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Arab Republic of Egypt
Ministry of Education
3rd preparatory Exam for our sons abroad - Second term 2017
Algebra, statistics (الفصل الدراسي الثاني ٢٠١٧) Time: 2 hours
((يسمح باستخدام الآلة الحاسبة)) الجبر والإحصاء باللغة الإنجليزية للصف الثالث الإعدادي
تنبيه هام : (يسلم الطالب ورقة الأسئلة باللغة العربية مع الورقة المترجمة)

Answer the following questions:-

1st question: Choose the correct answer:

(1) The solution set of the equation $x^2 - x = zero$ is .... (a) $\{0\}$ (b) $\{1\}$ (c) $\{0,1\}$ (d) $\emptyset$

(2) If $P(A) = 2P(A')$ then $P(A) =$ .... (a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{2}{3}$ (d) 1

(3) The domain of the function $f(x) = \frac{1}{x} + \frac{3}{x-2}$ is ....

(a) $\{0,2\}$ (b) $R - \{0,2\}$ (c) $\{1,3\}$ (d) $R - \{1,3\}$

(4) If A&B are two non-occurrence events & $P(A \cup B) = 0.6$, $P(A) = 0.2$ then $P(B) =$ ....

(a) 0.4 (b) 0.6 (c) 0.8 (d) 0.2

(5) The set of zeroes of the function $f(x) = x^2 + 1$ is ....

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

(6) If $x = 2$, $y = x^2 - 1$ then $y =$ .... (a) ± 3 (b) 1 (c) 3 (d) -3

2nd question: -

(A) By using the general form solve the equation $x^2 - 2x - 1 = 0$ where $\sqrt{2} \cong 1.4$

(B) Find $n(x)$ in the simplest form showing its domain where: $n(x) = \frac{x^2-1}{x^2-3x+2} \times \frac{x-2}{x+1}$

3rd question: -

(A) Find the Solution set of the following two equations together $x - y = 1$, $x^2 + y^2 = 5$

(B) If A & B are two events in a random experiment of a simple space if :

$P(A) = 0.6$, $P(B') = 0.7$, $P(A \cap B) = 0.2$ Find $P(B)$, $P(A \cup B)$

4th question: -

(A) Find $n(x)$ in the simplest form showing its domain where: $n(x) = \frac{2x}{x^2-1} \div \frac{1}{x-1}$

(B) Find the Solution set of the following equations together: $2x - y = 1$, $x + y = 2$

5th question:

(A) Prove that $n_1 = n_2$ where $n_1(x) = \frac{x^2+1}{x^3+x}$, $n_2(x) = \frac{2x^2+3}{2x^3+3x}$

(B) Draw the graph of the following function $f(x) = x^2 - 4x + 3$ Where $x \in [0,4]$

From the drawing find the Solution set of the equation $x^2 - 4x + 3 = 0$

-((انتهت الأسئلة))-

Algebra 2017
- 2nd term -

Q.1 Choose

1. (c) $\{0, 1\}$
2. (c) $\frac{2}{3}$
3. (b) $R - \{0, 2\}$
4. (a) 0.4
5. (d) ϕ
6. (c) 3

Q.2 (a) $x^2 - 2x - 1 = 0$, $\sqrt{2} \simeq 1.4$

$a = 1$, $b = -2$, $c = -1$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{2 \pm \sqrt{4 + 4 \times 1 \times 1}}{2 \times 1}$$

$$= \frac{2 \pm \sqrt{8}}{2} = \frac{2 \pm 2\sqrt{2}}{2} \quad \begin{cases} \frac{2 + 2\sqrt{2}}{2} = 2.4 \\ \frac{2 - 2\sqrt{2}}{2} = -0.4 \end{cases}$$

$\therefore$ S.S $= \{2.4, -0.4\}$

(b) $$n(x) = \frac{x^2 - 1}{x^2 - 3x + 2} \times \frac{x - 2}{x + 1}$$

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

$\therefore$ domain $= R - \{2, 1, -1\}$

$\therefore \boxed{n(x) = 1}$

$\boxed{Q.3}$ (a) $X - Y = 1$ (1)

$X^2 + Y^2 = 5$ (2)

From (1) $\boxed{X = Y + 1}$, substituting in (2)

$\therefore (Y+1)^2 + Y^2 = 5$

$Y^2 + 2Y + 1 + Y^2 - 5 = 0 \quad \therefore 2Y^2 + 2Y - 4 = 0$

dividing by 2 : $\quad \therefore Y^2 + Y - 2 = 0$

$\therefore (Y+2)(Y-1) = 0$

$\therefore Y = -2$, $\quad Y = 1$

$\therefore X = Y + 1 \quad X = Y + 1$

$= -2 + 1 \quad = 1 + 1$

$X = -1 \quad X = 2$

$\therefore S.S = \{(-1, -2), (2, 1)\}$

(b) $P(A) = 0.6$, $P(B') = 0.7$

$P(A \cap B) = 0.2$

$\therefore P(B) = 1 - P(B') = 1 - 0.7 = 0.3$

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

$= 0.6 + 0.3 - 0.2 = 0.7$

Q.4

(a) $n(x) = \dfrac{2x}{x^2-1} - \dfrac{1}{x-1}$

$\therefore n(x) = \dfrac{2x}{(x-1)(x+1)} - \dfrac{1}{x-1}$

$\therefore$ domain $= R - \{1, -1\}$

$\therefore n(x) = \dfrac{2x}{(x-1)(x+1)} - \dfrac{1(x+1)}{(x-1)(x+1)}$

$= \dfrac{2x-(x+1)}{(x-1)(x+1)} = \dfrac{2x-x-1}{(x-1)(x+1)} = \dfrac{\cancel{x-1}}{\cancel{(x-1)}(x+1)}$

$\therefore n(x) = \dfrac{1}{x+1}$

(b) $2x - \cancel{y} = 1$ (1)

$x + \cancel{y} = 2$ (2) by adding (1)+(2)

$3x = 3$ $\therefore \boxed{x = 1}$

From (1) $\therefore 2(1) - y = 1$

$2 - y = 1$

$-y = 1 - 2$

$-y = -1$

$\therefore \boxed{y = 1}$

$\therefore$ S.S $= \{(1, 1)\}$

Q.5 (a) $n_1(x) = \dfrac{x^2+1}{x^3+x}$

$n_1(x) = \dfrac{\cancel{x^2+1}}{x\cancel{(x^2+1)}}$

domain $= R - \{0\}$

$n_1(x) = \dfrac{1}{x}$

$n_2(x) = \dfrac{2x^2+3}{2x^3+3x}$

$n_2(x) = \dfrac{\cancel{2x^2+3}}{x\cancel{(2x^2+3)}}$

domain $= R - \{0\}$

$n_2(x) = \dfrac{1}{x}$

$\because$ domain of n_1 = domain of n_2

& $n_1(x) = n_2(x)$

$\therefore n_1 = n_2$

(b) $f(x) = x^2 - 4x + 3$, $x \in [0, 4]$

x	0	1	2	3	4
$f(x)$	3	0	-1	0	3

Vertex $(2, -1)$

Min value $= -1$

eqn. of axis of symmetry is $x = 2$

From the graph points of intersection with x-axis is $(1, 0)$ and $(3, 0)$

$\therefore$ S.S $= \{1, 3\}$