Algebra

مــــاث

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الاسئله Schoola

$$2x + 3 = 10$$

$$x^2 + 5x - 6 = 0$$

$$-2x + 1 = 5$$
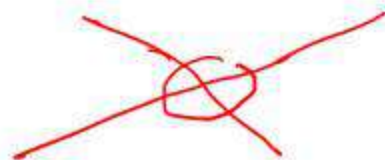
$$-2x - 1 = 10$$

$$3x = 15$$

$$\boxed{x = 5}$$

$$\{-1, 3\}$$
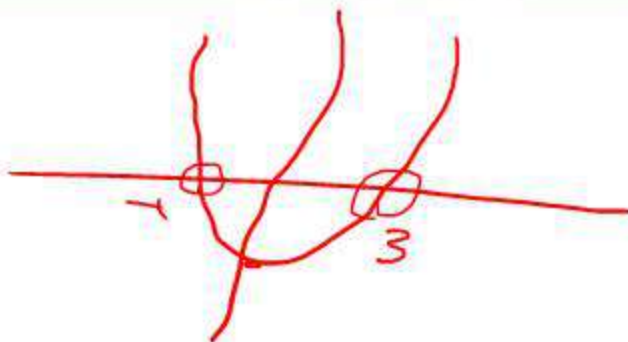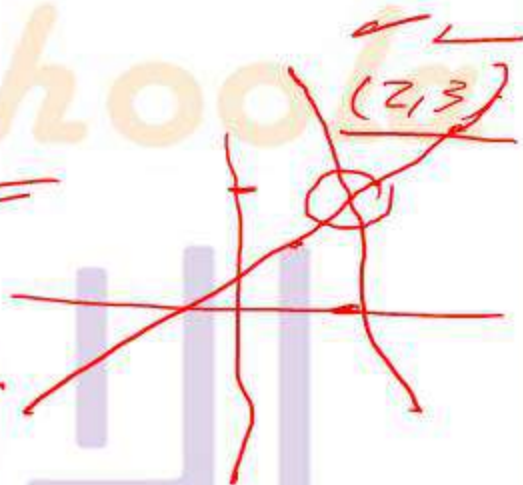
Choose the correct answer from those given

1- If (2 , 1) is a solution of the equation : $2x + ay = 6$, then a = ...

$$2 \times 2 + a = 6$$
$$4 + a = 6$$
$$a = 2$$

   (a) 2   (b) 6   (c) 1   (d) 3

2- The point of intersection of the two straight lines which equations are $x + y = 3$ and $x - y = 1$ is ....

$$x + y = 3$$
$$2x = 4 \longrightarrow x = 2$$

   (a) (1 , 2)   (b) (4 , -1)   (c) (2 , 1)   (d) (5 , -2)

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Choose the correct answer from those given

3- If the sum of two positive numbers is 9 and their product is 8 , then the two numbers are .... $x + y = 9$ $xy = 8$

(a) 2 , 7   (b) 3 , 6   (c) 4 , 5   (d) 1 , 8

4- The S.S. of two of the two equations : $x + y = 0$, $x - 2 = 0$ in $\mathbb{R} \times \mathbb{R}$ is ....

$2 + y = 0$ $x = 2$

(a) { (0 , 2) }   (b){ (2 , 2) }   (c) { (- 2 , 2) }   (d) { (2 , -2) }

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Choose the correct answer from those given

5- The number of solutions of the two equations : $x - 2y = 2$ and $3x - 6y = 6$ is ....

(a) 1   (b) 2   (c) 3   (d) an infinite

6- If : $x = 3$ is a root of the equation : $x^2 + mx = 3$, then $m =$ ....

$$3^2 + 3m = 3$$
$$9 + 3m = 3$$

(a) – 1   (b) – 2   (c) 2   (d) 1

$$3m = -6$$
$$m = -2$$

Choose the correct answer from those given

7- The solutions set of the two equations : $x + 3y = 4$, $3y + x = 1$ is ....

(a) $\{ (3 , 1) \}$ (b) $\{ (1 , 3) \}$ (c) $\emptyset$ (d) $\{ (1 , 0) \}$

[a] Find the solution set in of the equation : $x^2 - 5x + 3 = 0$

approximating the roots to the nearest tenth.

$$x^2 - 5x + 3 = 0$$
$$a = 1 \quad , \quad b = -5 \quad , \quad c = 3$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-5) \pm \sqrt{(-5)^2 - 4 \times 1 \times 3}}{2 \times 1}$$

$$= \frac{5 \pm \sqrt{25 - 12}}{2} = \frac{5 \pm \sqrt{13}}{2}$$

$$\{4.3 , 0.7\}$$

[b] The perimeter of a rectangle is 14 cm. and its area 12 cm ^{2}.

Find each of its two dimensions.

let the length be x and width be y

$$(x + y) \times 2 = 14$$
$$x + y = 7 \rightarrow$$
$$xy = 12 \rightarrow$$

$$x = 7 - y$$

$$(7 - y) y = 12$$
$$7y - y^2 - 12 = 0$$
$$y^2 - 7y + 12 = 0$$

$$3 , 4$$

$$(y - 3)(y - 4) = 0$$
$$y = 3 \quad y = 4$$
$$x = 7 - 3 \quad x = 7 - 4$$
$$= 4 \quad x = 3$$

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[c] Find algebraically the S.S. of the two equations :

$$x + y = 4 \ , \ 2x - y = 2 \ \text{in} \ \mathbb{R} \times \mathbb{R}$$

$x + y = 4$

$2x - y = 2$

—————————

$3x = 6$

$x = 2$

$2 + y = 4$

$y = -2$

$$S.S = \{(2, -2)\}$$

[d] The sum of two integers is **9** and the difference between their squares is **27** find the two numbers.

$9 \to x \quad 5 \to y$

$x + y = 9 \to \boxed{x = 9 - y}$

$x^2 - y^2 = 27$

$(9 - y)^2 - y^2 = 27$

$81 - 18y + y^2 - y^2 = 27$

$-18y = -81 + 27$

$-18y = -54$

$\boxed{y = 3}$

$\begin{cases} x = 9 - 3 \\ x = 6 \end{cases}$

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[e] Represent graphically the function f :

$f(x) = 4 - x^2$ **on the interval [- 3 , 3] and from the drawing deduce the :**

(1) Roots of the equation : $f(x) = 0$

(2) Equation of symmetric axis. 0

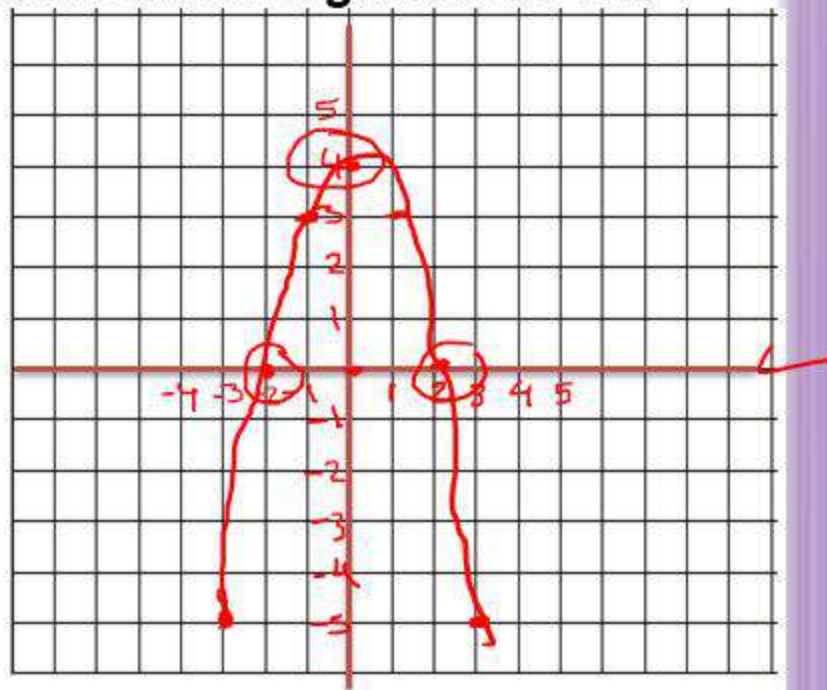| x	-3	-2	-1	0	1	2	3
$F(x)$	-5	0	3	4	3	0	-5

$4 - (-3)^2 = -5$

$4 - (-2)^2 = 0$ $(0, 4)$

$4 - (-1)^2 = 3$

$\{-2, 2\}$

[f] A rectangle with a length more than its width by 4 cm. If the perimeter of the rectangle is 28 cm. , find area of the rectangle.

$l = x$

$w = y$

$x - y = 4$

$(x + y) \times 2 = 28$

$x + y = 14$

$x - y = 4$

$x - 9$

$9 + y = 14$

$y = 5$

$2x = 18$

[g] Find algebraically the solution set of the two equations :
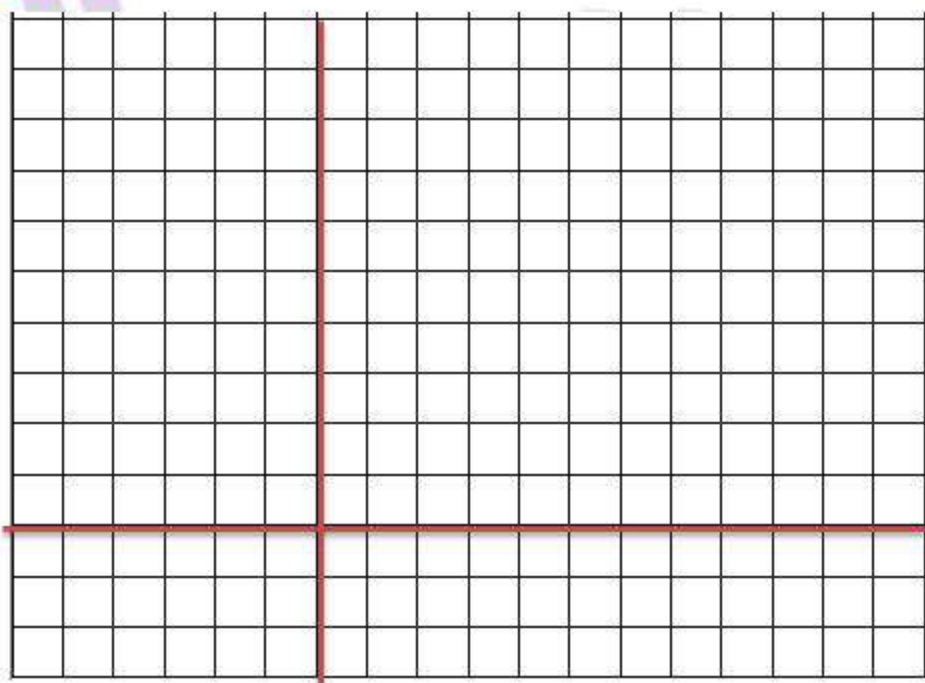
$$y - x = 2 \ , \ x^2 + xy - 4 = 0$$

Graph the quadratic function f where $(x) = x^2 - 4x + 3 = 0$

, $x \in [-1, 5]$, then from the graph deduce :

(1) The coordinates of the vertex of the curve.

(2) The minimum value of the function.

(3) The S.S. in $\mathbb{R}$ of the equation :

$x^2 + x$

$x(x+1)$

$25x + 5$

$5(5x+1)$

$4x^2 + 2x$

$2x(2x+1)$

$x^4 - 16$

$(x^2 + 4)(x^2 - 4)$

$(x^2 + 4)(x-2)(x+2)$

$x^2 + 27$

$(x+3)(x^2 - 3x + 9)$

$x^2 \pm 5x - \boxed{6}$

$(x + 6)(x - 1)$

$x^2 + 4x + 4$

$= x \quad 2 \quad x$

$(x + 2)^2$

$F(x) \; x^2 - 4 \rightarrow x^2 = 4$

$x = \pm 2$

$se T of zeros = \{2, -2\}$

$\frac{1}{2}$ ✓

$\boxed{\frac{3}{0}}$ ✗

$F(x) = \frac{x-1}{(x) - 2}$

domain

$= \mathbb{R} - \{2\}$

Algebraic Fractions and Probability

Choose the correct answer from those given

(1) If $A \subset S$ of a random experiment, $P(A) = 2 P(A)$, then $P(A) = $ .... $\frac{1}{3}$

(a) $\frac{1}{3}$

(b) $\frac{1}{2}$

(c) $\frac{2}{3}$

(d) 1

(2) The set of zeroes of $f(X) = $ zero is ....

(a) $\emptyset$

(b) Zero

(c) $\mathbb{R}$

(d) $\mathbb{R} - \{0\}$

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Choose the correct answer from those given

(3) If $f(X) = X^2 + X + a$ and the set of zeroes of the function f is $\{1 , -2\}$

then a =......$(1)^2 + 1 + a = 0 \rightarrow 2 + a = 0 \rightarrow a = -2$

(a) 2 (b) 1 (c) -1 (d) -2

(4) If $n(X) = \dfrac{x}{x+5}$, then the domain of n^{-1} = ...

-5

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{0\}$ (c) $\mathbb{R} - \{5\}$ (d) $\mathbb{R} - \{0 , -5\}$

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Choose the correct answer from those given

(5) If A $\subset$ B , then P(A $\cup$ B) = ...

(a) Zero (b) P (A) (c) P (B) (d) P (A∩B)

(6) If a = $\sqrt{3}$, b = $\dfrac{1}{\sqrt{3}}$, then $a^{50} \times b^{51}$ = ...$(\sqrt{3})^{50} \times (\sqrt{3})^{-51} = (\sqrt{3})^{-1}$...

(a) 3 (b) $\dfrac{1}{3}$ (c) $\sqrt{3}$ (d) $\dfrac{1}{\sqrt{3}}$

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Choose the correct answer from those given

(7) The domain of f: $f(X) = \dfrac{x+5}{x^2-4}$ is = $x^2 - 4 = (x+2)(x-2)$

(a) $\mathbb{R}$ (b) $\mathbb{R} - \{-2, 2\}$ (c) $\mathbb{R} - \{-2\}$ (d) $\mathbb{R} - \{2\}$

(8) If A and B are mutually exclusive events, then P (A∩B) = ...

(a) $\varnothing$ (b) Zero   (c) 0.56 (d) 1

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(1) If $n(X) = \dfrac{x^2 + x - 12}{x^2 + 5x + 4}$, find $n^{-1}(X)$, showing the domain

of n^{-1}, then find $n^{-1}(0)$

$$n(x) = \frac{(x-3)(x+4)}{(x+1)(x+4)}$$

$$d\, n^{-1}(x) = R - \{-1, -4, 3\}$$

$$n^{-1}(x) = \frac{x-3}{x+1} \qquad \longrightarrow n^{-1}(0) = \frac{0-3}{0+1} = \frac{-3}{1}$$

$$\boxed{-3}$$

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(2) Find n (X) in the simplest form , showing the domain

where :

$$n(X) = \frac{x^2 + 2x}{x^3 - 27} \div \frac{x + 2}{x^2 + 3x + 9}$$

$$n(x) = \frac{x(x+2)}{(x-3)(x^2+3x+9)} \div \frac{x+2}{x^2+3x+9}$$

$$d = R - \{3, -2\}$$

$$n(x) = \frac{x(x+2)}{(x-3)(x^2+3x+9)} \times \frac{x^2+3x+9}{x+2}$$

$$n(x) = \frac{x}{x-3} \checkmark$$

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(3) [a] If $n_1(X) = \dfrac{2x}{2x+8}$, $n_2(X) = \dfrac{x^2+4x}{x^2+8x+16}$, prove that : $n_1 = n_2$

$n_1(x) = \dfrac{2x}{2(x+4)}$

$n_2(x) = \dfrac{x(x+4)}{(x+4)^2}$

$d = R - \{-4\}$ ✓

$d = R - \{-4\}$ ✓

$n_1(x) = \dfrac{x}{x+4}$ ✓

$n_2(x) = \dfrac{x}{x+4}$ ✓

$\therefore n_1 = n_2$

(3) [b] If A , B are two mutually exclusive events and $P(A) = \dfrac{1}{3}$,

$P(A \cup B) = \dfrac{7}{12}$, find : $P(B)$

A   B

$\dfrac{1}{3}$

$$P(A \cup B) = P(A) + P(B)$$

$$P(B) = P(A \cup B) - P(A)$$

$$= \frac{7}{12} - \frac{1}{3} = \frac{3}{12} = \frac{1}{4}$$

(4) Find n (X) in the simplest form , showing the domain

where : $n(X) = \dfrac{x^2 + 2x}{x^2 - 4} - \dfrac{2x - 6}{x^2 - 5x + 6}$

$$n(x) = \frac{x(x+2)}{(x+2)(x-2)} - \frac{2(x-3)}{(x-2)(x-3)}$$

$$d = \mathbb{R} - \{-2, 2, 3\}$$

$$n(x) = \frac{x}{x-2} - \frac{2}{x-2} = \frac{x-2}{x-2} = 1$$

(5) If A and B are two events from the sample space S , P (A) = 0. 8, P (B) = 0. 7 , P (A ∩ B) = 0.6 , **find :**

[1] P (A$'$)   [2] P (A ∪ B)   [3] P (A−B)

$P(A') = 1 - P(A) \rightarrow 1 - 0.8 = 0.2$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.8 + 0.7 - 0.6 = 0.9$

$P(A - B) = P(A) - P(A \cap B)$

$= 0.8 - 0.6 = 0.2$