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Third Year Preparatory Exam for our Sons Abroad – Second Term 2018

Algebra & statistics

Time: 2 hours

(الفصل الدراسي الثاني ٢٠١٨)

الصف الثالث الاعدادي

مادة : الجبر والإحصاء بالإنجليزية

يسمح باستخدام الآلة الحاسبة

تنبيه هام : (يسلم الطالب ورقة امتحانيه باللغة العربية مع الورقة المترجمة) .

Answer the following questions:

First Question: Choose the correct answer:

- 1) The domain of the function n^{-1} where: $n(x) = \frac{x+4}{x-4}$ is.....
{ R or $R - \{-4\}$ or $R - \{4\}$ or $R - \{-4, 4\}$ }
- 2) The probability of the impossible event is.....
{ Φ or zero or 1 or -1 }
- 3) The two straight lines $3x + 5y = 0$ and $5x - 3y = 0$ intersects at
{ the origin point or first quadrant or second quadrant or fourth quadrant }
- 4) If $A \subset B$ then $P(A \cup B) = \dots\dots\dots$,
{ zero or $P(A)$ or $P(b)$ or $P(A \cap B)$ }
- 5) The set of zeroes of the function $f(x) = 9$ is
{ {9} or {0} or Φ or $R - \{9\}$ }
- 6) If the two straight lines $x + 2y = 4$ and $2x + ky = 11$ are parallel then $k = \dots\dots\dots$
{ 4 or 1 or -1 or 2 }

Second Question:

- 1) Find $n(x)$ in its simplest form showing its domain where $n(x) = \frac{x^2-2x}{x^2-4} + \frac{2x+6}{x^2+5x+6}$
- 2) By using the general formula solve the equation $x^2 - 5x + 3 = 0$ where $\sqrt{13} \approx 3.6$

Third Question:

- 1) Find the solution set the following two equations in $R \times R$
 $x - 5y = 0$ and $x^2 + y^2 = 26$
- 2) Find $n(x)$ in its simplest form showing its domain where $n(x) = \frac{x^2-3x+2}{x^2-1} \times \frac{x^2-4x-5}{3x-15}$

Fourth Question:

- 1) Find the solution set the following two equations in $R \times R$: $x + y = 4$, $x - y = 2$
- 2) If $n_1(x) = \frac{x}{x+2}$, $n_2(x) = \frac{2x}{2x+4}$ prove that $n_1 = n_2$

Fifth Question:

- 1) If A, B are two events in a sample space of a random experiment,
 $P(A) = 0.3$. $P(B) = 0.6$. $P(A \cap B) = 0.2$ find:
First: $p(A \cup B)$ Second: $p(A^c)$
- 2) Represent graphically the curve of the function $f(x) = x^2 + 2x + 3$ taking $x \in [-3, 1]$
from the graph find the solution set of the function $x^2 + 2x + 3 = 0$

★(((انتهت الأسئلة)))★

Algebra 2018
- 2nd term -

Q.1 choose:-

- ① $R = \{-4, 4\}$
- ② zero
- ③ the origin point.
- ④ $P(B)$
- ⑤ Φ
- ⑥ $K = 4$

Q.2 ①

$$n(x) = \frac{x^2 - 2x}{x^2 - 4} + \frac{2x + 6}{x^2 + 5x + 6}$$

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

$$\therefore \text{domain} = R - \{2, -2, -3\}$$

Reduce:-

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

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

$$\textcircled{2} \quad x^2 - 5x + 3 = 0, \quad \sqrt{13} \approx 3.6$$

$a = 1, \quad b = -5, \quad c = 3$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{5 \pm \sqrt{25 - 4 \times 1 \times 3}}{2 \times 1}$$

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

$\frac{5 + \sqrt{13}}{2} = 4.3$
 $\frac{5 - \sqrt{13}}{2} = 0.7$

$$\therefore S.S = \{4.3, 0.7\}^2$$

①

Q.3 (1) $X - 5Y = 0 \rightarrow (1)$, $X^2 + Y^2 = 26 \rightarrow (2)$

From (1)

$\therefore [X = 5Y]$ substitute in (2)

$$\therefore (5Y)^2 + Y^2 = 26$$

$$\therefore 25Y^2 + Y^2 = 26$$

$$\therefore 26Y^2 = 26$$

$$\therefore Y^2 = 1$$

$$\therefore Y = 1$$

$$, Y = -1$$

$$X = 5Y$$

$$, X = 5Y$$

$$X = 5$$

$$X = -5$$

$$\therefore S-S = \{(5, 1), (-5, -1)\}$$

(2)

$$n(X) = \frac{X^2 - 3X + 2}{X^2 - 1} \times \frac{X^2 - 4X - 5}{3X - 15}$$

$$\therefore n(X) = \frac{(X-2)(\cancel{X-1})}{(\cancel{X-1})(\cancel{X+1})} \times \frac{(\cancel{X-5})(\cancel{X+1})}{3(\cancel{X-5})}$$

\therefore domain = $\mathbb{R} - \{1, -1, 5\}$
after reducing:-

$$\therefore n(X) = \frac{X-2}{1} \times \frac{1}{3}$$

$$\therefore n(X) = \frac{X-2}{3}$$

(2)

Q.4

$$\begin{array}{ll} \textcircled{1} & X + Y = 4 \\ & X - Y = 2 \end{array} \quad \begin{array}{l} \textcircled{1} \\ \textcircled{2} \end{array}$$

by adding $\textcircled{1} + \textcircled{2}$

$$X + Y = 4$$

$$X - Y = 2$$

$$\hline 2X = 6$$

$$\therefore \boxed{X = 3}$$

substituting in $\textcircled{1}$

$$\therefore 3 + Y = 4$$

$$\therefore Y = 4 - 3$$

$$\therefore \boxed{Y = 1}$$

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

$$\textcircled{2} \quad n_1(X) = \frac{X}{X+2}, \quad n_2(X) = \frac{2X}{2X+4}$$

$$\text{domain} = \mathbb{R} - \{-2\} \quad \left\{ \begin{array}{l} n_2(X) = \frac{2X}{2(X+2)} \\ \therefore \text{domain} = \mathbb{R} - \{-2\} \end{array} \right.$$

$$n_1(X) = \frac{X}{X+2}$$

$$\therefore \text{domain} = \mathbb{R} - \{-2\}$$

$$n_2(X) = \frac{X}{X+2}$$

\therefore domain of n_1 = domain of n_2

$$\leftarrow n_1(X) = n_2(X)$$

$$\therefore \underline{n_1 = n_2}$$

$\textcircled{3}$

Q.5

$$\textcircled{1} \quad P(A) = 0.3$$

$$P(B) = 0.6$$

$$P(A \cap B) = 0.2$$

$$\begin{aligned} P(A \cup B) &= P(A) + P(B) - P(A \cap B) \\ &= 0.3 + 0.6 - 0.2 \\ &= 0.7 \end{aligned}$$

$$\begin{aligned} P(A') &= 1 - P(A) \\ &= 1 - 0.3 \\ &= 0.7 \end{aligned}$$

$$\textcircled{2} \quad f(x) = x^2 + 2x + 3, \quad x \in [-3, 1]$$

x	-3	-2	-1	0	1
f(x)	6	3	2	3	6

Vertex point $(-1, 2)$

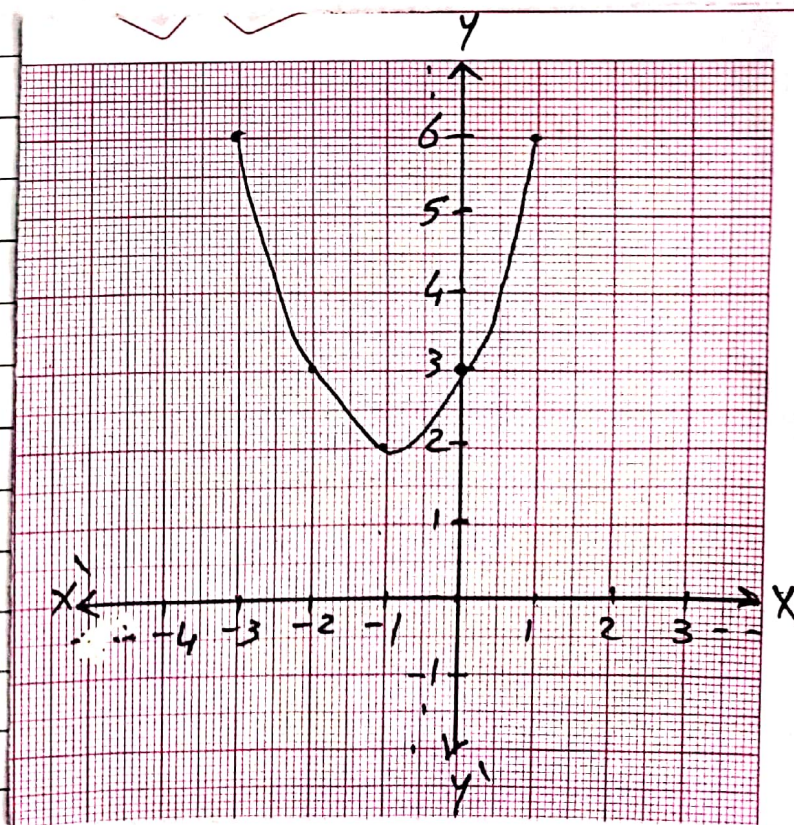
Min Value = 2

eqn. of axis of symmetry is $x = -1$

From the graph:-

The curve doesn't intersect x-axis

$$\therefore S.S = \emptyset$$



(4)