{Ay}{YC} = \frac{AX}{XB}$

then $\frac{Ay}{YC} = \frac{AD}{DB} = \frac{AD}{DC}$ **then** $\overline{DY}$ **bisects** $\angle ADC$

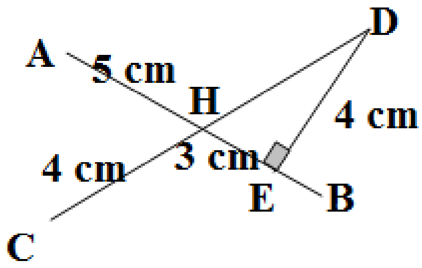
$m(\angle XDY) = \frac{180}{2} = 90$, **right angle (c)**

(142) If $f(x) = x + 2$ where $x \in]-4, 3[$ then $f(x)$ is positive when $x \in \dots$

a) $]-\infty, -2[$ b) $]-2, \infty[$ c) $]-4, -2[$ d) $]-2, 3[$

ans. $]-2, 3[$ **(d)**

(143) In the opposite figure:



AB ∩ DC = { H } , AH = 5 cm

HE = 3 cm , HC = 4 cm , DO = 4 cm

DO ⊥ BH , ACBD is cyclic quadrilateral

Then length of EB = …… cm

a) 0.5　　　b) 1

c) 1.5　　　d) 2

<u>**ans.**</u> $\mathbf{DH} = \sqrt{\mathbf{9+16}} = \mathbf{5}$

$\mathbf{AH \times HB = DH \times HC}$

$\mathbf{5 \times HB = 5 \times 4}$

HB= 4 , EB = 2 cm (d)

(144) If : $(1+i^4)(1-i^7) = x + iy$, then $x + y$ = …..

a) 4　　　b) 3　　　c) 2　　　d) 1

<u>**ans.**</u> $\boldsymbol{(1+i^4)(1-i^7) = (1+1)(1+i) = 2+2i}$

$\boldsymbol{x = 2 , y = 2}$

$\boldsymbol{x + y = 4}$ **(a)**

(145) In the opposite figure

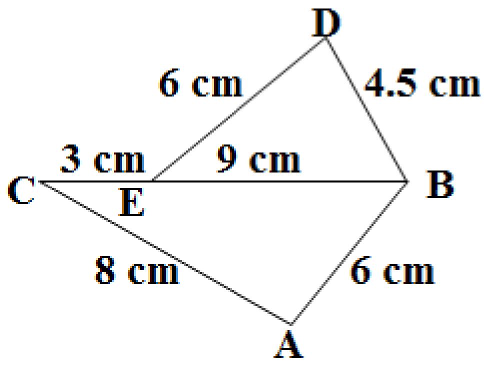
B , E , C are collinear

If CE = 3 cm , BE = 9 cm ,

BD = 4.5 cm , DE = 6 cm ,

BA = 6 cm , AC = 8 cm then

Coefficient of similarity between two triangles Δ ABC, Δ DBE = ….



a) 4 : 3 b) 3 : 4

c) 16 : 9 d) 9 : 16

ans. $\frac{12}{9} = \frac{8}{6} = \frac{6}{4.5} = \frac{4}{3} \rightarrow 4:3$ **(a)**

(146) Measure of central angle which drawn on arc its length equal length of diameter of circle nearest degree is ...... °

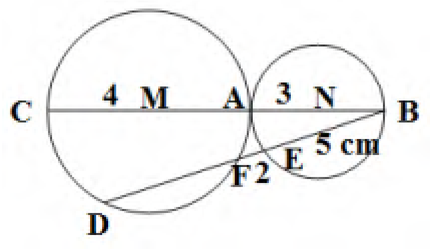
a) 113 b) 115 c) 120 d) 180

ans. $\theta^{rad} = \frac{L}{r} = \frac{2r}{r} = 2$

$2 \times \frac{180}{\pi} \approx 115°$

(147) In the opposite figure : If N is circle of radius 3 cm touch circle M of radius 4 cm at A , EB = 5 cm ,

EF = 2 cm then FD = …. cm



a) 12 b) 7

c) 6 d) 5

ans. $\mathbf{BA \times BC = BF \times BD \rightarrow 6 \times 14 = 17 \times BD \rightarrow BD = 12}$

$\mathbf{FD = 12 - 7 = 5\ cm}$

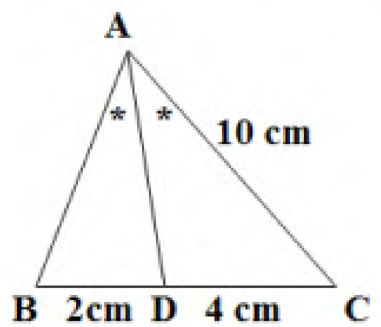
(148) If : tan (180 + 5 θ) + tan (270 + 4 θ) = 0 then value of θ which Satisfy the equation where θ ∈] 0 , 2 π [equals ……..

a) 5 b) 10 c) 20 d) 90

ans. $\mathbf{\tan 5\theta - \cot 4\theta = 0 \rightarrow \tan 5\theta = \cot 4\theta}$

$\mathbf{9\theta = 90 \rightarrow \theta = 10}$

(149) In the opposite figure: If AD interior bisector of ∠ BAC, AC = 10 cm, DC = 4 cm , DB = 2 cm Then length of AD = ….. cm

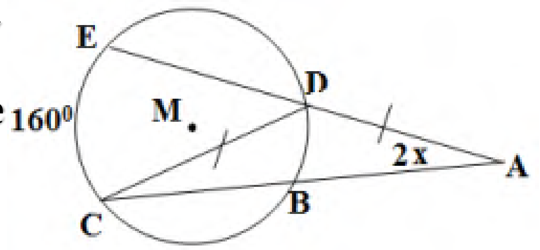


a) 9 b) 5

c) $\sqrt{42}$ d) $\sqrt{58}$

ans. $\mathbf{\frac{AC}{AB} = \frac{DC}{DB}}$, $\mathbf{\frac{10}{AB} = \frac{4}{2}}$, $\mathbf{AD = \sqrt{10 \times 5 - 4 \times 2} = \sqrt{42}}$ **(c)**

(150) In the opposite figure : If M is circle , draw AE cut the circle at D , E , draw AC cut the circle at B , C .



If AD = DC m(CE) = 160° then x = …..°

a) 40 b) 30

c) 20 d) 10

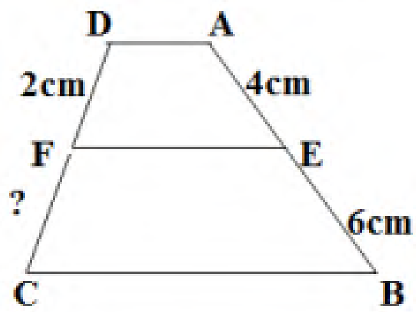
ans. $\mathbf{m\angle(A) = \frac{1}{2}[\, m(\widehat{EC}) - m(\widehat{DB})]}$

$\mathbf{2x = \frac{1}{2}(160 - 4x)}$

$\mathbf{4x = 160 - 4x \rightarrow x = 20}$ **(c)**

(151) In the opposite figure :

If AD // EF // BC AE = 4 cm , EB = 6 cm , DF = 2 cm then the length of CF = …. cm



a) 2 b) 3

c) 4 d) 5

ans. $\mathbf{\frac{AE}{EB} = \frac{DF}{FC} \rightarrow \frac{4}{6} = \frac{2}{FC} \rightarrow \quad FC = 3}$ **(b)**

(152) If the two roots of the equation: $x^2 + (2k+3)x + k^2 = 0$ are real and equal then k = ……

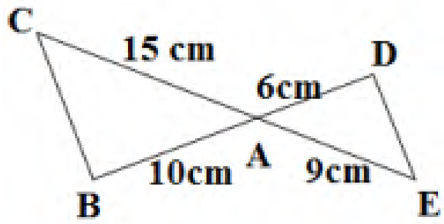
a) $\frac{3}{4}$ b) $-\frac{3}{4}$ c) $\frac{4}{3}$ d) $-\frac{4}{3}$

ans. $\mathbf{b^2 - 4ac = 0}$

$\mathbf{(2k+3)^2 - 4(1)(k^2) = 0}$

$\mathbf{4k^2 + 12k + 9 - 4k^2 = 0 \rightarrow \quad k = -\frac{3}{4}}$ **(b)**

(153) DB ∩ EC = {A } , AE = 9 cm AB = 10 cm , AC = 15 cm , DA = 6 cm, A(Δ ADE) = 36 cm^2



Then A(Δ ABC) = ………. cm^2

a) 60 b) 75

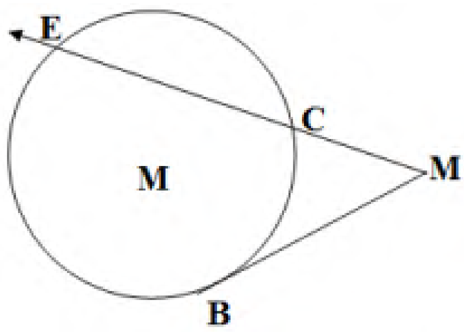
c) 100 d) 225

ans. $\frac{6}{10} = \frac{9}{15}$ then $\frac{AD}{AB} = \frac{AE}{AC}$ and m(∠ DAE) = m(∠ CAB)

Δ DAE ~ Δ BAC

$$\frac{A\,(\Delta\,ADE)}{A\,(\Delta\,ABC)} = \frac{9}{25} = \frac{36}{A\,(\Delta\,ABC)} \rightarrow \quad A\,(\Delta\,ABC) = 100\ cm^2 \quad (c)$$

(154) In the opposite figure : AB touch circle M at B , AE cut circle M at C , E respectively.



If AC = 3 cm, CE = 9 cm

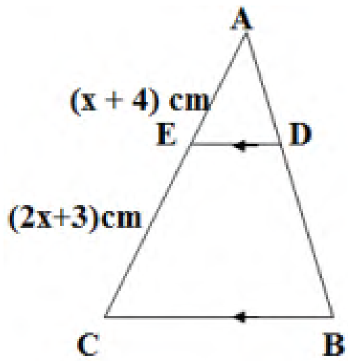
then $P_m(A)$ = …………..

a) 6 b) 9

c) 27 d) 36

ans. $P_M(A) = MC \times ME = 3 \times 12 = 36$ **(d)**

(155) In the opposite figure: If DE // BC , AD : AB = 2 : 5 then x = ….



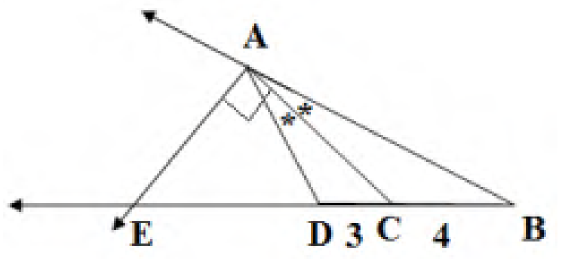
a) 8 b) 6

c) 4 d) 2

ans. $\frac{\mathbf{AD}}{\mathbf{DB}} = \frac{\mathbf{AE}}{\mathbf{EC}} \rightarrow \frac{\mathbf{2}}{\mathbf{3}} = \frac{\boldsymbol{x+4}}{\boldsymbol{2x+3}}$

$\boldsymbol{4x + 6 = 3x + 12 \quad , x = 6}$ **(b)**

(156) In the opposite figure : AC bisector of interior angle of triangle ABD at ∠A , AE ⊥ AC BC = 4cm , CD = 3cm Then BE : ED = ….. : ……



a) 7 : 4 b) 7 : 3

c) 3 : 4 d) 4 : 3

ans. $\overline{\mathbf{AE}}$ **is an exterior bisector**

$\frac{\mathbf{AB}}{\mathbf{AD}} = \frac{\mathbf{CB}}{\mathbf{CD}} = \frac{\mathbf{EB}}{\mathbf{ED}} = \frac{\mathbf{4}}{\mathbf{3}} \rightarrow \mathbf{4:3}$ **(d)**

(157) If (2 i) is one of the roots of quadratic equation : x^2+ a x + b = 0 Where coefficient of its terms are real numbers then

<u>all the following are true except :</u>

a) The second root is $(-2i)$

b) Sum of two roots of the equation equal zero

c) Product of two roots of the equation equal $= -4$

d) Discriminate of the equation < 0

ans. **product =** $\boldsymbol{2i \; x - 2i = -4i^2 = 4}$ **(c)**

(158) If one of the two roots of the equation :

$3x^2 - (k+2)x + k^2 + 2k = 0$ is multiplicative inverse of the other root then k = ….

a) – 3 , 1 b) $-3, -1$ c) $3, -1$ d) 3, 1

ans. $c = a$

$k^2 + 2k - 3 = 0 \rightarrow -3, 1$ **(a)**

(159) If 10 sin x = 6 where x is the greatest positive angle, [0 , 2 π]

Then the numerical value of sec (540 + x) is ....

a) $\frac{3}{5}$ b) $-\frac{5}{4}$ c) $\frac{5}{4}$ d) $-\frac{5}{3}$

ans. $\sin x = \frac{6}{10}$ **in the second quad.** $\cos x = \frac{-8}{10}$

$\sec(540 + x) = \sec(180 + x) = -\sec x = \frac{5}{4}$ **(c)**

(160) If $f(x) = x^2 - 7 + 12$, $x \in$ R **then all the following are true except**

a) Solution set of the equation $f(x) = 0$ is {3, 4}

b) Solution set of the inequality $f(x) > 0$ is R – {3, 4}

c) Solution set of inequality $f(x) < 0$ is] 3, 4 [

d) $f(x)$ is positive at the interval R−] 3, 4[

ans. **R – [3 , 4] (b)**

(161) Range of the function $f(x) = 4$ sin x where $x \in$ [0 , π] is ....

a) $[0, 4]$ b) $[0, 4[$ c) $[-4, 0]$ d) $[-4, 4]$

ans. **[0 , 4] (a)**

(162) The S.S. of the equation $x^2 + x - 6 = 0$ is ......

a) $\{2, 3\}$ b) $\{-3, 2\}$ c) $\{-2, -3\}$ d) $\{3, -2\}$

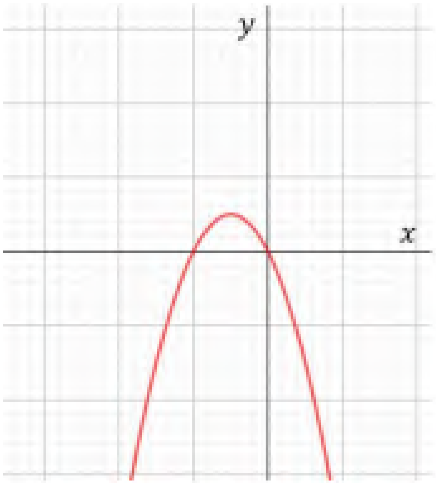
ans. $\{-3, 2\}$ **(b)**

(163) The S.S. of the equation $x^2 = x$ is ......

a) $\{-1\}$ b) $\{0\}$ c) $\{0, 1\}$ d) $\{0, -1\}$

ans. $\mathbf{\{0, 1\}}$ **(c)**

(164) The opposite figure represents the curve of a quadratic function f, then the solution set of equation $f(x) = 0$ is ......

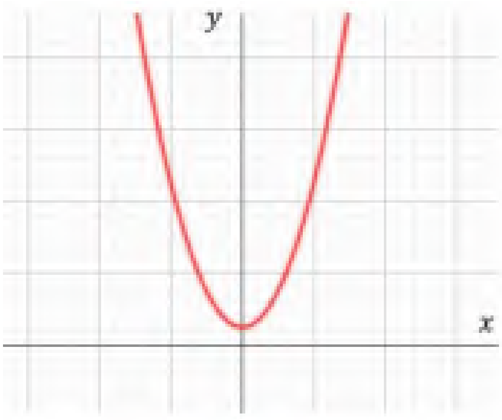


a) $\{-1, 0\}$ b) $\{-1\}$

c) $\{0\}$ d) φ

ans. $\mathbf{\{-1, 0\}}$ **(a)**

(165) The opposite figure represents the curve of a quadratic function f, then the two roots of the function $f(x) = 0$ are ......



a) different real roots

b) equal real roots

c) one of them is real and others is complex

d) two conjugate complex root

ans. **two conjugate complex root (d)**

(166) $i^{2019} =$ ......

a) i b) $-i$ c) 1 d) – 1

ans. $\boldsymbol{i^{2019} = i^{2016+3} = i^3 = -i}$ **(b)**

(167) The conjugate of the number $i + 2$ is ......

a) $i - 2$ b) $2 - i$ c) $- 2 - i$ d) $- i$

<u>**ans.**</u> $\mathbf{2 - i}$ **(b)**

(168) $(1 + i)^8 =$ ....

a) 16 b) $16\,i$ c) – 16 d) $- 16\,i$

<u>**ans.**</u> $\left((\mathbf{1} + \boldsymbol{i})^{\mathbf{2}}\right)^{\mathbf{4}} = (\mathbf{2}\boldsymbol{i})^{\mathbf{4}} = \mathbf{16}$ **(a)**

(169) The conjugate of the number $\frac{13}{3-2i}$ is ....

a) $\frac{13}{3+2i}$ b) $3 - 2\,i$ c) $3 + 2\,i$ d) $-3 - 2\,i$

<u>**ans.**</u> $\frac{\mathbf{13}}{\mathbf{3 - 2}\boldsymbol{i}} = \mathbf{3 + 2}\boldsymbol{i} \rightarrow \mathbf{3 - 2}\boldsymbol{i}$ **(b)**

(170) If the two roots of a quadric equation are $1 + 2\,i$, $1 - 2\,i$, then the quadratic equation is ....

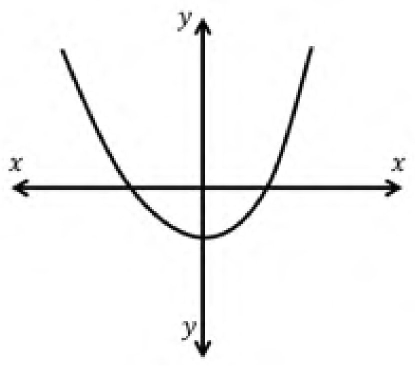
a) $x^2 - 2x + 5 = 0$ b) $x^2 + 2x - 5 = 0$

c) $x^2 - 2x - 5 = 0$ d) $x^2 - 5x + 2 = 0$

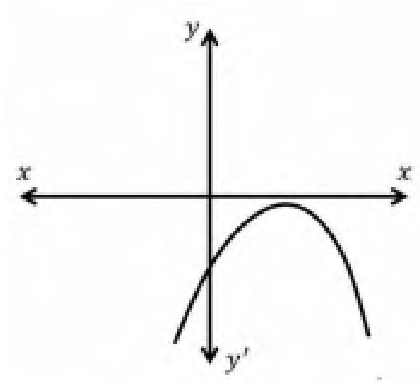
<u>**ans.**</u> **sum = 2 , product = 5 →** $\boldsymbol{x}^{\mathbf{2}} - \mathbf{2}\boldsymbol{x} + \mathbf{5} = \mathbf{0}$ **(a)**

(171) The two roots of the quadratic equations are two real different roots in the figure :

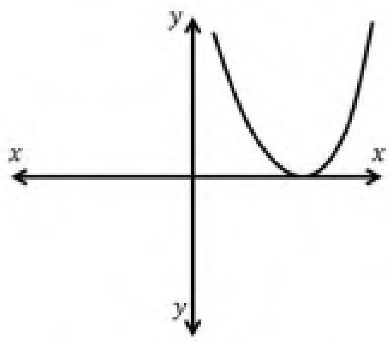
a)



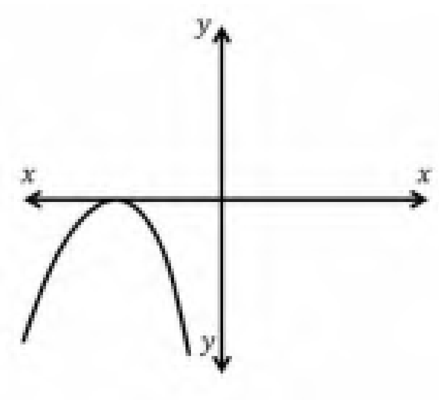
b)



c)



d)



ans. **(a)**

(172) If one root of the quadratic equation $2x^2 - 3x + k = 0$ is the multiplication inverse of the other, then k = ...

a) – 3 b) $\frac{1}{2}$ c) 2 d) 3

ans. **c = a , $k = 2$ (c)**

(173) If $1 + i$ is one of the roots of the equation $x^2 - 2x + a = 0$ then a = ...

a) – 2 b) $-\frac{1}{2}$ c) 0 d) 2

ans. **The other root $\mathbf{1 - i}$**

sum $= (1 + i) + (1 - i) = 2$, product $= (1 + i)(1 - i) = 2$

$x^2 - 2x + 2 = 0 \rightarrow a = 2$ (d)

(174) If $x = 1$ is one of the two roots of the equation $kx^2 + 6x + k = 0$ then k = ...

a) 6 b) 3 c) 2 d) – 3

ans. **$k + 6 + k = 0$, $k = -3$ (d)**

(175) The two roots of the equation $x^2 + 25 = 0$ are ......

a) $\{-5\}$ b) $\{5\}$ c) $\{5, -5\}$ d) $\{5i, -5i\}$

ans. $\{\mathbf{5i, -5i}\}$ **(d)**

(176) The sign of the function f where $f(x) = x - 2$ is positive when $x \in$ ....

a) $]-\infty, 0[$ b) $]0, \infty[$ c) $]0, 2[$ d) $]2, \infty[$

ans. $]\mathbf{2}, \infty[$ **(d)**

(177) The sign of the function f, where $f(x) = 3 - x$ is negative when $x \in$ ......

a) $]3, \infty[$ b) $]-3, \infty[$ c) $]-\infty, 3[$ d) $]-\infty, -3[$

ans. $]\mathbf{3}, \infty[$ **(a)**

(178) The sign of the function f, where $f(x) = x^2 - 2x - 3$ is negative when $\in$ ......

a) $]-\infty, -1[$ b) $]-1, 3[$ c) $\mathbb{R} - [-1, 3]$ d) $]3, \infty[$

ans. $]-\mathbf{1}, \mathbf{3}[$ **(b)**

(179) The function $f(x) = x^2 - 4x + 5$ is positive when $\in$ ......

a) $]-\infty, -2[$ b) $]-\infty, -4[$ c) $\mathbb{R}$ d) $]-4, \infty[$

ans. $\boldsymbol{b^2 - 4ac = 16 - 20 = -4 < 0 \to \mathbb{R}}$ **(c)**

(180) The function $f(x) = -4x^2 + 4x - 1$ is negative when $\in$ ......

a) $\mathbb{R}$ b) $\mathbb{R} - \left\{\frac{1}{2}\right\}$ c) $\left\{\frac{1}{2}, \frac{1}{2}\right\}$ d) $\frac{1}{2}$

ans. $\mathbb{R} - \left\{\frac{\mathbf{1}}{\mathbf{2}}\right\}$ **(b)**

(181) The S.S of $(x - 5)^2 + 3(x - 5) \geq 0$ is ......

a) $]2, 5[$ b) $]2, \infty[$ c) $]-\infty, -4[$ d) $]-4, 2[$

ans. $\boldsymbol{(x - 5)(x - 5 + 3) \geq 0}$

$\boldsymbol{(x - 5)(x - 2) \geq 0 \to]-4, 2[}$ **(d)**

(182) The S.S. of $(x - 5)^2 + 3(x - 5) \geq 0$ is ......

a) $]2, 5[$ b) $\mathbb{R} - [2, 5]$ c) $\mathbb{R} -]2, 5[$ d) $\mathbb{R}$

ans. $\boldsymbol{(x - 5)(x - 2) \geq 0 \to \mathbb{R} -]2, 5[}$ **(c)**

(183) The S.S. of $3x^2 \leq 11x + 4$ is ......

a) $]\frac{-1}{3}, 4[$ b) $[\frac{-1}{3}, 4]$ c) $\mathbb{R} -]\frac{-1}{3}, 4[$ d) $\mathbb{R} - [\frac{-1}{3}, 4]$

ans. $\boldsymbol{3x^2 - 11x - 4 \leq 0 \to \left[\frac{-1}{3}, 4\right]}$ **(b)**

(184) If $f(x) = x + 1, g(x) = 1 - x^2$, then the interval in which the two functions are positive together is ......

a) $]-1,1[$ b) $]-\infty,-1[$ c) $\mathbb{R} - [-1,1]$ d) $]1,\infty[$

ans. $]-\mathbf{1},\mathbf{1}[$ **(a)**

(185) The quadratic equation $7x^2 + 14x + c = 0$ has two equal real roots if c = ...

a) 2 b) 7 c) 28 d) 169

ans. $\boldsymbol{b^2 - 4ac = 0}$

$\mathbf{14^2 - 4(7)c = 0} \rightarrow \boldsymbol{c = 7}$ **(b)**

(186) If L, M are the two roots of the equation $x^2 + 5x + 3 = 0$, then the equation whose two roots L + 1, M + 1 is ......

a) $x^2 + 3x - 1 = 0$ b) $x^2 - 3x + 1 = 0$

c) $x^2 - 3x - 5 = 0$ d) $x^2 + 3x - 5 = 0$

ans. $\mathbf{L + M = -5}$, $\mathbf{L\,M = 3}$

$\mathbf{Sum = L + 1 + M + 1 = L + M + 2 = -3}$

$\mathbf{Product = (L + 1)(M + 1) = L\,M + L + M + 1 = -1}$

$\boldsymbol{x^2 + 3x - 1 = 0}$ **(a)**

(187) The angle of measure $295°$ lies in the ...... quadrant

a) First b) Second c) Third d) Fourth

ans. **Fourth (d)**

(188) The angle of measure $-750°$ lies in the ...... quadrant

a) First b) Second c) Third d) Fourth

ans. $\mathbf{-750°}$ **equivalent** $\mathbf{330°}$ **→ Fourth (d)**

(189) The negative measure the angle whose measure is $260°$ is ......

a) $-10°$ b) $-80°$ c) $-100°$ d) $-120°$

ans. $\mathbf{260 - 360 = -100}$ **(c)**

(190) The negative measure of an angle co – terminal with angle of measure $120°$ is ......

a) $60°$ b) $-60°$ c) $-240°$ d) $-120°$

ans. $\mathbf{120 - 360 = -240}$ **(c)**

(191) The negative measure of an angle co – terminal with an angle of measure $-230°$ is ......

a) $-590°$ b) $-410°$ c) $-130°$ d) $-50°$

ans. $\mathbf{-230 - 360 = -590}$ **(a)**

(192) The smallest positive angle of $-570°$ is ......

a) $-210°$ b) $30°$ c) $150°$ d) $510°$

ans. $\mathbf{-570 + 360 + 360 = 150}$ **(c)**

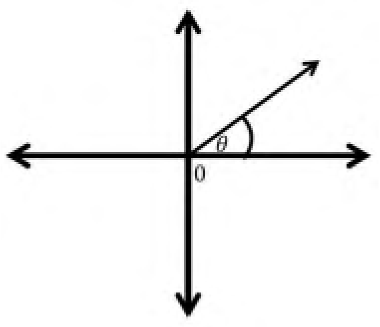
(193) $1^{\text{rad}} =$ ......

a) $\frac{\pi}{8}$ b) $\frac{\pi}{2}$ c) $57°17'45''$ d) $45°17'57''$

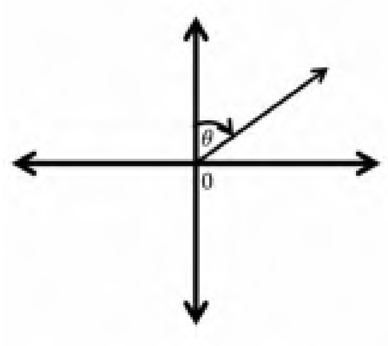
ans. $\mathbf{1 \times \frac{180}{\pi} = 57°17'45''}$ **(c)**

(194) The figure which represents angle θ in the standard position is ......

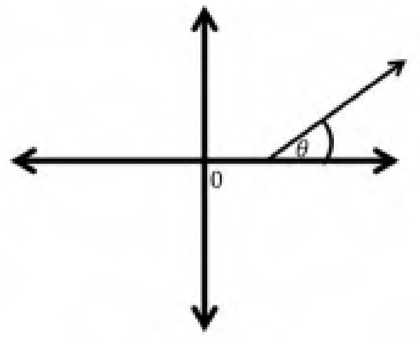
a)



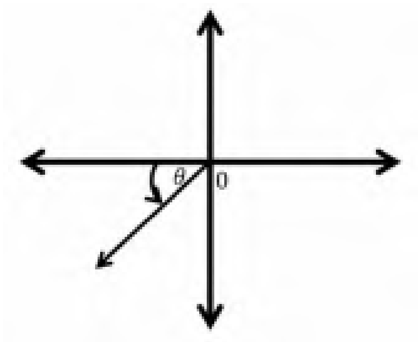
b)



c)



d)



ans. **(a)**

(195) The measure of the length of an arc opposite to a central angle of measure $\frac{5\pi}{12}$ in a circle of radius length 8 cm ≃ ...... cm

a) $\frac{12\pi}{5}$ b) 8 c) 5π d) 10.5

ans. $\mathbf{L = \frac{5\pi}{12} \times 8 \cong 10.5\ cm}$ **(d)**

(196) $1.2^{\text{rad}} \simeq$ ......

a) $\frac{\pi}{3}$ b) $18°45'68''$ c) $68°45'18''$ d) $\frac{\pi}{2}$

ans. $\mathbf{1.2\ rad \times \frac{180}{\pi} = 68°45'18''}$ **(c)**

(197) If the measures of two angles of a triangle are $75°, \frac{\pi}{4}$ then the radian measure of the third angle = ...

a) $\frac{\pi}{6}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{3}$ d) $\frac{5\pi}{12}$

ans. $\mathbf{180 - (75 + 45) = 60° \rightarrow \frac{\pi}{3}}$ **(c)**

(198) The arc length in a circle of diameter length 24 cm and opposite to a central angle of measure $30°$ is ...... cm

a) 2π b) 3π c) 4π d) 5π

ans. $\mathbf{L = 12 \times \frac{\pi}{6} \rightarrow 2\pi}$ **(a)**

(199) The measure of the angle of a regular hexagon is ......

a) $\frac{\pi}{3}$ b) $\frac{2\pi}{3}$ c) $\frac{4\pi}{3}$ d) $\frac{5\pi}{3}$

ans. $\mathbf{120 \times \frac{\pi}{180} \rightarrow \frac{2\pi}{3}}$ **(b)**

(200) All the measures of the following angles are equivalent to the measure $75°$ in the standard position except ....

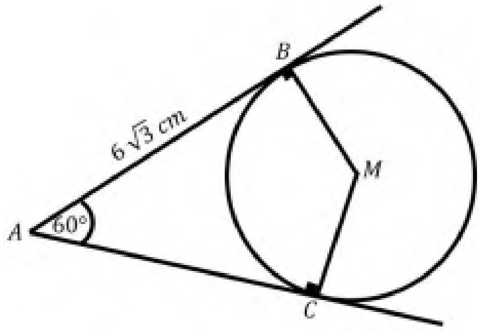
a) $-285°$ b) $-645°$ c) $285°$ d) $435°$

ans. $\mathbf{285°}$ **(c)**

(201) In the opposite:

The length of the greater arc

$\overset{\frown}{BC} = ...$

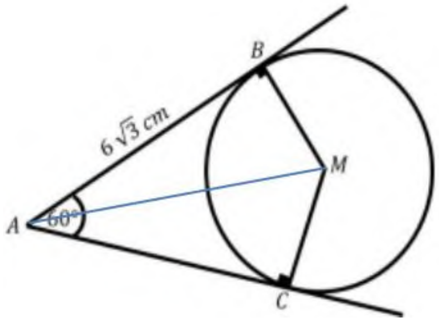


a) 8π cm b) 4π cm

c) $\frac{4}{3}\pi$ cm d) $4\sqrt{3}$ cm

ans. **join $\overline{AM}$, m(∠BAM) = 30°**

$$\tan 30 = \frac{r}{6\sqrt{3}}, r = 6 \text{ cm}$$



m (∠ reflex BMC) = 360 − 120 = 240°

$$L = r \times \theta^{rad} = 6 \times \left(\frac{240 \times \pi}{180}\right)$$

8π cm (a)

(202) If the angle θ drawn in the standard position, and its terminal side intersects the unit circle at $\left(\frac{3}{5}, d\right)$, then $\sin\theta = ...$

a) $\frac{3}{5}$ b) $\frac{4}{5}$ c) $-\frac{4}{5}$ d) $\pm\frac{4}{5}$

ans. $\sin\theta = \pm\frac{4}{5}$ **(d)**

(203) If $\tan(180° + \theta) = 1$, θ is the measure of the smallest (+ve) angle, then = ...

a) 45° b) 225° c) 135° d) 315°

ans. $\tan\theta = 1 \rightarrow \theta = 45°$ **(a)**

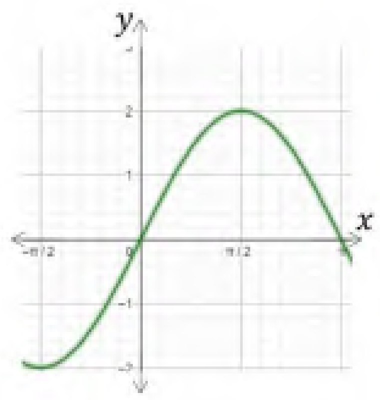
(204) If $\sin 2A = \cos 4A$, where A is positive acute angle then $\cos(90° - 2A) = ...$

a) 0 b) $\frac{\sqrt{3}}{2}$ c) $\frac{1}{2}$ d) $\frac{1}{\sqrt{2}}$

ans. $\mathbf{2A + 4A = 90° \rightarrow 6A = 90° \rightarrow A = 15°}$

$\mathbf{\cos(90 - 30) = \frac{1}{2}}$ **(c)**

(205) The opposite graph represents the function ....



a) $2\sin x$ b) $\frac{1}{2}\sin x$

c) $\sin 2x$ d) $\sin\frac{x}{2}$

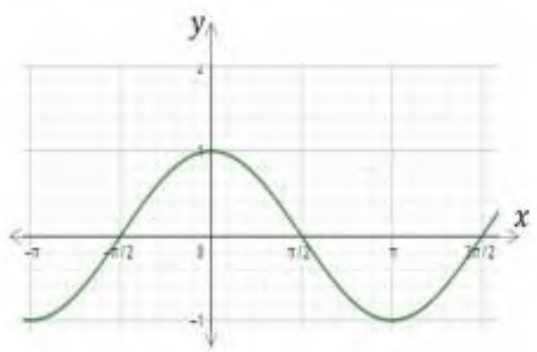
ans. $\mathbf{2\sin x}$ **(a)**

(206) $\cos 2\theta \in ......$, where $\theta \in [-2\pi, 2\pi]$

a) $[-1, 1]$ b) $[-\infty, \infty[$ c) $]-1, 1[$ d) $[-2, 2]$

ans. $\mathbf{[-1, 1]}$ **(a)**

(207) The opposite graph represents the function ......



a) $\cos x$ b) $\cos\frac{x}{2}$

c) $\sin x$ d) $2\cos x$

ans. $\mathbf{\cos x}$ **(a)**

(208) If the ratio between the perimeters of two similar polygon is $\frac{4}{9}$, then the ratio between their areas is ......

a) $\frac{2}{3}$ b) $\frac{4}{9}$ c) $\frac{16}{81}$ d) $\frac{8}{9}$

ans. $\left(\frac{4}{9}\right)^2 = \frac{16}{81}$ **(c)**

(209) If the ratio between the area of two similar polygon is $\frac{25}{64}$, then the ratio between their perimeters is ......

a) $\frac{5}{8}$ b) $\frac{25}{64}$ c) $\frac{\sqrt{5}}{2\sqrt{2}}$ d) $\frac{25}{8}$

ans. $\frac{\text{perimeter}}{\text{perimeter}} = \frac{\sqrt{25}}{\sqrt{64}} \rightarrow \frac{5}{8}$ **(a)**

(210) $\frac{\sec 40°}{\csc 50°} + \frac{\sin 50°}{\cos 40°} + \frac{\tan 100°}{\tan 80°} =$ ......

a) – 1 b) 1 c) 2 d) 3

ans. $1 + 1 - 1 = 1$ **(b)**

(211) If $\sin 2\theta = \cos \theta$, then the general solution is ......

a) $\{30°, 90°\}$ b) $\left\{-\frac{\pi}{2}, -2n\pi\right\}$

c) $\left\{\frac{\pi}{6}, \frac{2n\pi}{3}\right\}$ d) $\left\{\frac{\pi}{2} + 2n\pi, \frac{\pi}{6} + \frac{2n\pi}{3}\right\}$

ans. $2\theta \pm \theta = 90 + 2\,n\pi$

$3\theta = 90 \rightarrow \quad \theta = 30\ , \theta = 90 \ \rightarrow \quad \{30°, 90°\}$ **(a)**

(212) $\sin\left(\theta - \frac{\pi}{2}\right) =$ ....

a) $\cos\theta$ b) $-\cos\theta$ c) $\sin\theta$ d) $-\sin\theta$

ans. $\sin\left(\theta - \frac{\pi}{2}\right) = -\sin\left(\frac{\pi}{2} - \theta\right) \rightarrow -\cos\theta$ (b)

(213) $\tan 1° \times \tan 2° \times \tan 3° \times \ldots \times \tan 89° = \ldots\ldots$

a) 1 b) zero c) – 1 d) ∞

ans. $\tan 89 = \tan(90 - 1) = \cot 1, \ldots\ldots$

$\tan(1) \times \tan(2) \times \ldots\ldots \times \tan(45) \times \ldots\ldots \times \cot(2) \times \cot(1) \rightarrow$ 1 (a)

(214) $\sin 1° + \sin 2° + \sin 3° + \sin 4° + \ldots + \sin 360° = \ldots\ldots$

a) – 1 b) zero c) $\frac{1}{\sqrt{2}}$ d) 1

ans. $\sin 359 = \sin(360 - 1) = -\sin 1, \ldots\ldots$

$\sin 1 + \sin 2 + \ldots\ldots - \sin 2 - \sin 1 + 0 = 0 \rightarrow$ zero (b)

(215) $\cos 0° + \cos 1° + \cos 2° + \ldots + \cos 360° = \ldots\ldots$

a) – 1 b) zero c) 1 d) 2

ans. $\cos 179 = \cos(180 - 1) = -\cos 1, \ldots\ldots$

$\cos 181 = \cos(180 + 10) = -\cos 1, \cos 359 = \cos(360 - 1)$

$= \cos 1, \ldots\ldots$

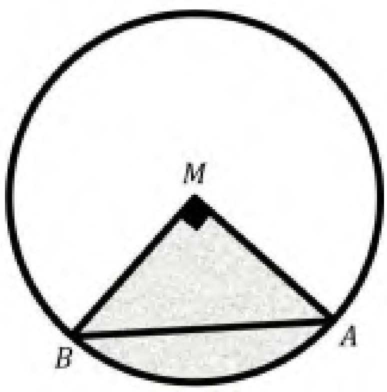
$\cos 0 + \cos 1 + \ldots\ldots - \cos 1 + \cos(180) + \ldots\ldots + \cos(360) = 1$ (c)

(216) If $2\sin x - 1 = 0, x \in [0, 2\pi]$ then $\in \ldots\ldots$

a) $\left\{\frac{\pi}{6}\right\}$ b) $\left\{\frac{5\pi}{6}\right\}$ c) $\left\{\frac{\pi}{6}, \frac{5\pi}{6}\right\}$ d) $\left[0, \frac{\pi}{2}\right]$

ans. $\sin x = \frac{1}{2} \rightarrow x = 30° \text{ or } x = 150° \rightarrow \left\{\frac{\pi}{6}, \frac{5\pi}{6}\right\}$ (c)

(217) If the area of Δ AMB $= 32\ \text{cm}^2$ then the perimeter of the shaded region is ......



a) 24 b) $16 + 8\sqrt{2}$

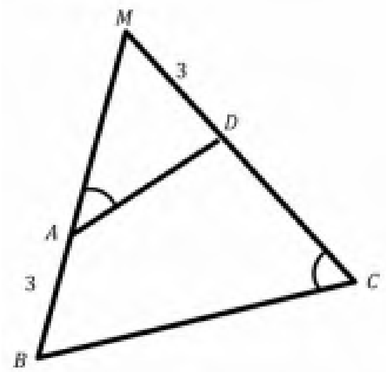
c) $16 + 4\pi$ d) $4 + 16\pi$

ans. $\frac{1}{2}r^2 = 32 \rightarrow r = 8$

$$L = r \times \theta^{\text{rad}} = 8 \times \frac{90 \times \pi}{180} = 4\pi \rightarrow 16 + 4\pi \quad \text{(c)}$$

(218) If ABCD is a cyclic quad

Area of Δ MAD : Area of quad D = ...



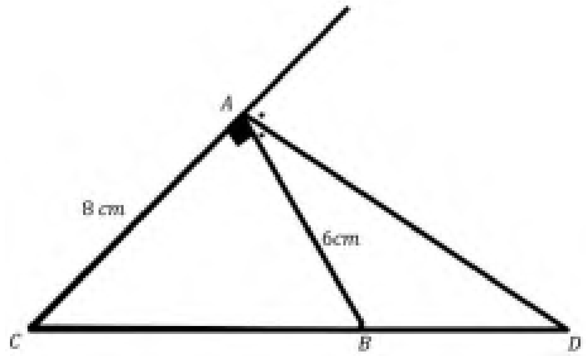
a) $\frac{9}{49}$ b) $\frac{40}{49}$

c) $\frac{9}{40}$ d) $\frac{40}{9}$

ans.

(219) In the opposite figure:

A(Δ ABD) = ...



a) 36 b) 48

c) 54 d) 72

ans. $\text{BC} = \sqrt{36 + 64} = 10 \quad h = 4.8\ \text{cm}$

$$\frac{AB}{AC} = \frac{DB}{DC} = \frac{6}{8} = \frac{DB}{DB + 10} \rightarrow BD = 30$$

$$A\ (\Delta\ ABD) = \frac{1}{2} BD \times h = \frac{1}{2} \times 30 \times 4.8 = 72\ cm^2$$

$$\text{or } \frac{A\ (\Delta\ ABC)}{A\ (\Delta\ ABD)} = \frac{BC}{BD} = \frac{2}{6} \quad \text{(have a common vertex)}$$

$$\frac{\frac{1}{2} \times 8 \times 6}{A\ (\Delta\ ABD)} = \frac{2}{6}\ ,\ A\ (\Delta\ ABD) = 72\ cm^2 \quad \text{(d)}$$

(220) The curve of sin wave is symmetric about ......

a) $x - axis$ b) $y - axis$ c) original point d) y = 1

ans. **original point (c)**

(221) The curve of $f(x) = \cos x$ is symmetric about ......

a) $x - axis$ b) $y - axis$ c) original d) $y = -1$

ans. $\boldsymbol{y - axis}$ **(b)**

(222) The range of the function $f(x) = \sin x$ is ......

a) $[0, 2\pi]$ b) $]-1, 1[$ c) $[-1, 1]$ d) $[-2\pi, 2\pi]$

ans. $[-1, 1]$ **(c)**

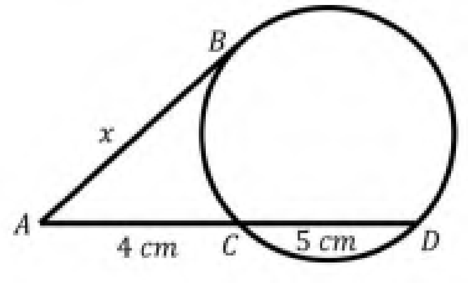
(223) If $\sin x = \frac{9}{4}, 90° \le x \le 180°$, then $\tan(360° - x) = ...$

a) $-\frac{4}{3}$ b) $-\frac{3}{4}$ c) $\frac{3}{4}$ d) $\frac{4}{3}$

ans. $\frac{\sin x\ 4}{5}\ ,\ \tan(360 - x) = -\tan x \to \frac{-4}{3}$ **(a)**

(224) In the opposite:

$x =$ ...... cm



a) 3 b) 6

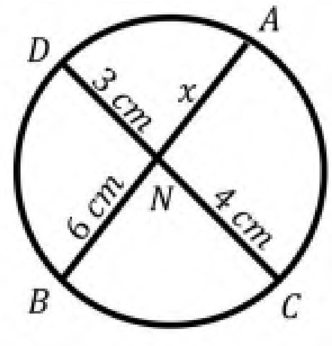
c) 9 d) 36

ans. $(AB)^2 = AC \times AD$

$\boldsymbol{x^2 = 4 \times 9 \rightarrow x = 6}$ **(b)**

(225) In the opposite figure:

$x =$ ...... cm



a) 2 b) 4

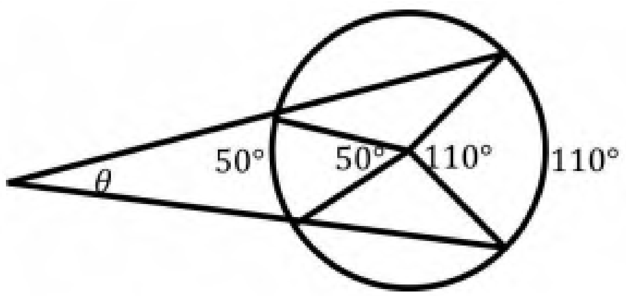
c) 12 d) 8

ans. $\mathbf{AN \times N = DN \times NC}$

$\boldsymbol{6x = 12 \rightarrow x = 2}$ **(a)**

(226) In the opposite figure:

$\theta =$ ...... °



a) 30° b) 50°

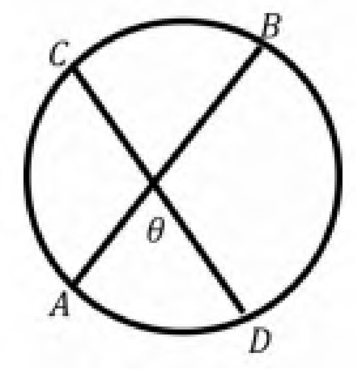
c) 60° d) 160°

ans. $\boldsymbol{\theta = \frac{1}{2}(110 - 50) \rightarrow 30°}$ **(a)**

(227) In the opposite figure:

If $m(\widehat{CB}) = \frac{1}{2}\, m\,(\widehat{AD}) = 60°$

then = ... °



a) 45° b) 90°

c) 120° d) 105°

ans. $\theta = \frac{1}{2}(60 + 120) \rightarrow 90°$ **(b)**

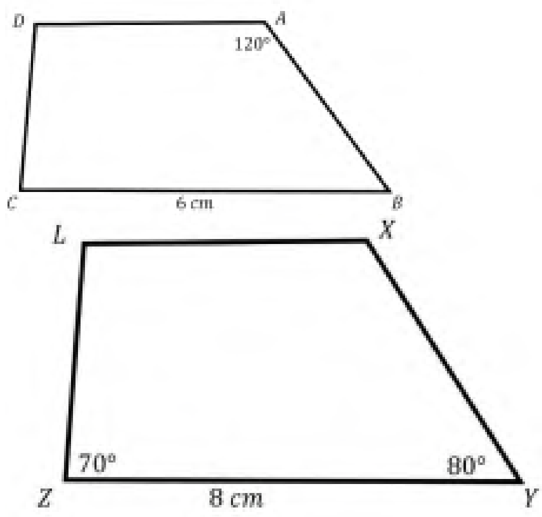
(228) In the opposite figure:

If the polygon ABCD ~ XYZL

If the perimeter of ABCD = 24 cm

, then the perimeter of polygon

XYZL = ... cm



a) 16 b) 18

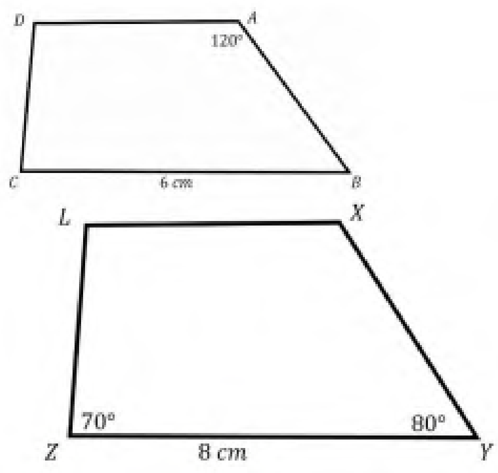
c) 32 d) 64

ans. $\frac{24}{\text{perimeter XYZL}} = \frac{6}{8} \rightarrow 32$ **(c)**

(229) In the opposite figure:

If the two polygons are similar

$m(\angle X) = ...$



a) 70° b) 80°

c) 90° d) 120°

ans. $m(\angle X) = m(\angle A) \rightarrow \mathbf{120^\circ}$

(230) In the opposite figure:

If the polygon ABCD ~ XYZL

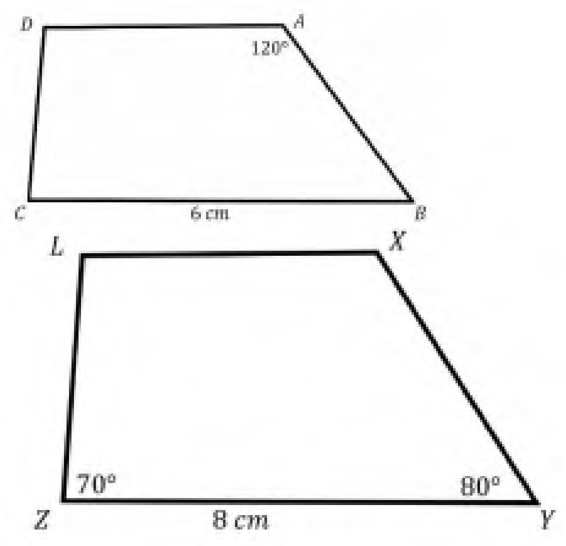
If the area of ABCD $= 36\ \text{cm}^2$

,then the area of the polygon

XYZL = ... cm

a) 24 b) 32

c) 48 d) 64



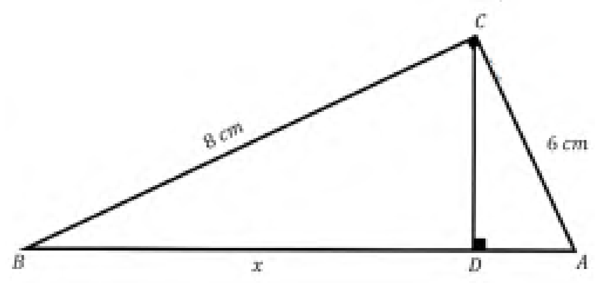
ans. $\left(\frac{6}{8}\right)^2 = \frac{9}{16} = \frac{36}{\text{area XYZL}} \rightarrow \mathbf{64}$ **(d)**

(231) In the opposite figure:

$x =$ ...... cm

a) 6.4 b) 3.6

c) 10 d) 4.8



ans. $(\mathbf{CB})^2 = \mathbf{BD} \times \mathbf{BA}$

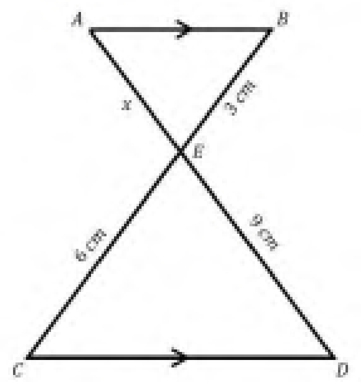
$\mathbf{64} = \boldsymbol{x} \times \mathbf{10} \rightarrow \mathbf{6.4}$ **(a)**

(232) In the opposite figure:

$x =$ ...... cm

a) 2 b) 3

c) 4.5 d) 5



ans. $\frac{\mathbf{3}}{\mathbf{6}} = \frac{\boldsymbol{x}}{\mathbf{9}} \rightarrow \mathbf{4.5}$ **(c)**

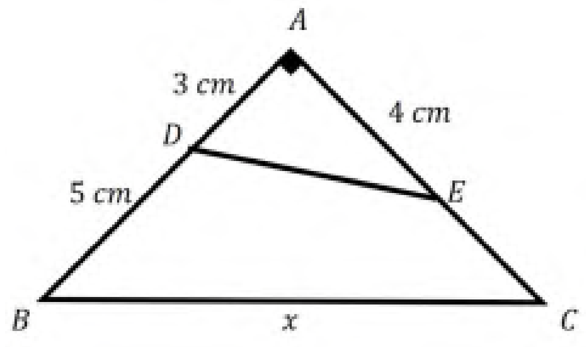
(233) In the opposite figure:

DECB is cyclic quadrilateral,

$x =$ ....

a) 5 b) 8

c) 9 d) 10



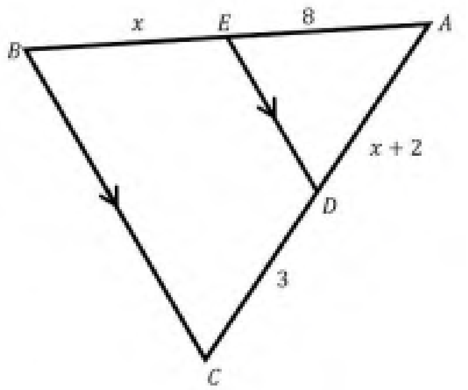
ans. $\frac{4}{8} = \frac{5}{x} \rightarrow$ **10 (d)**

(234) In the opposite figure:

$x =$ ...... cm

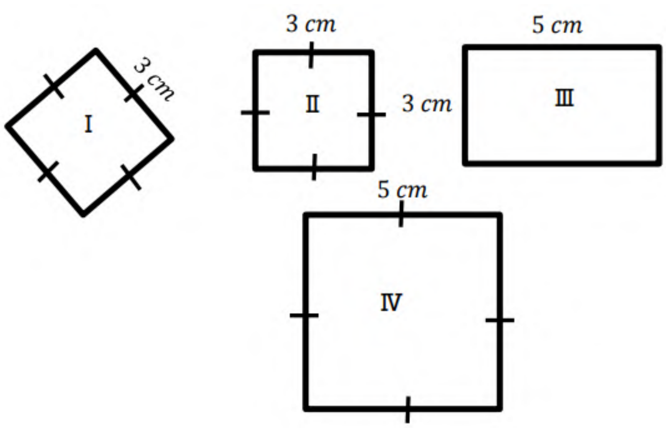
a) – 6 b) 3

c) 4 d) 6



ans. $\frac{8}{x} = \frac{x+2}{3}$, $x^2 + 2x = 24 \rightarrow$ $x = 4$ **(c)**

(235) Which of the following are similar ......



a) I , II b) II , IV c) I , III d) I , IV

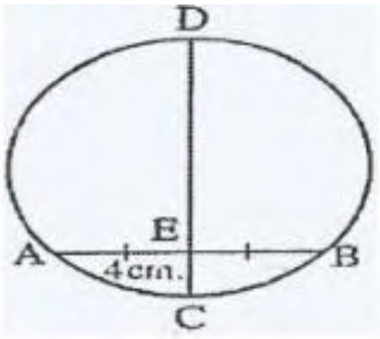
ans. **II , IV (b)**

(236) The ratio between two perimeters of two similar triangle is 4 : 9, then the ratio between their area is ......

a) 4 : 9 b) 2 : 3 c) 16 : 81 d) 9 : 4

ans. **16 : 81 (c)**

(237) In the opposite figure:



AB = 12 cm, CE = 4 cm, then ED = ...

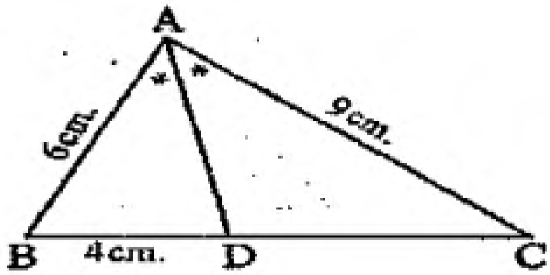
a) 5 b) 6

c) 8 d) 9

ans. $\mathbf{AE \times EB = DE \times EC}$

$\mathbf{6 \times 6 = 4 \times ED \rightarrow ED = 9}$ **(d)**

(238) In the opposite figure:



AC = 9 cm, AB = 6 cm, BD = 4 cm

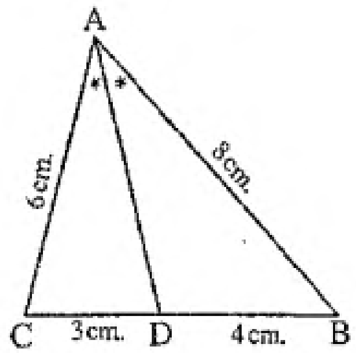
, then BC = ...

a) 12 b) 16

c) 8 d) 10

ans. $\mathbf{\frac{6}{9} = \frac{4}{DC} \rightarrow DC = 6\ cm \rightarrow BC = 10\ cm}$

(239) In the opposite figure:



AD = ... cm

a) 4 b) 8

c) 6 d) 5

ans. $AD = \sqrt{6 \times 8 - 3 \times 4} = 6$ **(c)**

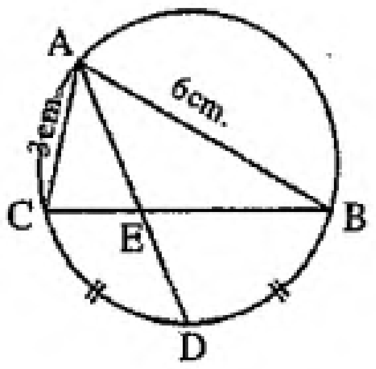
(240) In the opposite figure:

AB = 6 cm, AC = 3 cm, then

CE : CB = ...

a) 1 : 2 b) 1 : 3

c) 3 : 1 d) 2 : 1



ans. $\overline{AD}$ **bisects** $(\angle CAB) \rightarrow \frac{CE}{EB} = \frac{3}{6} = \frac{1}{2} \rightarrow$ **CE:CB = 1:3 (b)**

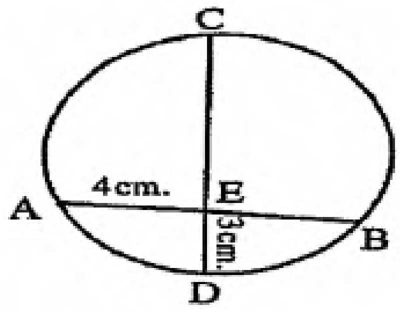
(241) In the opposite figure if:

i) AE = 4 cm, AB = 10 cm, ED = 3 cm

then CD = ... cm

a) 8 b) 5

c) 11 d) 24



ii) If $m(\angle AED) = 70°, m(\widehat{AD}) = 50°$, then $(\widehat{BC}) = ...$

a) 70 b) 90 c) 100 d) 140

ans. **i)** $AE \times EB = BE \times EC$

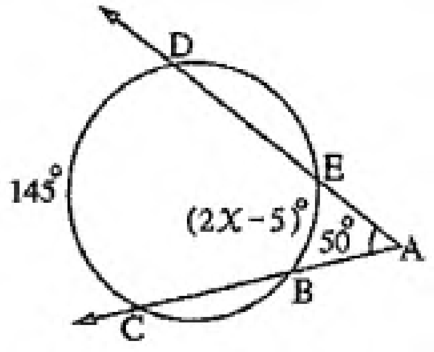
$4 \times 6 = 3 \times EC$, $EC = 8$ cm $\rightarrow CD = 8 + 3 = 11$ **(c)**

ii) $2 \times 70 = 50 + m(\widehat{CB}) \rightarrow m(\widehat{CB}) = 90$ **(b)**

(242) In the opposite figure:

$m(\widehat{CD}) = 145°, m(\widehat{EB}) = 2(x - 5)°$

and $(\angle A) = 50°$, then $x =$ .... °



a) 80 b) 50

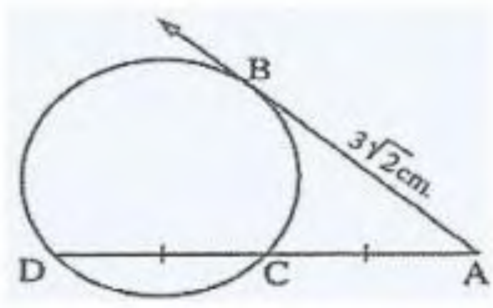
c) 25 d) 15

ans. $\mathbf{2\, m(\angle A) = m(\angle \widehat{DC}) - m(\widehat{EB})}$

$\mathbf{100 = 145 - (2x - 5) \rightarrow x = 25°}$ **(c)**

(243) In the opposite figure:

$\overrightarrow{AB}$ is a tangent to the circle and C is midpoint of $\overline{AD}$, then CD = ... cm



a) 9 b) 3

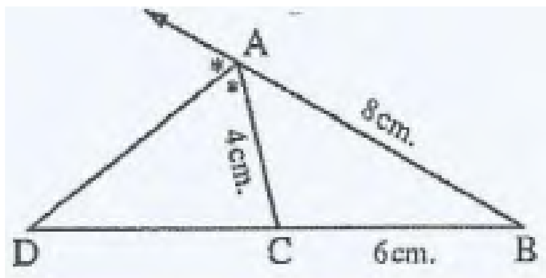
c) $\frac{1}{3}$ d) $\frac{1}{9}$

ans. **Let CD =** $\boldsymbol{x}$

$\mathbf{(AB)^2 = AC \times AD \rightarrow \left(3\sqrt{2}\right)^2 = x(2x) \rightarrow CD = 3\ cm}$

(244) In the opposite figure If:

$\overrightarrow{AD}$ bisects exterior ∠ A, then



i) CD = ... cm

a) 2 b) 6

c) 4 d) 8

ii) AD = ... cm

a) $2\sqrt{10}$ b) 40 c) $4\sqrt{10}$ d) $10\sqrt{2}$

ans. **i) Let CD = x**

$$\frac{\mathbf{AB}}{\mathbf{AC}} = \frac{\mathbf{DB}}{\mathbf{DC}} \rightarrow \frac{\mathbf{8}}{\mathbf{4}} = \frac{\mathbf{6}+\boldsymbol{x}}{\boldsymbol{x}} \rightarrow \boldsymbol{x} = \mathbf{6} \quad \text{(b)}$$

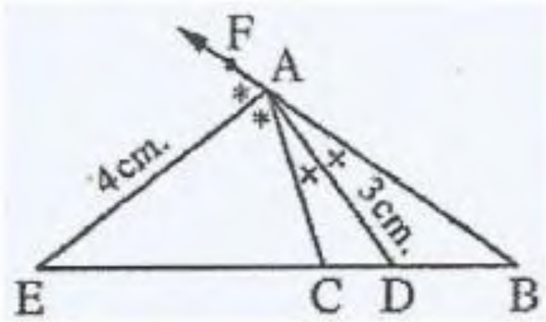
ii) $\mathbf{AD} = \sqrt{\mathbf{12}\boldsymbol{x}\mathbf{6} - \mathbf{8}\ \boldsymbol{x}\ \mathbf{4}} = \mathbf{2}\sqrt{\mathbf{10}}$ **(a)**

(245) $\overrightarrow{AD}$ bisects ∠ A internally,

$\overrightarrow{AE}$ bisects ∠ A externally

AD = 3 cm, AE = 4 cm, then

DE = ... cm



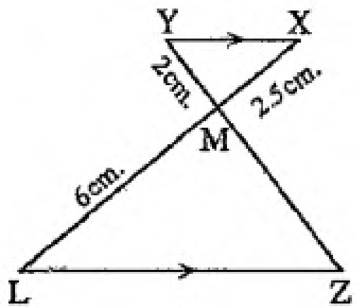
a) 3 b) 4

c) 5 d) 6

ans. $\overline{\mathbf{AE}}$ **and** $\overline{\mathbf{AD}}$ **are two bisectors** $\rightarrow \overline{\mathbf{AE}} \perp \overline{\mathbf{AD}} \rightarrow \mathbf{ED} = \sqrt{\mathbf{9}+\mathbf{16}} = \mathbf{5}$ **(c)**

(246) In the opposite figure:

Length of $\overline{MZ}$ = ... cm

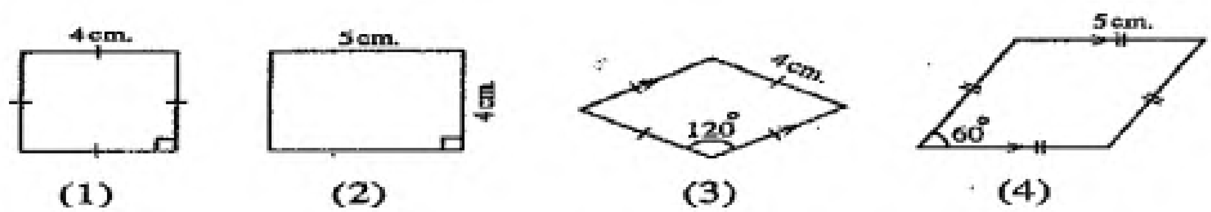


a) 3.6 b) 4.2

c) 4 d) 4.8

ans. $\frac{\mathbf{2}}{\mathbf{MZ}} = \frac{\mathbf{2.5}}{\mathbf{6}} \rightarrow \mathbf{MZ} = \mathbf{4.8\ cm}$

(247) Which two polygons of the following are similar?

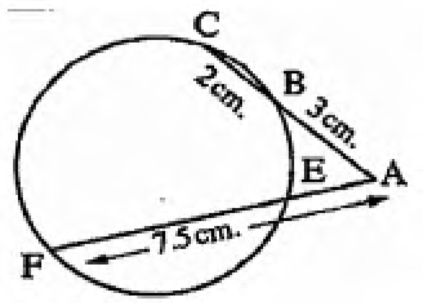


a) polygons **(1), (2)** b) polygons **(1), (3)**

c) polygons **(3), (4)** d) polygons **(2), (4)**

ans. polygons (3), (4) (c)

(248) In the opposite figure:



AB = 3 cm, BC = 2 cm, AF = 7.4 cm

Find the length of : $\overline{EF}$

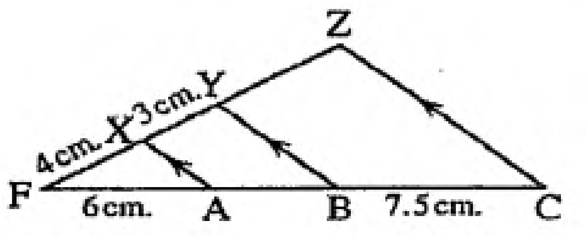
a) 2 b) 3

c) 5.5 d) 7.5

ans. $\mathbf{AB \times AC = AE \times AF \rightarrow 3 \times 5 = x \times 7.5 \rightarrow x = 2}$

$\mathbf{EF = 7.5 - 2 = 5.5\ cm}$ **(c)**

(249) In the opposite figure:



$\overline{AX} \,//\, \overline{BY} \,//\, \overline{CZ}$, XY = 3 cm,

FA = 6 cm , BC = 7.5 cm , FX = 4 cm

Then: $\frac{AB}{ZY} = ...$

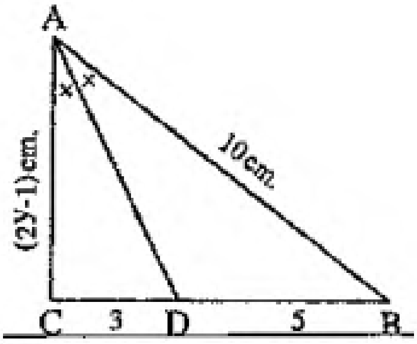
a) 4.5 b) 5

c) 9.5 d) 10.5

ans. $\mathbf{\frac{FX}{XY} = \frac{FA}{AB} \rightarrow \frac{4}{3} = \frac{6}{AB} \rightarrow AB = 4.6\ cm}$

$\mathbf{\frac{XY}{YZ} = \frac{AB}{BC} \rightarrow \frac{3}{YZ} = \frac{4.5}{7.5} \rightarrow YZ = 5 \Longrightarrow \frac{AB}{YZ} = \frac{4.5}{5} = 0.9}$

(250) In the opposite figure:



$\overrightarrow{AD}$ bisects $\angle A$, $\frac{BD}{DC} = \frac{5}{3}$

If AB = 10 cm, AC = $(2\,y - 1)$ cm

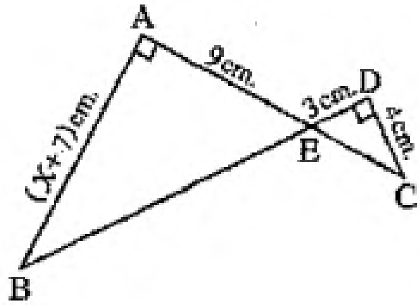
then y = ... cm

a) 1.5 b) 3.5

c) 6 d) 10

ans. $\mathbf{\frac{10}{2y-1} = \frac{5}{3} \rightarrow 2y - 1 = 6 \rightarrow y = 3.5}$ **(b)**

(251) In the opposite figure:



$\overline{BA} \perp \overline{AE}$, $\overline{CD} \perp \overline{DE}$,

AB $= (x + 7)$ cm, AE = 9 cm,

ED = 3 cm, DC = 4 cm

Find the value of : x

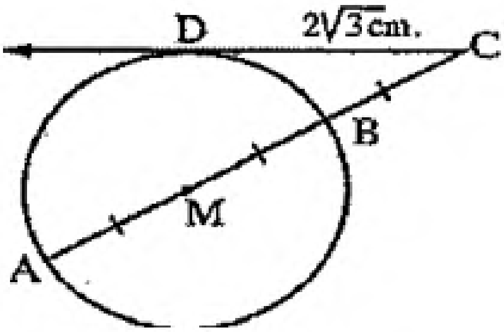
a) 3 b) 4

c) 5 d) 7

ans. **Δ CDE ~ Δ BAE**

$\mathbf{\frac{4}{x+7} = \frac{3}{9} \rightarrow x + 7 = 12 \rightarrow x = 5}$ **(c)**

(252) In the opposite figure:



$\overrightarrow{CD}$ is tangent to circle M,

AM = MB = BC , DC = $2\sqrt{3}$

Find the diameter length of the circle M

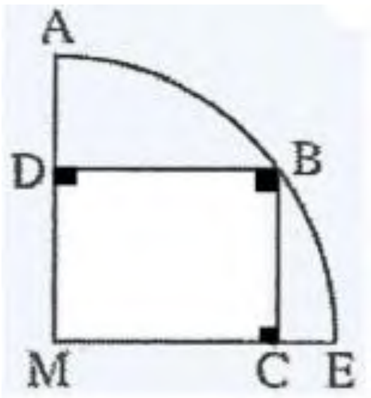
a) $4\sqrt{3}$ b) 4

c) 6 d) 10

ans. Let BC = MB = MA = x

$$\left(2\sqrt{3}\right)^2 = x\,(3x) \rightarrow \quad x = 2 \rightarrow \text{diameter} = 4 \text{ cm}$$

(253) In the opposite figure:



A quarter circle, BCMD is a rectangle, which is drawn inside it, where CD = 10 cm,

Find the length of arc : $\widehat{ABE}$ = ...

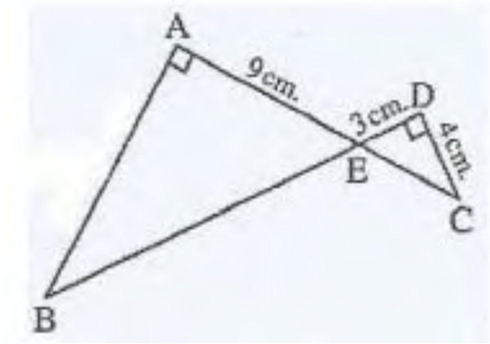
a) 5π b) 10π

c) 14 d) 20π

ans. $\boldsymbol{r = 10}$ **cm**

$$\mathrm{L} = r \times \theta^{\text{rad}} = \mathbf{10} \times \frac{\mathbf{90\pi}}{\mathbf{180}} = \mathbf{5\,\pi} \quad \text{(a)}$$

(254) In the opposite figure:



$\overline{BA} \perp \overline{AE}$, $\overline{CD} \perp \overline{DE}$, AE = 9 cm,

ED = 3 cm, DC = 4 cm

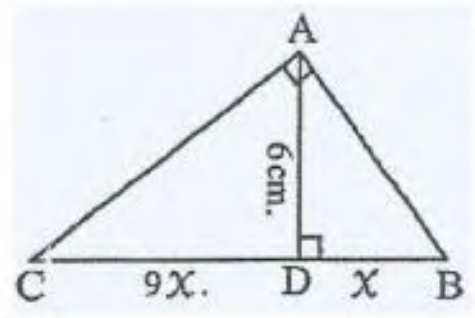
Find the length of : $\overline{EB}$ = ...

a) 6 b) 8

c) 12 d) 14

ans. Δ **CDE ~** Δ **BAE** $\rightarrow \frac{3}{9} = \frac{5}{EB} \rightarrow$ **EB = 15 (d)**

(255) In the opposite figure:



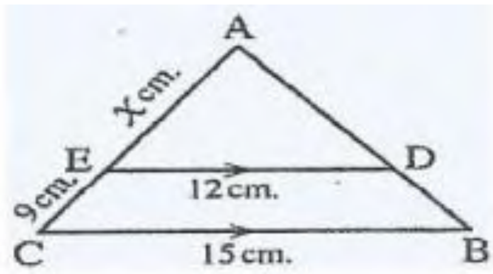
The value of = ...

a) 2 b) 4

c) 6 d) 8

ans. $(AD)^2 = x\,(9x) \rightarrow 36 = 9\,x^2 \rightarrow x = 2$ **(a)**

(256) In the opposite figure:



x = ...

a) 32 b) 40

c) 36 d) 10

ans. $\frac{x}{9 + x} = \frac{12}{15} \rightarrow 15x = 108 + 12x \rightarrow x = 36$ **(c)**

(257) If L, M are the two roots of the equation $x^2 - 7x + 3 = 0$ then

$L^2 + M^2$ = ...

a) 3 b) 7 c) 40 d) 43

ans. $L^2 + M^2 = (L + M)^2 - 2\,L\,M = (7)^2 - 2\,(3) = 43$ **(d)**

(258) If the two roots of the equation $x^2 + 3x - m = 0$ are real different then m = ...

a) – 9 b) – 2.25 c) – 3 d) – 2

ans. $\boldsymbol{b^2 - 4ac > 0 \rightarrow 9 + 4m > 0 \rightarrow m > \frac{-9}{4} \rightarrow -2}$ **(d)**

(259) If the two roots of the equation $3x^2 - (k+2)x + k^2 + 2k = 0$ is the multiplication inverse of the other, then $k \in$ ....

a) $\{-3, 1\}$ b) $\{-3, -1\}$ c) $\{3, -1\}$ d) $\{3, 1\}$

ans. $\boldsymbol{c = a}$

$\boldsymbol{k^2 + 2k = 3}$

$\boldsymbol{k^2 + 2k - 3 = 0 \rightarrow k = -3, k = 1 \rightarrow \{-3, 1\}}$ **(a)**

(260) If $f(x) = x^2 - 7x + 12$ then $(x) \leq 0$, in ......

a) $[3, 4]$ b) $\mathbb{R} - [3, 4]$ c) $]3, 4[$ d) $\mathbb{R} -]3, 4[$

ans. $\boldsymbol{[3, 4]}$ **(a)**

(261) If the two roots of the equation $kx^2 - 12x + 9 = 0$ are equal if ....

a) $k < 4$ b) $k = 4$ c) $k > 4$ d) $k = 144$

ans. $\boldsymbol{b^2 - 4ac = 0 \rightarrow 144 - 36k = 0 \rightarrow k = 4}$ **(b)**

(262) If $x = -3$ is one of the roots of the equation:

$2x^2 + kx - 3 = 0$, then = ...

a) – 5 b) 5 c) 3 d) – 3

ans. $\boldsymbol{18 - 3k - 3 = 0 \rightarrow 3k = 15 \rightarrow k = 5}$ **(b)**

(263) If 3 and 4 are the roots of the equation: $x^2 + ax + b = 0$

then $a + b =$ ....

a) 5 b) – 5 c) 12 d) – 12

ans. **sum = 7 , product = 12**

$\boldsymbol{x^2 - 7x + 12 = 0}$

$\boldsymbol{a = -7 , b = 12 \rightarrow a + b = 5}$ **(a)**

(264) $(1 + i)^4 - (1 - i)^4 =$ ......

a) 8 b) – 8 c) 4 d) zero

ans. $\boldsymbol{\left((1 + i)^2\right)^2 - \left((1 - i)^2\right)^2 = -4 - (-4) = 0 \rightarrow}$ **zero (d)**

(265) If $2x - y + (x - 2y)i = 5 + i$, then $(x, y) =$ ......

a) $(1, 3)$ b) $(3, 1)$ c) $(-3, 1)$ d) $(3, -1)$

ans. $\boldsymbol{2x - y = 5 \rightarrow x - 2y = 1 \rightarrow (x, y) = (3, 1)}$ **(b)**

(266) If the two roots of the equation: $kx^2 - 8x + 16 = 0$ are complex and not real then ∈ ......

a) $]1, \infty[$ b) $]-1, \infty[$ c) $]-\infty, 1[$ d) $]-\infty, -1[$

ans. $\boldsymbol{b^2 - 4ac < 0 \rightarrow 64 - 64k < 0 \rightarrow k > 1 \rightarrow k \in]1, \infty[}$ **(a)**

(267) The two roots of the equation: $x + \frac{4}{x} = 4$ where $x \neq 0$ are ......

a) Real and different b) Real and equal

c) Complex and not real d) Two conjugate

ans. $\boldsymbol{x^2 - 4x + 4 = 0 \rightarrow b^2 - 4ac = 0 \rightarrow}$ **Real and equal (b)**

(268) If the two roots of the equation $8x^2 - ax + 3 = 0$ are positive and the ration between them is 2 : 3, then a = ...

a) 1 b) – 1 c) – 10 d) 10

ans. **The two roots are 2L and 3L**

$$\textbf{sum} = 5\,\text{L} = \frac{a}{8}\ ,\ \textbf{product} = 6\,\text{L}^2 = \frac{3}{8}$$

$$\text{L}^2 = \frac{1}{16} \rightarrow \text{L} = \frac{1}{4} \rightarrow \frac{5}{4} = \frac{a}{8} \rightarrow a = 10 \quad \textbf{(d)}$$

(269) If L and M are the roots of the equation: $x^2 - 8x + 5 = 0$, then the equation whose roots are $\frac{1}{\text{L}}$ and $\frac{1}{\text{M}}$ is ......

a) $5x^2 + 8x + 1 = 0$ b) $5x^2 - 8x - 1 = 0$

c) $5x^2 - 8x + 1 = 0$ d) $-5x^2 + 8x + 1 = 0$

ans. $\text{L} + \text{M} = 8\ ,\ \text{L M} = 5$

$$\frac{1}{\text{L}} + \frac{1}{\text{M}} = \frac{\text{L} + \text{M}}{\text{L M}} = \frac{8}{5}\ ,\ \frac{1}{\text{L}} \times \frac{1}{\text{M}} = \frac{1}{\text{L M}} = \frac{1}{5}$$

$$x^2 - \frac{8}{5}x + \frac{1}{5} = 0 \rightarrow 5x^2 - 8x + 1 = 0 \quad \textbf{(c)}$$

(270) If the difference of the two roots of the equation:

$x^2 - 9x + (1 - a) = 0$ is 5 then a = ...

a) 13 b) 9 c) – 13 d) – 9

ans. $$\textbf{difference} = \frac{\sqrt{b^2 - 4ac}}{a} = 5 \rightarrow \frac{\sqrt{81 - 4(1 - a)}}{1} = 5$$

$$\sqrt{81 - 4 + 4a} = \sqrt{77 + 4a} = 5$$

$$77 + 4a = 25 \rightarrow a = -13 \quad \textbf{(c)}$$

(271) If the function $f : \mathrm{R} \to \mathrm{R}, f(x) = 3x + 6$, then the sign of the function is negative on the interval ......

a) $]2, \infty[$ b) $]-\infty, -2[$ c) $]-\infty, -2]$ d) $[2, \infty[$

ans. $]-\infty, \mathbf{-2}[$ **(b)**

(272) If the function $f(x) = ax^2 + bx + c, a < 0$ and the two roots of the equations $f(x) = 0$ are 2 and – 5, then the function is positive on the interval ....

a) $\{-5, 2\}$ b) $]-5, 2[$ c) $[-5, 2[$ d) $[-5, 2]$

ans. $[\mathbf{-5, 2}[$ **(c)**

(273) The solution set of the inequality: $(x-2)(x-3) < 0$ in R is ......

a) $\{2, 3\}$ b) $]2, 3[$ c) $[2, 3]$ d) $\mathrm{R} - [2, 3]$

ans. $]\mathbf{2, 3}[$ **(b)**

(274) The quadrant in which the angle whose measure $89°59'$ is ....

a) Fourth b) First c) Second d) Third

ans. **First (b)**

(275) If the length of arc of a circle equal $\frac{1}{4}$ of circumference, then the measure of the central angle opposite to this arc equals ....

a) $270°$ b) $180°$ c) $90°$ d) $360°$

ans.

$$\mathrm{L} = \frac{1}{4} \times 2\pi r \ , \theta = \frac{\frac{1}{2}\pi r}{r} = 90° \quad \textbf{(c)}$$

(276) If $x \sin\frac{\pi}{6} \cos^2\frac{\pi}{4} = \cos^2 30 \sin\frac{\pi}{2}$ then = ...

a) $\frac{3}{4}$ b) 1 c) 3 d) 4

<u>ans.</u> $\boldsymbol{x \times \frac{1}{2} \times \frac{1}{2} = \frac{3}{4} \times 1 \rightarrow \quad x = 3}$ **(c)**

(277) If $\theta \in]\frac{\pi}{2}, \pi[$, $\sin\theta = \frac{12}{13}$, then the value of:

$\csc\theta - \tan\theta \cot\theta + \cos^2\theta = ...$

a) $\frac{169}{25}$ b) $\frac{144}{169}$ c) $\frac{25}{169}$ d) $\frac{169}{144}$

<u>ans.</u> $\boldsymbol{\frac{13}{12} - \frac{-12}{5} \times \frac{-5}{12} + \left(\frac{-5}{13}\right)^2 = \frac{\square}{\square}}$

(278) If $\sin(270° - \theta) = -\frac{1}{2}$ where θ is the measure of the smallest positive angle, then = ...

a) 60° b) 30° c) 90° d) 45°

<u>ans.</u> $\boldsymbol{-\cos\theta = \frac{-1}{2} \rightarrow \quad \theta = 60°}$

(279) If $\cos\left(\frac{20+\theta}{2}\right) = \sin\left(\frac{40+\theta}{2}\right)$ where $0° < \theta < 90°$ then ° = ...

a) 30° b) 60° c) 45° d) 15°

<u>ans.</u> $\boldsymbol{\frac{20+\theta}{2} + \frac{40+\theta}{2} = 90 \rightarrow 60 + 2\theta = 180 \rightarrow 2\theta = 120 \rightarrow \theta = 60°}$ **(b)**

(280) If $f(\theta) = 5\sin 3\theta$ then the range of the function is ....

a) $[-3, 3]$ b) $[-5, 5]$ c) $]-3, 3[$ d) $]-5, 5[$

<u>ans.</u> $\boldsymbol{[-5, 5]}$ **(b)**

(281) If $\sin\theta = \frac{3}{5}$ where $0° < \theta < 90°$, then the value of:

$\tan(90 - \theta) + \sec(90 - \theta) = ...$

a) $\frac{1}{2}$ b) 4 c) 1 d) 2

ans. $\boldsymbol{\cot\theta + \csc\theta = \frac{4}{3} + \frac{5}{3} = 3}$

Complete the following:

(1) The solutions set $x^2 + 9 = 0$ in C ......

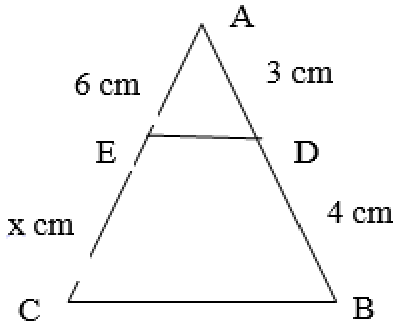
(2) One of the roots of the equation $A\,x^2 + 4x + 7 = 0$ is multiplicative of the other root then $A =$ ......

(3) Any two regular polygons of same number of sides are ....

(4) In the opposite figure:

???

Then = ...



(5) The angle measure 250° lies in the .... quadrant

Complete the following from column A to column B

	Columns A	Columns B
(6)	If $A = 1 + 2\sqrt{2}i$, $B = 1 - 2\sqrt{2}i$ then AB = ...	{2}
(7)	The solutions set $x^2 - 4x + 4 = 0$ in R	9
(8)	If the lengths of two corresponding sides 7 cm, 11 cm then the ratio between their parameters	9
(9)	In Δ ABC ~ Δ XYZ if $\frac{AB}{XY} = 3$ then $\frac{\alpha(\text{of } \Delta\, ABC)}{\alpha(\text{of } \Delta\, XYZ)} = \cdots$	410°
(10)	The angle measure 50° in standard position is equivalent to the angle of measure	$\frac{7}{11}$

ans. 1) $\pm 3i$

2) A = 7

3) Similar

4) $x = \frac{4(6)}{3} = 8$ cm

5) third

6) $(1 + 2\sqrt{2}\, i)(1 - 2\sqrt{2}\, i) = 1 + 8 = 9$

7) S.S. of $x^2 - 4x + 4 = 0$ in R is {2}

8) $\frac{7}{11}$

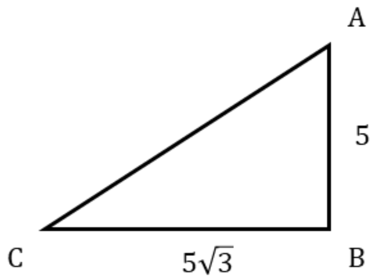
9) $(3)^2 = 9$

10) $410°$

Answer the following questions:

(1) If ABC is a right angled triangle at B, AB = 5 cm, BC = $5\sqrt{3}$ cm, then find: $m(\angle C), m(\angle A)$ and the length of $\overline{AC}$

ans. $m(\angle C) = \tan^{-1}\left(\frac{5}{5\sqrt{3}}\right) = 30°$



$\therefore m(\angle A) = 90 - 30 = 60°$

$AC = \sqrt{\left(5\sqrt{3}\right)^2 + 5^2} = 10$

Other correct methods are always considered.

(2) Prove the validity of the identity: $\sin\theta\cos\theta\ [\tan\theta+\cot\theta]=1$

ans. $\sin\theta\cos\theta\ [\tan\theta+\cot\theta]$

$\sin\theta\,\cancel{\cos\theta}\ .\dfrac{\sin\theta}{\cancel{\cos\theta}}+\cancel{\sin\theta}\cos\theta\ .\dfrac{\cos\theta}{\cancel{\sin\theta}}$

$\sin^2\theta+\cos^2\theta=1$

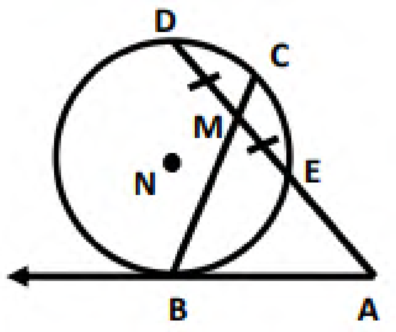
(3) If $a=2i^2-5i^3, b=\dfrac{2}{i^3}+5\,i^2$, Prove that: $a-b=3(1+i)$

ans. $a=2i^2-5i^3\ , b=\dfrac{2}{i^3}+5i^2$

$a=-2+5i\ , b=-5+2i$

$\therefore a-b=(-2+5i)-(-5+2i)=3(1+i)$

(4) <u>In the opposite figure:</u>



$\overrightarrow{AB}$ touches the circle N at B, AE = ED ,

M is the midpoint of $\overline{DE}$, CM = 1cm, MB = 4 cm

Find $P_N(A)$

<u>ans.</u> $\mathbf{ME\,.\,MD = MC\,.\,MB = 1 \times 4}$

$\therefore \mathbf{ME = MD = 2 \rightarrow ED = 4\ cm = AE}$

$\therefore \mathbf{P(A) = AE.AD = 4 \times 8 = 32}$

(5) If L and M are the roots of the equation: $x^2 - 7x + 1 = 0$, form the quadratic equation whose roots are $\sqrt{L}$ and $\sqrt{M}$

ans. $S^2 = \left(\sqrt{L} + \sqrt{M}\right)^2 = L + M + 2\sqrt{LM} = 7 + 2 = 9$

$L + M = 7$ $L\,M = 1$

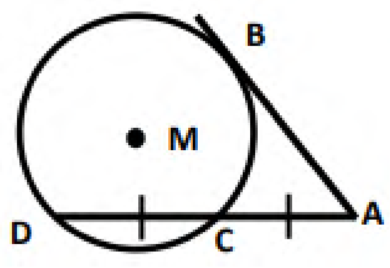
$\therefore S = \sqrt{L} + \sqrt{M} = \sqrt{9} = 3$

$P = \sqrt{LM} = \sqrt{1} = 1$

eq. $x^2 - 3x + 1 = 0$

(6) In the opposite figure:

C is the midpoint of $\overline{DA}$, $\overline{AB}$ touches the circle M at B, $P_M(A) = 200$, find the length of $\overline{AD}$.



ans. $P_M(A) = AC\,(AD) = \frac{AD}{2} . AD = 200$

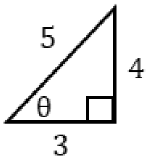
$(AD)^2 = 400 \rightarrow AD = 20$

(7) If θ is acute angle in standard position where its terminal side pass through the point (0.6 , B) on unit circle Find to the nearest degree measure of angle $\theta \in [0, \pi]$ which satisfy the relation :

$\tan\theta - 10\sin(90-\theta) - \cot^2(390°)$

ans. $\because (0.6, B) \in$ **unit circle**

$\therefore \cos\theta = \boxed{0.6}, \sin\theta = \sqrt{1-0.6^2} = \boxed{0.8}$



$\therefore \tan\theta = \dfrac{\sin\theta}{\cos\theta} = \dfrac{0.8}{0.6} = \boxed{\dfrac{4}{3}}$

$\sin(90-\theta) = \cos\theta = 0.6$

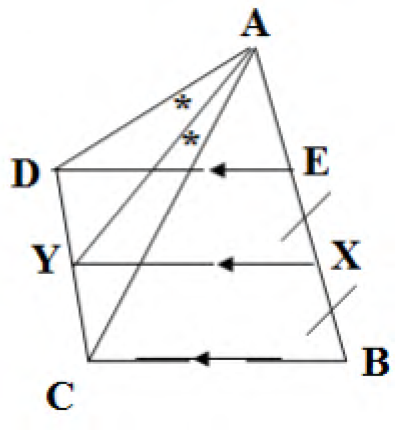
$\cot(390) = \cot 30 = \sqrt{3} \to \cot^2 390 = 3$

$\therefore \tan\theta - 10\sin(90-\theta) - \cot^2 390$

$\dfrac{4}{3} - 10(0.6) - 3 = \dfrac{-35}{3}$

(8) In the opposite figure : DE // YX // CB

AY bisects ∠ CAD Prove that Δ CAD is an isosceles triangle



ans. $\because \overrightarrow{AY}$ bisects $\angle$ CAD

$\therefore \frac{AD}{AC} = \frac{YD}{YC} = \frac{XE}{XB} = 1 \left(\text{As } \overrightarrow{DE} // \overrightarrow{YX} // \overrightarrow{CB}\right)$

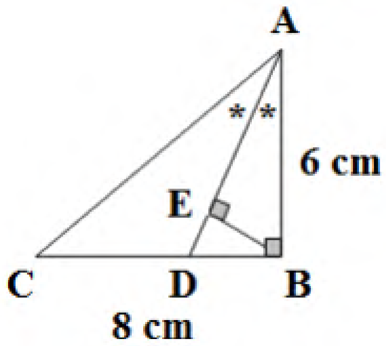
As $XE = XB \rightarrow AD = AC$

(9) In the opposite figure :

ABC is a right angled triangle at B, AD = $3\sqrt{5}$ cm

, BC = 8 cm , AB = 6 cm ,

AD bisects ∠ BAC BE ⊥ AD . Find length of DE



ans. $\overrightarrow{AD}$ bisects ∠ BAC → $\frac{AB}{AC} = \frac{DB}{DC} = \frac{6}{10} = \frac{3}{5}$ $\boxed{AC = \sqrt{6^2 + 8^2}}$

$\because$ BC = 8 cm $\therefore$ BD = 3 cm , DC = 5 cm

$(DB)^2 = DE \, . \, DA$ (Euclidean)

$3^2 = DE\left(3\sqrt{5}\right) \rightarrow DE = \frac{3\sqrt{5}}{5}$

$BE = \frac{BA \times BD}{AD} = \frac{6 \times 3}{3\sqrt{5}} = \frac{6\sqrt{5}}{5}$

$\therefore DE = \sqrt{(DB)^2 - (BE)^2} = \frac{3\sqrt{5}}{5}$

(10) If L , M are roots of the equation : $x^2 - 5x + 7 = 0$

Form the equation whose roots L^2 M and M^2 L

ans. **roots: L^2M and M^2L**

$L + M = 5$
$L\,M = 7$

$S. = L\,M(L + M) = 7 \times 5 = 35$

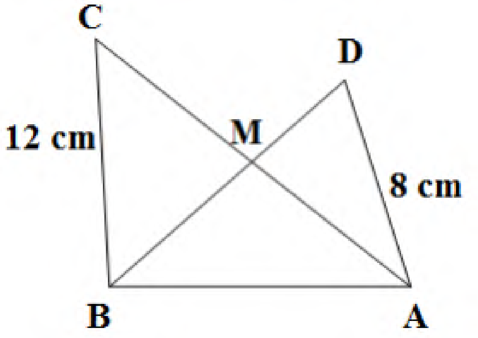
$P. = L^3M^3 = (L\,M)^3 = 5^3 = 125$

eq. $x^2 - 35x + 125 = 0$

(11) In the opposite figure :

ABCD is cyclic quadrilateral , AD = 8cm ,

CB = 12 cm , Find A(Δ AMD) : A(Δ BMC)



ans. ∵ **ABCD is cyclic quad.**

$\therefore MD \cdot MB = MA \cdot MC \quad \therefore \frac{MD}{MA} = \frac{MC}{MB}$

$\because \angle AMD = \angle CMD$ (v.o.a)

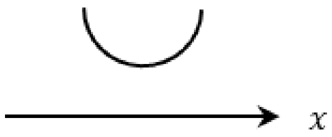
$\therefore \Delta AMD \sim \Delta BMC$ (S.A.S.)

$\therefore \frac{a.(\Delta AMD)}{a.(\Delta BMC)} = \left(\frac{AD}{BC}\right)^2 = \left(\frac{8}{12}\right)^2 = 4 : 9$

(12) Determine the sign of the function f where $f(x) = x^2 + 4$

Then find in R the solution set of the inequality $f(x) < 0$

ans. $f(x) = 0 \Rightarrow x^2 + 4 = 0 \xrightarrow{\text{in R}} \emptyset$

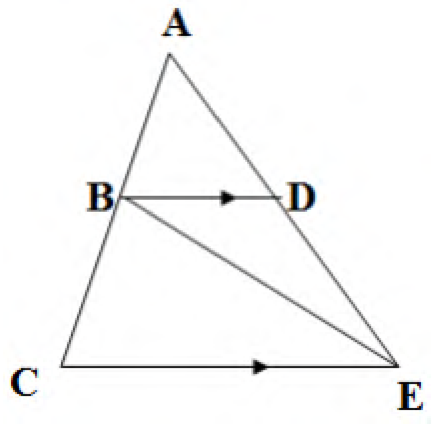


$\therefore$ S.S. in R of $f(x) < 0$ is $\emptyset$

(13) In triangle AEC :

BD // CE, AD : DE = 3 : 4, AE = 9 cm ,

EC = 12 cm . Prove that EB bisects ∠ AEC



ans.

$$\left.\begin{array}{l}\frac{EA}{EC}=\frac{9}{12}=\frac{3}{4}\\ \frac{BA}{BC}=\frac{DA}{DE}=\frac{3}{4}\end{array}\right\}\Rightarrow \frac{EA}{EC}=\frac{BA}{BC}$$

$\therefore \overrightarrow{EB}$ bisects ∠ AEC