



ALADWANA

Gem



Mathematics

للفصف 2 الإعدادى

إجابات نماذج اختبارات الأضواء لشهر إبريل

الفصل الدراسى الثانى 2024 – 2025



1 Choose the correct answer:

- a The S.S. of the equation: $x^2 = x$ in \mathbb{R} is ($\{0\}, \emptyset, \{1\}, \{0,1\}$)
- b $0.002 \times 0.05 =$ ($10^{-5}, 10^{-4}, 10^4, 10^5$)
- c If $2^x + 2^x + 2^x = 48$, then $x =$ ($2, 4, 6, 12$)
- d If $(25)^2 - (15)^2 = 10x$, then $x =$ ($40, 30, 20, 10$)
- e If $3^{x-1} = \sqrt[3]{\frac{1}{27}}$, then $x =$ ($0, 1, -1, -2$)

2 Answer each of the following:

- a If $3^x = 27, 4^{x+y} = 1$, calculate the value of x and y .
- $\therefore 3^x = 27$
- $\therefore 3^x = 3^3 \qquad \therefore x = 3$
- $\therefore 4^{x+y} = 1$
- $\therefore 4^{3+y} = 4^0 \qquad \therefore y = -3$
- b Find the value of n where $n \in \mathbb{Z}$

$$\frac{3^n \times 8^n}{(12)^{n+1}} = \frac{1}{3}$$

$$\therefore \frac{3^n \times 2^{3n}}{3^{n+1} \times 4^{n+1}} = \frac{1}{3}$$

$$\therefore \frac{3^n \times 2^{3n}}{3^{n+1} \times 2^{2n+2}} = \frac{1}{3}$$

$$\therefore 3^{-1} \times 2^{n-2} = 3^{-1}$$

$$\therefore 2^{n-2} = 1$$

$$\therefore 2^{n-2} = 2^0 \qquad \therefore n = 2$$

- c Find the dimensions of a rectangle whose length is 4 cm more than its width and its area is 21 cm².

Let the width of the rectangle be x cm.

∴ the length of the rectangle is $(x+4)$ cm

$$\therefore x(x+4) = 21$$

$$\therefore x^2 + 4x - 21 = 0$$

$$\therefore (x+7)(x-3) = 0$$

$$\therefore x+7 = 0, \text{ then } x = -7 \text{ (refused)}$$

$$\text{or } x-3 = 0, \text{ then } x = 3$$

∴ The width = 3 cm and the length = 7 cm

- d Use the factorization to get the value of $(77)^2 - (23)^2$.

$$(77)^2 - (23)^2 = (77+23)(77-23)$$

$$= 100 \times 54 = 5,400$$

- e Factorize the expression $4a^4 + b^4$

$$\therefore 2 \times \sqrt{4a^4} \times \sqrt{b^4} = 4a^2 b^2$$

$$\therefore 4a^4 + b^4 = 4a^4 + b^4 + 4a^2 b^2 - 4a^2 b^2$$

$$= (4a^4 + 4a^2 b^2 + b^4) - 4a^2 b^2$$

$$= (2a^2 + b^2)^2 - (2ab)^2$$

$$= (2a^2 + b^2 - 2ab)(2a^2 + b^2 + 2ab)$$

1 Choose the correct answer:

- a If Ali's age now is x years, then his age after 3 years will be years.
($3x, x-3, x+3, x^3$)
- b If $6^x = 11$, then $6^{x+1} =$
($12, 22, 66, 72$)
- c The S.S of the equation $x^2 - 4 = 0$ in \mathbb{R} is
($\{4\}, \{4, -4\}, \{2\}, \{2, -2\}$)
- d The numerical value of the expression $\frac{2^{2n+1} \times 5^{2n+1}}{10^{2n}}$ is
($7, 10, 100, \frac{1}{10}$)
- e $4^3 + 4^3 + 4^3 + 4^3 =$
($4^3, 4^4, 4^{12}, 4^8$)

2 Answer each of the following:

- a Find in \mathbb{R} the S.S of $(2x - 1)^2 + (x - 1)^2 = 10$
 $\therefore (2x - 1)^2 + (x - 1)^2 = 10$
 $\therefore 4x^2 - 4x + 1 + x^2 - 2x + 1 = 10$
 $\therefore 5x^2 - 6x + 2 = 10$
 $\therefore 5x^2 - 6x - 8 = 0$
 $\therefore (5x + 4)(x - 2) = 0$
 $\therefore x = \frac{-4}{5}$ and $x = 2$
 Then the S.S = $\{\frac{-4}{5}, 2\}$
- b Find in \mathbb{R} the S.S of the equation: $25 \times 3^{x-1} = 9 \times 5^{x-1}$
 $5^2 \times 3^{x-1} = 3^2 \times 5^{x-1}$
 $x - 1 = 2 \quad \therefore x = 3 \quad \therefore \text{the S.S.} = \{3\}$

c If $x = \frac{\sqrt{3}}{2}$, $y = \frac{1}{\sqrt{3}}$ and $Z = \frac{\sqrt{2}}{2}$,

find the value of $x^2 + (xz)^2 \times y^2$

$$\begin{aligned} & \left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{\sqrt{3}}{2} \times \frac{\sqrt{2}}{2}\right)^2 \left(\frac{1}{\sqrt{3}}\right)^2 \\ &= \frac{3}{4} + \frac{3}{8} \times \frac{1}{3} = \frac{3}{4} + \frac{1}{8} = \frac{7}{8} \end{aligned}$$

d What is the real number if it is added to its square the result will be 12 ?

Let the number be x

$$x + x^2 = 12$$

$$x^2 + x - 12 = 0$$

$$(x + 4)(x - 3) = 0$$

then $x = -4$ or $x = 3$

e Use factorization to get the value of 31×29

$$\begin{aligned} 31 \times 29 &= (30 + 1)(30 - 1) \\ &= 30^2 - 1^2 = 900 - 1 = 899 \end{aligned}$$

1 Choose the correct answer:

- a If $2^{x-1} \times 3^{1-x} = \frac{9}{4}$, then $x = \dots\dots\dots$ (-3, -1, 1, 3)
- b If $x^2 - y^2 = 16$, $y - x = 2$, then $x + y = \dots\dots\dots$ (4, 8, -8, 2)
- c If $\left(\frac{2}{3}\right)^3 = \left(\frac{3}{2}\right)^x$, then $x = \dots\dots\dots$ (3, -3, 5, -5)
- d The S.S of the equation $x(x - 3) = 5x$ in \mathbb{R} is $\dots\dots\dots$ ({3}, {0,3,5}, {3,5}, {0,8})
- e If $a + b = 5$, $a - b = 4$, then $b^2 - a^2 = \dots\dots\dots$ (-20, -1, 9, 20)

2 Answer each of the following:

- a Hatem is 4 years older than Hanan now, and the sum of squares of their ages now is 26. Find their ages.

Let the age of Hatem now be x years.

\therefore The age of Hanan now = $(x - 4)$ years

$$\therefore x^2 + (x - 4)^2 = 26$$

$$\therefore x^2 + x^2 - 8x + 16 - 26 = 0$$

$$\therefore 2x^2 - 8x - 10 = 0$$

$$\therefore x^2 - 4x - 5 = 0$$

$$\therefore (x - 5)(x + 1) = 0$$

$$\therefore \text{then } x = -1 \text{ (refused), } x = 5$$

\therefore the age of Hatem now is 5 years.

\therefore the age of Hanan now is one year.

- b Simplify $\frac{4^{x+1} \times 9^{2-x}}{6^{2x}}$, then find the value of the result when $x = 1$

$$\frac{4^{x+1} \times 9^{2-x}}{6^{2x}}$$

$$= \frac{2^{2x+2} \times 3^{4-2x}}{2^{2x} \times 3^{2x}}$$

$$= 2^2 \times 3^{4-4x} = 4 \times 3^{4-4x}$$

$$\text{The value when } x = 1 \text{ is } 2^2 \times 3^{4-4(1)} = 4 \times 3^0 = 4$$

- c Find in \mathbb{R} the S.S. of the following equation:

$$y^2 - \frac{7y}{3} = -\frac{4}{3}$$

$$3y^2 - 7y = -4$$

$$3y^2 - 7y + 4 = 0$$

$$(3y - 4)(y - 1) = 0$$

$$\text{Then } y = \frac{4}{3} \text{ Or } y = 1$$

$$\text{S.S.} = \left\{ \frac{4}{3}, 1 \right\}$$

- d Factorize the following perfectly: $x^5 - x^3 - x^2 + 1$

$$x^3(x^2 - 1) - (x^2 - 1) = (x^2 - 1)(x^3 - 1)$$

$$= (x - 1)(x + 1)(x - 1)(x^2 + x + 1)$$

$$= (x - 1)^2(x + 1)(x^2 + x + 1)$$

- e Simplify the expression: $4^{x-1} \times 2^{3x+2} \times \left(\frac{1}{2}\right)^{3x}$, then find the value of the result if $2^x = 5$.

$$4^{x-1} \times 2^{3x+2} \times \left(\frac{1}{2}\right)^{3x}$$

$$2^{2x-2} \times 2^{3x+2} \times \left(\frac{1}{2}\right)^{3x}$$

$$2^{5x} \times 2^{-3x} = 2^{2x}$$

$$\text{The value when } 2^x = 5 \text{ is } 2^{2x} = (2^x)^2 = (5)^2 = 25$$