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Arab Republic of Egypt
Ministry of Education
The completion of the basic education certificate
Examination 2016 for our sons abroad

E٣٣٠٩

Algebra, statistics (Second Term) **Time : 2 hours**

مادة : الجبر والإحصاء بالإنجليزية الصف الثالث الاعدادى (الفصل الدراسى الثاني ٢٠١٦)

تنبيه هام : (يسلم الطالب ورقة امتحانية باللغة العربية مع الورقة المترجمة) يسمح باستخدام الآلة الحاسبة

Answer the following questions: **Calculator is allowed**

First question: Choose the correct answer of the following:

(1) The solution set of the equation $9 - x^2 = 0$ is .....

(a) 3 (b) -3 (c) {3,-3} (d) ∅

(2) If $P(a) = P(a')$ then $P(a)$ =.....

(a) 1 (b) $\frac{1}{2}$ (c) 0.25 (d) zero

(3) If $n(x) = \frac{3}{x} + \frac{1}{x}$ then $n^{-1}(x)$ = ...

(a) $\frac{-4}{x}$ (b) $\frac{4}{x}$ (c) $\frac{x}{4}$ (d) $\frac{-x}{4}$

(4) If a,b are two mutual exclusive events then $P(a \cup b)$ = ...

(a) P (a) (b) $P(\bar{a})$ (c) P (a) + P (b) (d) P (b)

(5) If $x = 3$ & $y^2 = x + 6$ then y = ...

(a) 10 (b) 3 (c) -3 (d) ±3

(6) The set of zeros of the function $f(x) = x(x + 1)$ is .....

(a) {-1,0} (b) {Zero} (c) (-1,0) (d) {-1}

Second question:

a) Using the formula to solve the equation $x^2 = 3x - 1$ in R where $\sqrt{5} = 2.226$

b) Find n(x) in the simplest form and showing the domain of n. Where $n(x) = \frac{x-3}{x^2-9} \times \frac{x^2+2x}{3x^2+6x}$.

Third question:

a) Find the solution set for the two equations together $x - 2y = 0$, $x^2 + y^2 = 20$

b) If a and b are two events in a sample space of a random experiment and $P(a) = 0.6$, $P(b) = 0.7$, $P(a \cap b) = 0.5$. Find $P(\bar{a})$, $P(a \cup b)$.

Fourth question:

a) Find n(x) in the simplest form and showing the domain of n where :

$$n(x) = \frac{4x-16}{x^2-16} + \frac{x^2+x}{x^2+5x+4}.$$

b) Find the solution set for the two equations $3x + y = 5$, $x - y = -1$.

Fifth question:

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

b) Draw the graph of the function $f(x) = x^2 - 2$. Taking that $x \in [-1,3]$. From the graph find the solution set for the equation: $x^2 - 2x = 0$

(انتهت الأسئلة)

Algebra 2016
– 2nd term –

Q.1 Choose: ① (c) $\{3, -3\}$ ② (b) $\frac{1}{2}$ ③ (c) $\frac{x}{4}$ ④ (c) $P(a)+P(b)$ ⑤ (d) ± 3 ⑥ (a) $\{-1, 0\}$

Q.2 (a) $x^2 = 3x - 1$ $\therefore x^2 - 3x + 1 = 0$

$\therefore a = 1, b = -3, c = 1$, $\sqrt{5} = 2.226$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{3 \pm \sqrt{9-4\times1\times1}}{2\times1} = \frac{3\pm\sqrt{5}}{2}$$

$$x \begin{cases} \frac{3+\sqrt{5}}{2} = 2.613 \\ \frac{3-\sqrt{5}}{2} = 0.387 \end{cases}$$

$\therefore S.S = \{2.613, 0.387\}$

(b) $n(x) = \frac{x-3}{x^2-9} \times \frac{x^2+2x}{3x^2+6x}$

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

$\therefore$ domain $= R - \{3, -3, 0, -2\}$

after reduction:

$\therefore n(x) = \frac{1}{x+3} \times \frac{1}{3} = \frac{1}{3(x+3)}$

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

Q.3

(a) $x - 2y = 0$ ①

$x^2 + y^2 = 20$ ②

From ① $\boxed{x = 2y}$, substitute in ②

$\therefore (2y)^2 + y^2 = 20$

$4y^2 + y^2 = 20$

$5y^2 = 20 \quad (\div 5)$

$\therefore y^2 = 4 \quad \therefore y = 2 \quad , y = -2$

$x = 2y$

$x = 2(2)$

$x = 4$

$x = 2y$

$x = 2(-2)$

$x = -4$

$\therefore S.S = \{(4, 2), (-4, -2)\}$

(b) $P(a) = 0.6 \quad , P(b) = 0.7$

$P(a \cap b) = 0.5$

$P(a') = 1 - P(a) = 1 - 0.6$

$\therefore P(a') = 0.4$

$P(a \cup b) = P(a) + P(b) - P(a \cap b)$

$= 0.6 + 0.7 - 0.5$

$= 0.8$

Q.4

(a) $n(x) = \frac{4x-16}{x^2-16} + \frac{x^2+x}{x^2+5x+4}$

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

domain $= R - \{4, -4, -1\}$

$\therefore n(x) = \frac{4}{x+4} + \frac{x}{x+4} = \frac{x+4}{x+4}$

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

(b) $3x + y = 5$ (1)

$x - y = -1$ (2)

by adding (1) + (2)

$\therefore 4x = 4$ $\therefore \boxed{x = 1}$

substitute in (1)

$\therefore 3 + y = 5$ $\therefore \boxed{y = 2}$

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

Q.5

(a) $n_1(x) = \frac{x^2+3}{x^3+3x}$, $n_2(x) = \frac{2x^2+3}{2x^3+3x}$

$n_1(x) = \frac{x^2+3}{x(x^2+3)}$

domain $= R - \{0\}$

$\therefore n_1(x) = \frac{1}{x}$

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

domain $= R - \{0\}$

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

$\because$ domain of $n_1(x)$ = domain of $n_2(x)$

$\because n_1(x) = n_2(x)$

$\therefore n_1 = n_2$

(b) $F(x) = x^2 - 2$, $x \in [-1, 3]$

x	-1	0	1	2	3
F(x)	-1	-2	-1	2	7

Find $F(-2) = (-2)^2 - 2$

$= 2$

vertex point $(0, -2)$

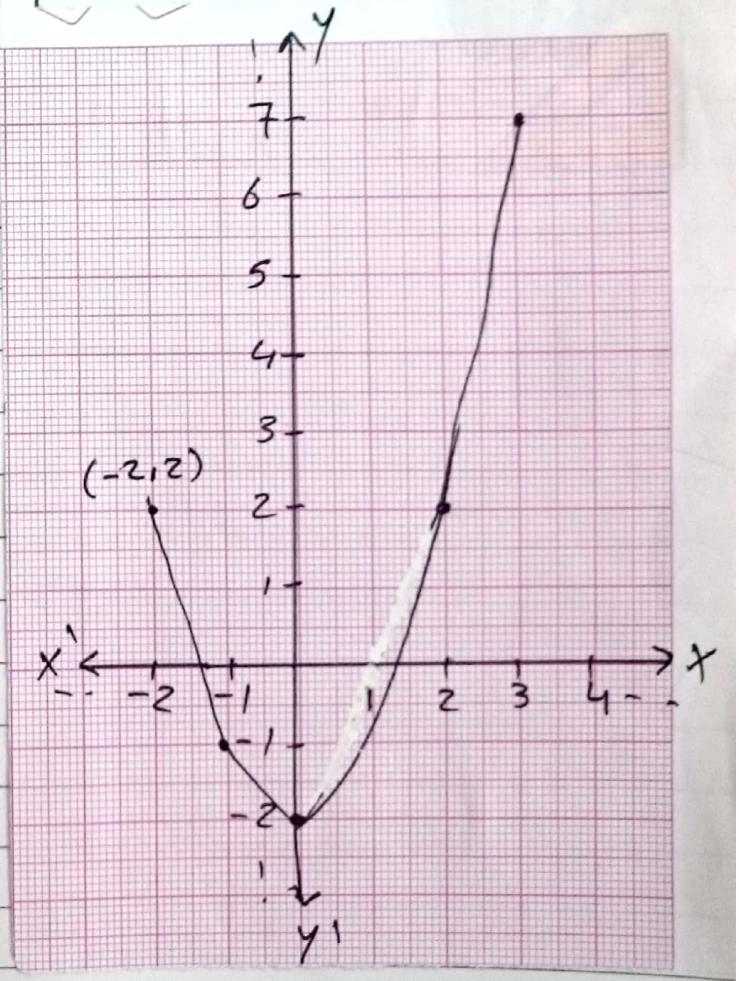
Min value $= -2$

eqn. is $x = 0$

From the graph :

S.S. $= \{\sqrt{2}, -\sqrt{2}\}$

$\simeq \{1.4, -1.4\}$



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