AL ADWAA

Gem

Mathematics

للصف 2 الإعدادى

GEOMETRY

إجابات نماذج اختبارات الأضواء لشهر إبريل

الفصل الدراسى الثانى 2025 – 2024

Model (1)

15 Marks

1 Choose the correct answer:

5

a The trapezium in which the length of one of its parallel bases is 15 cm, its area is 108 cm^2 and its height is 8 cm, then the length of the other base is .... cm.

(15 , 4 , **12** , 27)

b The projection of a point on a given straight line is a ....

(**point** , line segment , ray , straight line)

c All .... are similar. (triangles , **squares** , rhombuses , rectangles)

d The area of a square whose side length 5 cm .... the area of a square whose diagonal length 7 cm. (**>** , < , = , ≡)

e If ΔABC ~ ΔDEF and $AB = \frac{1}{5} DE$, then the perimeter of ΔABC = ... perimeter of ΔDEF.

(5 , 1 , $\mathbf{\frac{1}{5}}$, $\frac{2}{5}$)

2 Answer each of the following:

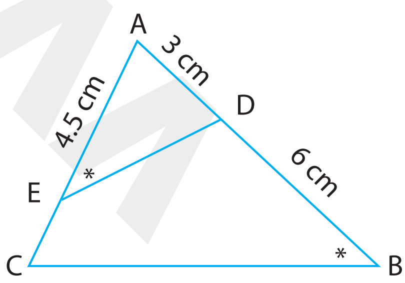
10

a In the opposite figure:

m(∠AED) = m(∠B), AD = 3 cm, AE = 4.5 cm and BD = 6 cm

- Prove that Δ ADE ~ ΔACB

- Find the length of $\overline{EC}$



Answer Proof:

In ΔΔABC,AED

∵ m(∠B) = m(∠AED) , ∠A is a common angle

∴ m(∠C) = m(∠ADE)

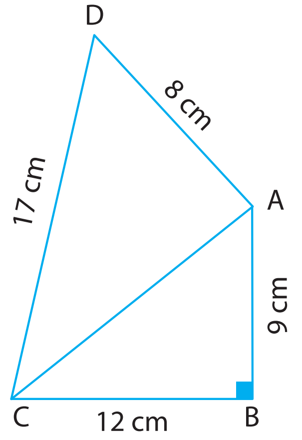
∴ Δ ADE ~ Δ ACB (1st req)

∴ $\frac{AD}{AC} = \frac{AE}{AB}$ ∴ $\frac{3}{AC} = \frac{4.5}{9}$

∴ $AC = \frac{3 \times 9}{4.5} = 6$ cm

∴ EC = 6 – 4.5 = 1.5 cm (2nd req)

b In the opposite figure:



ABCD is a quadrilateral in which: m(∠B) = 90°,

AB = 9 cm, BC = 12 cm, CD = 17 cm and DA = 8 cm

Prove that m(∠DAC) = 90°

Answer Proof:

In ΔABC

∵ m(∠B) = 90°

∴ $(AC)^2 = (AB)^2 + (BC)^2 = 81 + 144 = 225$

∴ AC = 15 cm

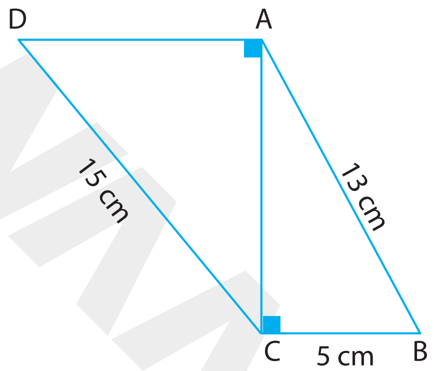
In ΔDAC

∵ $(AC)^2 = 225$, $(AD)^2 = 64$, $(DC)^2 = 289$

∴ $(DC)^2 = (AD)^2 + (AC)^2$

∴ m(∠DAC) = 90°

c In the opposite figure:



$\overline{AD}$ // $\overline{BC}$, AB = 13 cm, BC = 5 cm, CD = 15 cm

and m(∠ACB) = m(∠CAD) = 90°

Find :

– The length of the projection of $\overline{AB}$ on $\overleftrightarrow{AC}$

– The length of the projection of $\overline{CD}$ on $\overleftrightarrow{AD}$

Answer:

∵ $\overline{AC}$ is the projection of $\overline{AB}$ on $\overleftrightarrow{AC}$

In the right-angled triangle ACB at C

∵ $(AC)^2 = (AB)^2 - (BC)^2 = 169 - 25 = 144$

∴ AC = 12 cm (first req.)

$\overline{AD}$ is the projection of $\overline{CD}$ on $\overleftrightarrow{AD}$

In the right-angled triangle DAC at A

∵ $(AD)^2 = (CD)^2 - (AC)^2 = 225 - 144 = 81$

∴ AD = 9 cm (second req.)

d If the ratio between the two lengths of the diagonals of a rhombus is 3:4 and the length of the smaller diagonal is 9cm. find the area of the rhombus

Answer:

Let the length of the smaller diagonal be $3x$ cm

$\therefore$ The length of the greater diagonal $= 4x$ cm

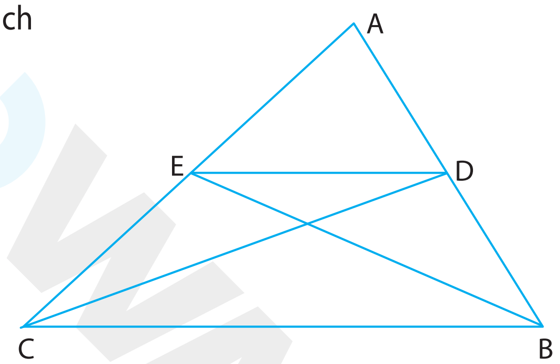
$\therefore 3x = 9 \qquad \therefore x = 3$

$\therefore$ The length of the greater diagonal $= 4 \times 3 = 12$ cm

$\therefore$ The area of the rhombus $= \frac{1}{2} \times 9 \times 12 = 54\ cm^2$

e ABC is a triangle in which D $\in \overline{AB}$ and E $\in \overline{AC}$, such that the area of ΔABE = the area of ΔACD

Prove that: $\overline{DE} \mathbin{//} \overline{BC}$



Answer Proof:

$\because$ The area of ΔABE = The area of ΔACD

(By subtracting the area of ΔADE from both sides)

$\therefore$ The area of ΔDEB = The area of ΔDEC

and they have a common base $\overline{DE}$ and on one side of it

$\therefore \overline{DE} \mathbin{//} \overline{BC}$

15 Marks

Model (2)

1 Choose the correct answer:

5

a The area of a square is 50 cm^2, then the length of its diagonal = ... cm.

(5 , **10** , 15 , 20)

b If the ratio between the lengths of two corresponding sides of two squares is 1 and the perimeter of one of them is 20 cm, then the area of the other square = ... cm^2.

(20 , **25** , 16 , 24)

c The projection of a line segment on the straight line not perpendicular to it is a ....

(ray , point , **line segment** , straight line)

d If the base length of a parallelogram is 7 cm and the corresponding height is 4 cm, then its area = ... cm^2.

(11 , 14 , 22 , **28**)

e If $\Delta XYZ \sim \Delta LMN$, then $\frac{\text{the perimeter of } \Delta XYZ}{\text{the perimeter of } \Delta LMN}$ = ...

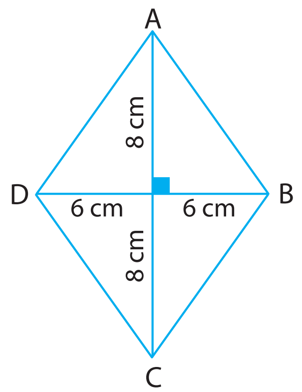
($\frac{XY}{LM}$, $\frac{XZ}{YX}$, $\frac{NM}{ZY}$, $\left(\frac{XY}{LM}\right)^2$)

2 Answer each of the following:

10

a A rhombus with diagonals lengths are 12 cm and 16 cm. Find its side length, then its area.

Answer:



From the figure:

$(AB)^2 = (6)^2 + (8)^2 = 100$

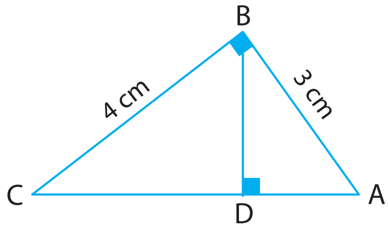
$\therefore$ AB = 10 cm

$\therefore$ The side length = 10 cm

$\therefore$ The area of the rhombus = $\frac{1}{2} \times 12 \times 16 = 96$ cm^2

b In the opposite figure:

ABC is a right-angled triangle at B in which:



AB = 3 cm, BC = 4 cm and $\overline{BD} \perp \overline{AC}$

– **Prove that:** $\Delta BAC \sim \Delta DAB$

– **Find** the length of $\overline{AD}$ and $\overline{DC}$

Answer Proof:

In ΔΔBAC, DAB

$\because m(\angle ABC) = m(\angle ADB) = 90°$, $\angle A$ is a common angle

$\therefore m(\angle C) = m(\angle ABD)$

$\therefore \Delta BAC \sim \Delta DAB$ (first req.)

$\because \Delta ABC$ is right - angled at B

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = 9 + 16 = 25$

$\therefore AC = 5$ cm

$\therefore \frac{AD}{AB} = \frac{AB}{AC} = \frac{BD}{CB}$

$\therefore \frac{AD}{3} = \frac{3}{5} = \frac{BD}{4}$

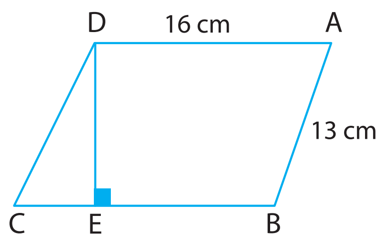
$\therefore AD = \frac{3 \times 3}{5} = 1.8$ cm

$\because DC = AC - AD$

$\therefore DC = 5 - 1.8 = 3.2$ cm

c In the opposite figure:

ABCD is a parallelogram in which:



AD = 16 cm and AB = 13 cm

If $\overline{DE} \perp \overline{BC}$ and the area of the parallelogram

ABCD = 192cm^2.

Find the length of the projection of $\overline{DC}$ on $\overleftrightarrow{BC}$

Answer Proof:

$\overline{EC}$ is the projection of $\overline{DC}$ on $\overleftrightarrow{BC}$

$\because$ ABCD is a parallelogram $\therefore$ AB = DC

$\therefore$ DC = 13 cm , DE = $\frac{192}{16}$ =12 cm

In the right-angled triangle DEC at E

$(EC)^2 = (DC)^2 - (DE)^2 = 169 - 144 = 25$

$\therefore$ EC = 5 cm

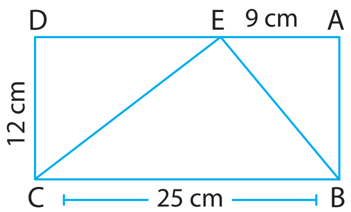
d In the opposite figure:

ABCD is a rectangle in which:

DC = 12 cm , AD = 25 cm and E $\in \overline{AD}$

Such that: AE = 9 cm

Prove that: $\overline{BE} \perp \overline{EC}$



Answer Proof:

$\because$ ABCD is a rectangle

$\therefore$ ΔBAE is right-angled at A

$\therefore (EB)^2 = (AE)^2 + (AB)^2 = 81 + 144 = 225$

$\therefore$ EB = 15 cm

$\therefore$ ΔEDC is a right-angled at D

$\therefore$ ED = AD – AE = 25 – 9 = 16 cm

$\therefore (EC)^2 = (ED)^2 + (DC)^2 = 256 + 144 = 400$

$\therefore$ EC = 20 cm

In ΔBEC

$\therefore (BC)^2 = 625 , (BE)^2 = 225 , (EC)^2 = 400$

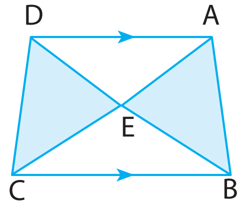
$\therefore (BC)^2 = (BE)^2 + (EC)^2$, then m ($\angle$BEC) = 90°

$\therefore \overline{BE} \perp \overline{EC}$

e In the opposite figure : ABCD is a quadrilateral,

$\overline{AD} // \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{E\}$

Prove that : the area of Δ ABE = the area of Δ DCE



Answer Proof:

∵ Δ Δ ADB , ADC have a common base $\overline{AD}$, $\overline{AD} // \overline{BC}$

∴ The area of triangle ADB = The area of triangle ADC

(By subtracting the area of triangle AED from both sides)

∴ The area of triangle ABE = The area of triangle DCE

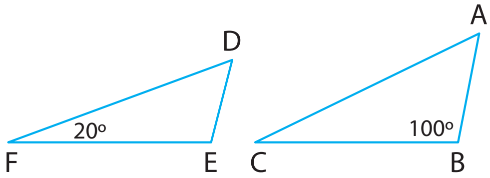
15 Marks

Model (3)

5

1 Choose the correct answer:

a In the opposite figure:



If $\Delta ABC \sim \Delta DEF$, then $m(\angle A) =$ ....° .

(20 , **60** , 80 , 100)

b The length of the projection of a line segment on a given straight line .... of the line segment itself . (> , ≥ , **≤** , =)

c If the base length of a triangle is 4 cm and the corresponding height is 3 cm . then its area = ... cm^2 . (**6** , 12 , 24 , 30)

d If the perimeter of a rhombus 48 cm and its area = $60cm^2$, then its height = ... cm . (4 , **5** , 6 , 12)

e The projection of a ray on a straight line not perpendicular to it a ....

(point , line segment , **ray** , straight line)

10

2 Answer each of the following:

a The area of a trapezium is $180cm^2$, and its height is 12 cm. Find the lengths of its parallel bases if the ratio between their lengths is 3:2

Answer:

Let the lengths of the two parallel bases be $3x$ cm and $2x$ cm

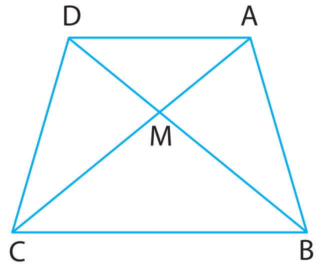
$\because$ The area $= \frac{1}{2}(3x + 2x) \times 12$

$\therefore 180 = \frac{1}{2}(3x + 2x) \times 12$

$\therefore 30x = 180$ $\therefore x = 6$ cm

$\therefore$ The lengths of the two bases are 18 cm and 12 cm

b In the opposite figure:



ABCD is a quadrilateral, its diagonals intersect at M and the area of ΔABM = The area of ΔDCM

Prove that: $\overline{AD} // \overline{BC}$

Answer Proof

∵ The area of ΔABM= The area of ΔDMC

(By adding the area of ΔBMC to both sides)

∴ The area of ΔABC = The area of ΔDCB

(and they have the common base $\overline{BC}$ and on one side of it)

∴ $\overline{AD}$ // $\overline{BC}$

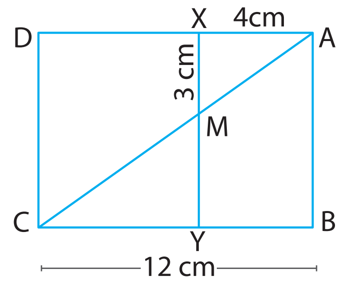
c In the opposite figure:

ABCD is a rectangle in which AD = 12 cm and

$X \in \overline{AD}$, where AX = 4 cm, $\overline{XY}$ // $\overline{AB}$ and

intersects $\overline{AC}$ at M and $\overline{BC}$ at Y , where MX = 3 cm

Prove that ΔAMX ~ ΔCMY



Answer Proof

∵ $\overline{XY}$ // $\overline{AB}$, $\overline{AX}$ // $\overline{BY}$

∴ ABYX is a parallelogram

∵ m(∠B) = 90°   ∴ ABYX is a rectangle

∴ BY = AX = 4 cm

∵ BC = AD = 12 cm

∴ YC = 12 – 4 = 8 cm

∵ AXM is a right-angled triangle at X

∵ $(AM)^2 = (AX)^2 + (XM)^2 = 16 + 9 = 25$

AM = 5 cm

In ΔΔAMX , CMY

∵ m(∠AXM) = m(∠MYC) = 90°

∵ m(∠AMX) = m(∠CMY)   (V.O.A)

∴ m(∠XAM) = m(∠MCY)

∴ ΔAMX ~ ΔCMY

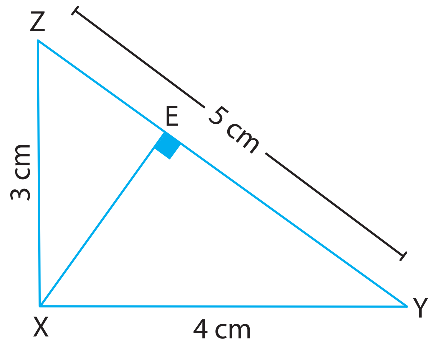
d In the opposite figure:

XYZ is a triangle in which $\overline{XE} \perp \overline{YZ}$,

$E \in \overline{ZY}$, YZ = 5 cm, XZ = 3 cm and

XY = 4 cm. Find the area of ΔXYZ,

then find the length of $\overline{XE}$



Answer

In ΔXYZ

$\because (YZ)^2 = 25 , (XY)^2 = 16 , (ZX)^2 = 9$

$\therefore (YZ)^2 = (XY)^2 + (ZX)^2$

$\therefore m(\angle YXZ) = 90°$

$\therefore$ The area of ΔXYZ $= \frac{1}{2} \times 4 \times 3 = 6 \text{ cm}^2$ (first req)

$\because \overline{XE} \perp \overline{YZ}$

$\because XE = \frac{3 \times 4}{5} = 2.4$ cm (second req)

e In the opposite figure:

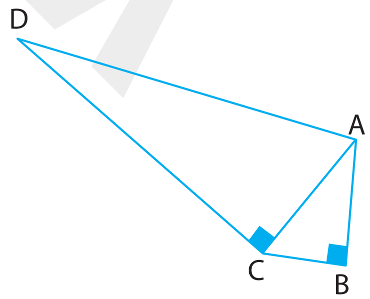
$m(\angle B) = m(\angle ACD) = 90°$

Complete:

The projection of $\overline{AD}$ on $\overleftrightarrow{CD}$ is ………………… .

The projection of $\overline{AC}$ on $\overleftrightarrow{CD}$ is ………………… .

The projection of $\overline{AC}$ on $\overleftrightarrow{AB}$ is ………………… .



Answer

a) $\overline{CD}$

c) The point C

d) $\overline{AB}$