ALGEBRA

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1 EQUATIONS

Solving two equations in two variables – Solving two equations of second degree in one unknown – General formula – Set of zeroes of the polynomial functions.

SOLVING TWO EQUATION OF THE FIRST DEGREE IN TWO VARIABLES

1 The solution set of the two equation : $x + y = 0$, $y - 5 = 0$ in : $\mathbb{R} \times \mathbb{R}$ is ..... *(Alex 11 , Aswan 18)*

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

2 The solution set of the two equation : $x - 2y = 1$, $3x + y = 10$ in : $\mathbb{R} \times \mathbb{R}$ is ..... *(Souhag 18 , Fayoum 11)*

ⓐ $\{(5, 2)\}$ ⓑ $\{(2, 4)\}$ ⓒ $\{(1, 3)\}$ ⓓ $\{(3, 1)\}$

3 The two straighy lines : $x + 2y = 1$, $2x + 4y = 6$ are ..... *(South Sini 21 , Ismaillia 21)*

ⓐ Parallel ⓑ Perpendicular ⓒ Coincident ⓓ intersecting

4 The two straight lines : $3x + 5y = 0$, $5x - 3y = 0$ are intersected in the ..... *(Alex 14 , Beheira 11 , Assiut 21)*

ⓐ Origin point ⓑ first quadrant ⓒ second quadrant ⓓ fourth quadrant

5 The Solution set of the two equations : $x = 3$, $y = 4$ is ..... *(Qalyubia 21 , Minya 21)*

ⓐ $\{(3, 4)\}$ ⓑ $\{(4, 3)\}$ ⓒ $\mathbb{R}$ ⓓ ϕ

6 The S.S in $\mathbb{R} \times \mathbb{R}$ of the two equations : $y - 3 = 0$, $y + x = 0$ is ..... *(Ismailia 12)*

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

7 The two straight lines representing the two equations : $2x - y = 4$, $2x - 3 = y$ are .....

ⓐ Parallel ⓑ Perpendicular ⓒ Coincident ⓓ intersecting

8 The two straight lines representing the two equations : $x - y = 2$, $2x - 2y = 4$ are .....

ⓐ Parallel ⓑ Perpendicular ⓒ Coincident ⓓ intersecting

9 If there are infinite number of solutions in $\mathbb{R} \times \mathbb{R}$ of the two equations : $x + 4y = 7$, $3x + ky = 21$

Then : $k =$ ..... *(Souhag 19 , Beheira 18 , Qena 17 , Dakahlia 12 , Giza 21)*

ⓐ 4 ⓑ 7 ⓒ 12 ⓓ 21

10 If the two equations : $x + 2y = 1$, $2x + ky = 2$ has only one solution for , Then $k \neq$ ..... *(Giza 18)*

ⓐ 2 ⓑ 3 ⓒ 4 ⓓ – 4

11 If the point of intersection of the two equations : $x - 3 = 0$ and $y + 2k = 5$ lies on the fourth quadrant , Then k may be equals .....

ⓐ – 1 ⓑ – 2 ⓒ 1 ⓓ 3

12 The number of solutions of the equation : $x + y = 5$ in $\mathbb{R} \times \mathbb{R}$ is .....

ⓐ zero ⓑ 1 ⓒ 2 ⓓ Infinite numbers

13 The number of solutions of the equation : $x = 3$ in $\mathbb{R}$ is .....

ⓐ zero ⓑ 1 ⓒ 2 ⓓ Infinite numbers

14 The number of solutions of the equation : $x = 7$ in $\mathbb{R} \times \mathbb{R}$ is ..... *(Cairo 21)*

ⓐ Infinite numbers ⓑ zero ⓒ 1 ⓓ 2

15 The point of intersection of the two straight lines : $x = 2$ and $x + y = 6$ is ..... *(Alex 18)*

ⓐ $(2, 6)$ ⓑ $(2, 4)$ ⓒ $(4, 2)$ ⓓ $(6, 2)$

16 The point of intersection of the two straight lines : $2x - y = 3$ and $2x + y = 5$ lies on the .....

ⓐ First quadrant. ⓑ Second quadrant. ⓒ Third quadrant. ⓓ Fourth quadrant.

17 If the point of intersection of the two straight lines : $x - 1 = 0$ and $y = 2k$ lies on the fourth quadrant , then k may be equal ..... *(K.El.Sheikh 16)*

ⓐ -5 ⓑ 0 ⓒ 1 ⓓ 5

18 The two straight lines : $3x = 7$ and $2y = 9$ are ..... *(matrouh 16 , luxor 17)*

ⓐ Parallel ⓒ Coincide

ⓒ Intersect and non-perpendicular ⓓ perpendicular

19 If the two straight lines which represent the two equations : $x + 3y = 4$ and $x + ay = 7$ are parallel , then $a =$ ..... *(Port Said 18)*

ⓐ 6 ⓑ 1 ⓒ -3 ⓓ 3

20 If the point $(9, 2)$ belong to the set of solutions of the equation : $x - ky = 3$, then $k =$ .....

ⓐ 1 ⓑ 2 ⓒ 3 ⓓ 6

21 Two numbers their sum = 13 and their difference is 5 , then the two number are .....

ⓐ 7 and 6 ⓑ 8 and 5 ⓒ 9 and 4 ⓓ 10 and 3

22 Three years ago , ahmed's age was x years , then his age after 5 years is .....

ⓐ $x + 3$ ⓑ $x + 5$ ⓒ $x + 8$ ⓓ $x + 2$

23 A two-digit-number , ones digit is x and tens digit is y , then the number is .....

ⓐ $x + 10y$ ⓑ $y + 10x$ ⓒ xy ⓓ $x + y$

24 If the sum of ages of a father and his son now is 47 years , then the sum of their ages after 10 years = ... years *(Giza 18)*

ⓐ 27 ⓑ 37 ⓒ 57 ⓓ 67

25 If $(5, x - 4) = (y + 2, 3)$, then : $x + y =$ ..... *(Luxor 18)*

ⓐ 6 ⓑ 8 ⓒ 10 ⓓ 12

26 If $(5, x + 1) = (y, 3)$, then : $x + y =$ ..... *(Damietta 21)*

ⓐ 3 ⓑ 5 ⓒ 7 ⓓ 9

27 The orderd pair which satisfies the equation : $x - y = 1$ is ..... *(Red Sea 21)*

ⓐ $(1, 1)$ ⓑ $(2, 1)$ ⓒ $(1, 2)$ ⓓ $(0.5, 1)$

SOLVING AN EQUATION OF THE SECOND DEGREE IN ONE UNKNOWN

1 The solution set of the equation : $x^2+1=0$ in $\mathbb{R}$ is ..... *(Beni Suef 18)*

ⓐ $\{1\}$ ⓑ $\{-1,1\}$ ⓒ $\{-1\}$ ⓓ ϕ

2 The solution set of the equation : $x^2-4=0$ in $\mathbb{R}$ is ..... *(South Sini 21 , matrouh 21)*

ⓐ $\{-2,2\}$ ⓑ $\{-2\}$ ⓒ $\{2\}$ ⓓ ϕ

3 If the curve of the quadratic function f passes through the points $(-1,0)$, $(0,-4)$, $(4,0)$ and And $(0,-6)$, Then the solution set of the equation : $f(x)=0$ in $\mathbb{R}$ is ..... *(gharbia 19)*

ⓐ $\{-1,0\}$ ⓑ $\{-4,0\}$ ⓒ $\{-1,4\}$ ⓓ $\{4,-4\}$

4 If the curve of the quadratic function f does not intersect X-axis at any points. , Then the number of solution of the equation : $f(x)=0$ in $\mathbb{R}$ is ..... *(monofia 17)*

ⓐ A unique solution ⓑ zero ⓒ two solution ⓓ An infinite solutions

5 The curve of the function f such that $f(x)=x^2-3x+2$ cuts X – axis at the two points .....

ⓐ $(2,0),(3,0)$ ⓑ $(2,0),(1,0)$ ⓒ $(-2,0),(-1,0)$ ⓓ $(2,0),(-1,0)$

6 The solution set of the equations : $x^2+5x=0$ in $\mathbb{R}$ is .....

ⓐ $\{0,5\}$ ⓑ $\{\frac{-5}{2},0\}$ ⓒ $\{2,5\}$ ⓓ ϕ

7 The solution set of the equations : $x^2-4x+4=0$ in $\mathbb{R}$ is .....

ⓐ $\{-2,2\}$ ⓑ $\{4,1\}$ ⓒ $\{2\}$ ⓓ ϕ

8 The solution set of the equations : $x^2+5=0$ in $\mathbb{R}$ is .....

ⓐ $\{\sqrt{5},-\sqrt{5}\}$ ⓑ $\{-\sqrt{5}\}$ ⓒ $\{\sqrt{5}\}$ ⓓ ϕ

9 In the equations : $ax^2+bx+c=0$ if $b^2-4ac>0$, then the equation has ..... roots in $\mathbb{R}$ *(Fayoum 19 , damietta 16)*

ⓐ 1 ⓑ 2 ⓒ zero ⓓ An infinite solutions

10 If the curve of the function f : $f(x)=ax^2+bx+c$ has a minimum value at $x=2$, then the number of solutions of the equation : $f(x)=0$ in $\mathbb{R}$ is .....

ⓐ 0 ⓑ 1 ⓒ 2 ⓓ An infinite solutions

11 If the point of the vertex of the curve of the function f : $f(x)=x^2+bx+c$ is $(2,8)$. , then the solution set of the equation : $f(x)=0$ in $\mathbb{R}$ is .....

ⓐ $\{2,6\}$ ⓑ $\{-2,6\}$ ⓒ $\{2,-6\}$ ⓓ $\{2,0\}$

12 If the equation of the symmetry line of the curve of the function f : $f(x)=x^2+bx-10$ is $x=\frac{3}{2}$. , then the solution set of the equation : $f(x)=0$ in $\mathbb{R}$ is .....

ⓐ $\{10,-1\}$ ⓑ $\{-2,5\}$ ⓒ $\{2,-5\}$ ⓓ $\{-1,10\}$

13 If : $x = 3$ is one of the solutions of the function f : $f(x) = x^2 - ax + 3$ in $\mathbb{R}$, Then : $a =$ ..... (*Suez 17*)

ⓐ 2 ⓑ 1 ⓒ -1 ⓓ -8

14 If the solution set of the equation : $x^2 - ax + 4 = 0$ in $\mathbb{R}$ is $\{-2\}$, Then : $a =$ ..... (*Gharbia 18*)

ⓐ -2 ⓑ -4 ⓒ 4 ⓓ 2

15 If the curve of the function f : $f(x) = x^2 - x + c$ passes through the points $(2, 1)$, then : $c =$ ..... (*gharbia 18*)

ⓐ 2 ⓑ 1 ⓒ -2 ⓓ -1

16 The solution set of the equation : $ax^2 + bx + c = 0$, $a \neq 0$ graphically is the set of X coordinates of the point of intersection of the curve of the function f : $f(x) = ax^2 + bx + c$ with the ..... (*Damiettaa 18*)

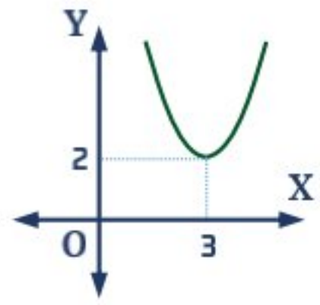
ⓐ Y – axis ⓑ X – axis ⓒ Symmetric line ⓓ Straight line $y = 2$

17 In the opposite figure :

The solution set of f : $f(x) = 0$ is ..... (*Souhag 18*)

ⓐ ϕ ⓑ $\{3\}$

ⓒ $\{2, 3\}$ ⓓ $\{2\}$



18 The equation of the symmetric axis of the curve of the function f where $f(x) = x^2 - 4$ is is ..... (*K.El.Sheikh 21*)

ⓐ $x = -4$ ⓑ $x = 0$ ⓒ $y = 0$ ⓓ $y = -4$

SOLVING TWO EQUATION OF THE FIRST DEGREE IN TWO VARIABLES

1 The S.S of the two equations : $x - y = 0$, $xy = 9$ in $\mathbb{R} \times \mathbb{R}$ is ..... (*Qena 18 , gharbia 11*)

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

2 If : $x + y = 3$, $x^2 - y^2 = 6$ in $\mathbb{R} \times \mathbb{R}$, then $(x - y) =$ .....

ⓐ 18 ⓑ 9 ⓒ 3 ⓓ 2

3 If : $x^2 + y^2 = 9$, $(x + y)^2 = 17$, then : $xy =$ .....

ⓐ 16 ⓑ 8 ⓒ 4 ⓓ 2

4 one of the solutions of the two equations : $x - y = 2$, $x^2 + y^2 = 20$ is ..... (*Kalyoubia 19 , Qena 17*)

ⓐ $(-4, 2)$ ⓑ $(2, -4)$ ⓒ $(3, 1)$ ⓓ $(4, 2)$

5 The degree of the equation : $3x + 4y + xy = 5$ is ..... (*Port Said 18 , Beheira 21*)

ⓐ Zero ⓑ First ⓒ Second ⓓ Third

6 one solution of the equation : $x^2 - y^2 = 3$ in $\mathbb{R} \times \mathbb{R}$ is .....

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

7 The ordered pair that satisfies each of the two equations : $xy = 2$, $x - y = 1$ is ..... (*Sharkia 12*)

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

8 The solution set of the two equations : $x = y$, $xy = 1$ in $\mathbb{R} \times \mathbb{R}$ is .....

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

9 If : $y = 1 - x$, $(x+y)^2 + y = 5$, Then : $y =$ ..... (*Fayoum 12*)

ⓐ 5 ⓑ 3 ⓒ 4 ⓓ -4

10 If : $x^2 + xy = 15$, $x + y = 5$, Then : $x =$ .....

ⓐ 3 ⓑ 4 ⓒ 5 ⓓ 6

11 If the difference between two numbers is 1 and the square of their sum is 25 , then the two numbers are .....

ⓐ 1 , 2 ⓑ 2 , 3 ⓒ 3 , 4 ⓓ 4 , 5

12 Two positive numbers , their sum is 9 and their product is 8 , then the two numbers are ..... (*Giza 12*)

ⓐ 2 , 7 ⓑ 3 , 6 ⓒ 4 , 9 ⓓ 1 , 8

13 If : $x^2 y + x y^2 = 25$, $x + y = 5$, Then : $xy =$ .....

ⓐ 3 ⓑ 4 ⓒ 5 ⓓ 6

14 If : $x + 2y = 5$, $(x + 2y - 3)^2 + 2x = 10$, Then : $x =$ .....

ⓐ 2 ⓑ 3 ⓒ 6 ⓓ -3

SET OF ZEROES OF A POLYNOMIAL FUNCTIONS

1 The set of zeroes of the function f : $f(x) = -3x$ is ..... (*Alex 12 , Giza 17 , Seuz 18 , Damietta 21*)

ⓐ $\{0\}$ ⓑ $\{-3\}$ ⓒ $\{-3,0\}$ ⓓ $\mathbb{R}$

2 The set of zeroes of the function f where $f(x) = 4$ is ..... (*aswan 12 , aswan 17 , Matrouh 19 , Minya 21*)

ⓐ $\{-4\}$ ⓑ $\{0\}$ ⓒ ϕ ⓓ $\{2\}$

3 The set of zeroes of the function f where $f(x) = zero$ is ..... (*Cairo 19 , ismaillia 21*)

ⓐ ϕ ⓑ $\mathbb{R} - \{0\}$ ⓒ $\mathbb{R}$ ⓓ zero

4 The set of zeroes of the function f where $f(x) = x^2 + 9$ is ..... (*Dakahlia 19*)

ⓐ $\mathbb{R}$ ⓑ $\{3\}$ ⓒ $\{3,-3\}$ ⓓ ϕ

5 The set of zeroes of the function f where $f(x) = x^2 - 4$ is ..... (*Qalyubia 21*)

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

6 The set of zeroes of the function f where $f(x) = x(x^2 - 2x + 1)$ is ..... (*Alex 13 , Ismaillia 17*)

ⓐ $\{0,1\}$ ⓑ $\{0,-1\}$ ⓒ $\{-1,1\}$ ⓓ $\{0,1,-1\}$

7 The set of zeroes of f where $f(x) = x - 5$ is ..... (Damietta 11 , Suez 19 , Matrouh 21)

ⓐ $\{$ zero $\}$ ⓑ $\{5\}$ ⓒ $\{-5\}$ ⓓ $\{-5, 5\}$

8 The set of zeroes of f where $f(x) = (x-1)^2 (x+2)$ is ..... (Suez 12)

ⓐ $\{1, -2\}$ ⓑ $\{-1, 2\}$ ⓒ $\{-1, -2\}$ ⓓ $\{1, 2\}$

9 If : $z(f) = \{2\}$, $f(x) = x^3 - m$, then : $m =$ ..... (Ismaillia 12 , Sharkia 14 , Qena 15)

ⓐ $\sqrt[3]{2}$ ⓑ 2 ⓒ 4 ⓓ 8

10 If : $z(f) = \{1, -2\}$, $f(x) = x^2 + x + a$, then : $a =$ ..... (Sharkia 14 , Qena 15)

ⓐ 28 ⓑ 1 ⓒ -1 ⓓ -2

11 If : $z(f) = \{5\}$, $f(x) = x^3 - 3x^2 + a$, then : $a =$ ..... (Assiut 11 , Port said 14)

ⓐ $\sqrt[3]{2}$ ⓑ 2 ⓒ 4 ⓓ 8

12 If $\{-2, 2\}$ is the set of zeroes of the function f where $f(x) = x^2 + a$, then : $a =$ ..... (Sharkia 21)

ⓐ 2 ⓑ -2 ⓒ 4 ⓓ -4

13 If the set of zeroes of the function f : $f(x) = x^2 + kx + 1$ is ϕ , then : k may equal ..... (Sharkia 15)

ⓐ 3 ⓑ 2 ⓒ 1 ⓓ -2

14 If the set of zeroes of the function f where $f(x) = ax + (b-2)$ is $\{2\}$, $a - b = 4$, then : $a =$ .....

ⓐ 1 ⓑ 2 ⓒ -2 ⓓ -1

15 If the set of zeroes of the function f : $f(x) = x^2 + ax + 4$ equals to the set of zeroes of the Function g : $g(x) = x - 2$, then : $a =$ .....

ⓐ 2 ⓑ -2 ⓒ -4 ⓓ 4

16 If $\{3\}$ is the set of common zeroes between the two function f : $f(x) = x^2 - ax$ and g : $g(x) = ax + b$, then : $b =$ .....

ⓐ 3 ⓑ -3 ⓒ 9 ⓓ -9

17 If : $a \in$ the set of zeroes of the function $f(x) = x^2 - 2x - 3$ and $a \notin$ the set of zeroes of the function $g(x) = x + 1$, then : $a \in$ .....

ⓐ $\{3\}$ ⓑ $\{-1, 3\}$ ⓒ $\{-1, 3, 5\}$ ⓓ $\{3, 5\}$

18 If : $f(x) = ax^2 + bx + c$ and $f(x) = 0$ to each $x \in \{0, 2\}$, then : $2a + b + c =$ .....

ⓐ 2 ⓑ 4 ⓒ 0 ⓓ 20

19 The set of zeroes of the function f where $f(x) = x^3 - 3x^2 - 4x + 12$ is .....

ⓐ $\{3\}$ ⓑ $\{-2, 2\}$ ⓒ $\{-2, 2, 3\}$ ⓓ $\{2, 3\}$

2 ALGEBRIC FRACTIONS

The domain of the algebraic fractions – The common domain

Reducing the algebraic fractions – Operations on the algebraic fractions.

ALGEBRAIC FRACTIONAL FUNCTION

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

ⓐ $\{1\}$ ⓑ $\{-2\}$ ⓒ $\mathbb{R}-\{2\}$ ⓓ $\mathbb{R}-\{1\}$

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

ⓐ $\mathbb{R}-\{0\}$ ⓑ $\mathbb{R}-\{-1,3\}$ ⓒ $\mathbb{R}-\{0,1\}$ ⓓ $\mathbb{R}-\{1,-3\}$

3 The domain of the function f where $f(x) = \frac{x+2}{5x}$ is ..... (Kalyoubia 17)

ⓐ $\mathbb{R}-\{5\}$ ⓑ $\mathbb{R}-\{-5\}$ ⓒ $\mathbb{R}$ ⓓ $\mathbb{R}-\{$ zero $\}$

4 The domain of the function f where $f(x) = \frac{x^2+2}{x^2+4}$ is .....

ⓐ $\mathbb{R}$ ⓑ $\mathbb{R}-\{-2,2\}$ ⓒ $\{-2,2\}$ ⓓ $\{2,3\}$

5 The domain of the function f where $f(x) = \frac{x(x+2)}{x^2-4}$ is .....

ⓐ $\mathbb{R}$ ⓑ $\mathbb{R}-\{-2,2\}$ ⓒ $\mathbb{R}-\{0,2\}$ ⓓ $\mathbb{R}-\{2\}$

6 The domain of the function f where $f(x) = \frac{x-3}{2}$ is ..... (Giza 17)

ⓐ $\mathbb{R}$ ⓑ $\mathbb{R}-\{0\}$ ⓒ $\mathbb{R}-\{-1,0\}$ ⓓ $\mathbb{R}-\{1,0\}$

7 The domain of the function f where $f(x) = \frac{x-7}{3(x+1)}$ is .....

ⓐ $\mathbb{R}$ ⓑ $\mathbb{R}-\{1\}$ ⓒ $\mathbb{R}-\{-1,3\}$ ⓓ $\mathbb{R}-\{-1\}$

8 If : $f(x) = \frac{x^2-9}{x+b}$, $f(4) = 1$, then : $b =$ .....

ⓐ -7 ⓑ 7 ⓒ 3 ⓓ -3

9 If : $n(x) = \frac{7}{x+a}$, and the domain of the function n is $\mathbb{R}-\{-2\}$, then : $a =$ ..... (Monofia 11)

ⓐ -2 ⓑ 2 ⓒ 0 ⓓ 7

10 The domain of the function f where $f(x) = x^2-4$ is ..... (Dakahlia 21)

ⓐ $\mathbb{R}-\{2,-2\}$ ⓑ $\mathbb{R}-\{0\}$ ⓒ $\mathbb{R}$ ⓓ ϕ

11 If : $n_1(x) = \frac{-7}{x+2}$, $n_2(x) = \frac{x}{x-k}$ and The common domain of the two functions n_1 and n_2 is $\mathbb{R}-\{-2,7\}$, then $k =$ ..... (North Sini 12)

ⓐ 2 ⓑ -2 ⓒ 7 ⓓ -7

12 The domain of the function f : $f(x) = \frac{x^2 - 5x - 14}{x^2 + 9}$ is ..... (Arab republic of Egypt 21)

ⓐ $\mathbb{R}$ ⓑ $\mathbb{R} - \{-3\}$ ⓒ $\mathbb{R} - \{3, -3\}$ ⓓ $\mathbb{R} - \{2, -7\}$

13 If : $n_1(x) = \frac{x+2}{x-1}$, $n_2(x) = \frac{x-5}{x+3}$, then The common domain of the two functions is ..... (Cairo 12)

ⓐ $\mathbb{R} - \{1, -2\}$ ⓑ $\mathbb{R}$ ⓒ $\mathbb{R} - \{5, -3\}$ ⓓ $\mathbb{R} - \{1, -3\}$

14 The common domain of the two functions n_1 and n_2 where : $n_1(x) = 3x - 15$, $n_2(x) = x^2 - 4$ is .....

ⓐ $\mathbb{R} - \{5\}$ ⓑ $\mathbb{R} - \{-3\}$ ⓒ $\mathbb{R} - \{2, -2, 5\}$ ⓓ $\mathbb{R}$

15 The common domain of the two functions : $f_1(x) = \frac{1}{x-1}$, $f_2(x) = \frac{1}{x^2 + 4}$ is ..... (Sharkia 12)

ⓐ $\mathbb{R}$ ⓑ $\mathbb{R} - \{1\}$ ⓒ $\mathbb{R} - \{1, 2\}$ ⓓ $\mathbb{R} - \{1, 2, -2\}$

16 If the domain of the algebraic fraction n is $\mathbb{R} - \{2, 3, 4\}$, then : $n(3) =$ ..... (Sharkia 19)

ⓐ 3 ⓑ 2 ⓒ 4 ⓓ Undefined

17 If the domain of the function n : $n(x) = \frac{x+2}{4x^2 + kx + 9}$ is $\mathbb{R} - \{\frac{-3}{2}\}$, then : $k =$ ..... (Kafr El Sheikh 19)

ⓐ 3 ⓑ 2 ⓒ 4 ⓓ Undefined

THE SET OF ZEROES OF THE ALGEBRAIC FRACTIONAL FUNCTIONS

1 The set of zeroes of the function f where $f(x) = \frac{x^2 - 9}{x - 3}$ is ..... (Monofia 17)

ⓐ $\{3\}$ ⓑ $\{-3\}$ ⓒ $\{-3, 3\}$ ⓓ ϕ

2 The set of zeroes of the function f where $f(x) = \frac{x^2 - x - 2}{x^2 + 4}$ is ..... (Gharbia 17)

ⓐ $\{2, -2\}$ ⓑ $\{-2, -1\}$ ⓒ $\{2, -1\}$ ⓓ $\{1, -1\}$

3 The set of zeroes of the function f where $f(x) = \frac{(x-5)(x-4)}{x^2 + 16}$ is ..... (monofia 12)

ⓐ $\{2, -2\}$ ⓑ $\{-2, -1\}$ ⓒ $\{2, -1\}$ ⓓ $\{1, -1\}$

4 The set of zeroes of the function f where $f(x) = \frac{x^3 + 2x^2 - 4x - 8}{x^2 - 4}$ is .....

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

5 If the set of zeroes of the function f where $f(x) = \frac{x^2 + 4x - 12}{x + k}$ is $\{-6\}$ then : $k =$ .....

ⓐ 2 ⓑ −2 ⓒ 1 ⓓ 6

6 If the set of zeroes of the function f where $f(x) = \frac{x^2 - k}{x + 2}$ is $\{2\}$ then : $k =$ .....

ⓐ 2 ⓑ −2 ⓒ 4 ⓓ −4

REDUCING THE ALGEBRAIC FRACTIONS

1 The Simplest form of the function f where $f(x)=\frac{2x^2+x}{x}$ and $x\neq 0$ is ..... (Giza 12)

ⓐ $3x$ ⓑ $2x^2+1$ ⓒ x^2+1 ⓓ $2x+1$

2 The Simplest form of the function f : $f(x)=\frac{5-x}{x-5}$ and $x\neq 5$ is ..... (Sharkia 12)

ⓐ 5 ⓑ 0 ⓒ -1 ⓓ 1

3 The Simplest form of the function f : $f(x)=\frac{x}{x-1}+\frac{1}{1-x}$ and $x\neq 1$ is .....

ⓐ $\frac{x+1}{x-1}$ ⓑ $\frac{x+1}{1-x}$ ⓒ 1 ⓓ -1

4 The simplest form of the function n : $n(x)=\frac{3-x}{x-3}$ such that $x\in\mathbb{R}-\{3\}$ is ..... (Dakahlia 17)

ⓐ 1 ⓑ -1 ⓒ 3 ⓓ -3

5 The simplest form of : $n(x)=\frac{x^2+1}{x^2+4}+\frac{3}{x^2+4}$ is ..... (Fayoum 15)

ⓐ 3 ⓑ 4 ⓒ 1 ⓓ $\frac{1}{x^2+4}$

OPERATIONS ON THE ALGEBRAIC FRACTIONS

1 The additive inverse of the fraction n : $n(x)=\frac{x-1}{x+3}$ and $x\neq -3$ is .....

ⓐ $\frac{x+1}{x-3}$ ⓑ $\frac{1-x}{x+3}$ ⓒ $\frac{x+1}{-(x+3)}$ ⓓ $\frac{1-x}{-(x+3)}$

2 The fraction f where $f(x)=\frac{x-2}{x-5}$ has an additive inverse if the domain is .....

ⓐ $\mathbb{R}-\{2\}$ ⓑ $\mathbb{R}-\{5\}$ ⓒ $\mathbb{R}-\{-2,2\}$ ⓓ $\mathbb{R}-\{0,1\}$

3 If : $n(x)=\frac{x-2}{x+5}$, then the domain of n^{-1} is ..... (Gharbia 17 , Souhag 18 , Port Said 19)

ⓐ $\mathbb{R}$ ⓑ $\mathbb{R}-\{2\}$ ⓒ $\mathbb{R}-\{-5\}$ ⓓ $\mathbb{R}-\{2,-5\}$

4 If : $n(x)=\frac{x}{x^2+1}$, then the domain of n^{-1} is ..... (Sharkia 21)

ⓐ $\mathbb{R}-\{0\}$ ⓑ ϕ ⓒ $\mathbb{R}-\{-1\}$ ⓓ $\mathbb{R}-\{1,-1\}$

5 The multiplicative inverse of the fraction : $n(x)=\frac{x-3}{x^2-9}\times\frac{x-3}{x}$ is .....

ⓐ $\frac{1}{x}$ ⓑ $-\frac{1}{x}$ ⓒ x ⓓ $-x$

6 The fraction f where $f(x)=\frac{x-2}{x-5}$ has a multiplicative inverse if the domain is .....

ⓐ $\mathbb{R}$ ⓑ $\mathbb{R}-\{5\}$ ⓒ $\mathbb{R}-\{2\}$ ⓓ $\mathbb{R}-\{2,5\}$

7 If : $n(x)=\frac{x-3}{x^2-4}$, then : $n^{-1}(3)=$ .....

ⓐ ϕ ⓑ $\mathbb{R}-\{3,-3\}$ ⓒ $\mathbb{R}-\{0\}$ ⓓ $\mathbb{R}$

8 If : $(x \neq 0)$, then : $n(x) = \frac{5x}{x^2+1} \div \frac{x}{x^2+1} =$ ..... *(Souhag 19 , S-Sini 21)*

ⓐ -5 ⓑ -1 ⓒ 5 ⓓ 1

9 If : $n(x) = \frac{x-2}{x+1}$, then : $n^{-1}(2) =$ ..... *(Dakahlia 21)*

ⓐ 0 ⓑ 2 ⓒ 3 ⓓ undefined

10 The domain of the multiplicative inverse of the function : $n(x) = \frac{x+2}{x-3}$ is ..... *(Beheira 21)*

ⓐ $\mathbb{R}-\{3\}$ ⓑ $\mathbb{R}-\{-3\}$ ⓒ $\mathbb{R}-\{-2,3\}$ ⓓ $\mathbb{R}$

11 The domain of the Additive inverse of the function : $n(x) = \frac{x-2}{x-5}$ is ..... *(Port Said 21)*

ⓐ $\mathbb{R}-\{2,5\}$ ⓑ $\mathbb{R}-\{2\}$ ⓒ $\mathbb{R}-\{5\}$ ⓓ $\{2,5\}$

12 If the algebraic fraction $\frac{x-a}{x-2}$ has a multiplicative inverse which is $\frac{x-2}{x+3}$, then : $a =$ ..... *(Beni Suef 21)*

ⓐ $\mathbb{R}-\{2,5\}$ ⓑ $\mathbb{R}-\{2\}$ ⓒ $\mathbb{R}-\{5\}$ ⓓ $\{2,5\}$

13 If : $n(x) = \frac{x^2-2x}{(x-3)(x^2+2)}$, then the domain of n^{-1} is ..... *(Fayoum 19)*

ⓐ $\mathbb{R}$ ⓑ $\mathbb{R}-\{2\}$ ⓒ $\mathbb{R}-\{0\}$ ⓓ $\mathbb{R}-\{0,2\}$

14 If the domain of the function : $n(x) = \frac{1}{x} + \frac{9}{x+b}$ is $\mathbb{R}-\{0,4\}$, then : $b =$ ..... *(Giza 12)*

ⓐ 0 ⓑ -4 ⓒ 4 ⓓ 3

15 The function f where $f(x) = \frac{x-2}{x^3+27}$, then the domain of its multiplicative inverse is .....

(Port Said 17)

ⓐ $\mathbb{R}-\{2\}$ ⓑ $\mathbb{R}-\{-3,2\}$ ⓒ $\mathbb{R}-\{2,-3,3\}$ ⓓ $\mathbb{R}-\{-3,3\}$

3 PROBABILITY

Operation on the events

(union – intersection – difference and complement)

1 The probability of the impossible event equals .....

(Kafr El Sheikh 17 , Beni Suef 17 , South Sini 19 , Cairo 21 , Kalyoubia 21)

ⓐ ϕ ⓑ Zero ⓒ $\frac{1}{2}$ ⓓ 1

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

(Giza 11 , Cairo 12 , Gharbia 15 , Monofia 17 , Fayoum 17 , Cairo 19 , Ismaillia 19 , Red Sea 21 , Dakahlia 21)

ⓐ ϕ ⓑ P (A) ⓒ P (B) ⓓ Zero

3 If : A and B are two events in a sample space for a random experiments , A ⊂ B , then : P (A ∩ B) = ... (Kalyoubia 12 , Cairo 16)

ⓐ P (B) ⓑ P (A) ⓒ Zero ⓓ ϕ

4 If : A ⊂ B , then : P (A ∪ B) = ... (Gharbia 12 , Qena 17 , Kalyoubia 18 , Beheira 19 , Aswan 19 , Dakahlia 19)

ⓐ Zero ⓑ P (A) ⓒ P (B) ⓓ P (A ∩ B)

5 If a regular coin is tossed once , then the probability of getting head or tail is ..... (Dakahlia 13 , Alex 14)

ⓐ 100 % ⓑ 50 % ⓒ 25 % ⓓ zero

6 If a regular die is rolled once , then the probability of getting an odd number and even number together equals ..... (Fayoum 12 , Beheira 14 , Alex 16)

ⓐ Zero ⓑ $\frac{1}{2}$ ⓒ $\frac{3}{4}$ ⓓ 1

7 If a regular die is rolled once , then the probability of getting an odd number and a prime number together equals ..... (Port Said 19 , Kafr El Sheikh 21)

ⓐ $\frac{1}{6}$ ⓑ Zero ⓒ $\frac{3}{4}$ ⓓ 1

8 If a regular coin is tossed once , then the probability of getting tail is ..... (Beni Suef 19)

ⓐ $\frac{1}{4}$ ⓑ $\frac{1}{2}$ ⓒ $\frac{3}{4}$ ⓓ 1

9 If : A and B are two mutually exclusive events , P (B) = 0.5 and P (A ∪ B) = 0.7 , then : P (A) = ... (Alex 17)

ⓐ 0.02 ⓑ 0.2 ⓒ 0.5 ⓓ 0.13

10 If the probability that a student succeeded is 95 % , then the probability that he does not succeed is ..... (Aswan 17)

ⓐ 20 % ⓑ 5 % ⓒ 5010 % ⓓ zero

11 If : A and B are two mutually exclusive events , then : A ∩ B = ... (Assiut 21 , Alex 21 , Cairo 21)

ⓐ zero ⓑ 0.5 ⓒ 1 ⓓ ϕ

12 If : A and B are two events in a sample space , then the event of occurrence of A only is = ... (Menia 15)

ⓐ A' ⓑ $A - B$ ⓒ $A \cap B$ ⓓ $A \cup B$

13 If : A is an event from the sample space of a random experiment , $P(A') =$ ..... (Dakahlia 17)

ⓐ 1 ⓑ -1 ⓒ $1 - P(A)$ ⓓ $P(A) - 1$

14 If : $P(A) = 4\,P(A')$, then : $P(A) =$ ..... (Kalyoubia 17 , Kalyoubia 18)

ⓐ 0.8 ⓑ 0.6 ⓒ 0.4 ⓓ 0.2

15 If : $P(A) = \frac{1}{3}$, then : $P(A') =$ ..... (Giza 12 , Assiut 17)

ⓐ $\frac{1}{3}$ ⓑ $\frac{2}{3}$ ⓒ 1 ⓓ $\frac{1}{2}$

16 If : $P(A) = P(A')$, then : $P(A) =$ ..... (Alex 12 , Dakahlia 12 , Giza 17 , Suez 19)

ⓐ Zero ⓑ 1 ⓒ $\frac{1}{2}$ ⓓ $\frac{1}{3}$

17 If : $X \subset S$ and X' is the complementary event to event X , then : $P(X \cap X') =$ ..... (Assiut 19)

ⓐ zero ⓑ S ⓒ ϕ ⓓ 1

18 If : A and B are two events in a sample space of a random experiment , $P(A) = \frac{2}{3}$, $P(B) = \frac{1}{2}$

$P(A \cup B) = \frac{5}{6}$, then : $P(A \cap B) =$ ..... (Dakahlia 12)

ⓐ $\frac{1}{2}$ ⓑ $\frac{1}{3}$ ⓒ $\frac{1}{5}$ ⓓ $\frac{1}{6}$

19 If : A and B are two events in a random experiment and $A \subset B$, then : $P(A - B) =$ .....

ⓐ zero ⓑ $P(A) - P(B)$ ⓒ $P(B) - P(A)$ ⓓ $P(A)$

20 If : $A \subset S$ of a random experiment and $P(A') = 2\,P(A)$, then : $P(A) =$ ..... (Alex 19 , Port Said 19)

ⓐ $\frac{1}{3}$ ⓑ $\frac{1}{2}$ ⓒ $\frac{2}{3}$ ⓓ 1

21 If : $P(A) + P(A') = 2k$, then : $k =$ ..... (Giza 19)

ⓐ 1 ⓑ $\frac{1}{2}$ ⓒ $\frac{1}{3}$ ⓓ $\frac{1}{4}$

22 If : $A \cap B = \phi$, then : $P(A - B) =$ ..... (Kalyoubia 19)

ⓐ $P(A)$ ⓑ $P(B)$ ⓒ $P(B - A)$ ⓓ 1

23 In The opposite Figure :

If : A and B are two events in a sample space of a random experiment

Then , $P(B - A) =$ ..... (Kafr El Sheikh 19)

ⓐ $\frac{1}{2}$ ⓑ $\frac{5}{7}$ ⓒ $\frac{2}{7}$ ⓓ $\frac{3}{7}$

ESSAY QUESTIONS

1 EQUATIONS

Solving two equations in two variables – Solving two equations of second degree in one unknown – General formula – Set of zeroes of the polynomial functions.

SOLVING TWO EQUATION OF THE FIRST DEGREE IN TWO VARIABLES

1 Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations

1 $x + y = 5$ and $x - y = 1$ (S-Sini 13 , Kafr El Sheikh 21) $\{(3,2)\}$

2 $2x - y = 3$ and $x + 2y = 4$ (N-Valley 12 , Alex 18 , Sharkia 19 , Damietta 21) $\{(2,-1)\}$

3 $y = x + 4$ and $x + y = 4$ (Souhag 16 , Gharbia 19 , S-Sini 21) $\{(0,4)\}$

4 $3x + 4y = 24$ and $x - 2y = -2$ (Giza 12 , Gharbia 18) $\{(4,3)\}$

5 $2x + 3y = 7$ and $3x + 2y = 8$ $\{(2,1)\}$

2 Find in $\mathbb{R} \times \mathbb{R}$ the S.S of the two Equations : $\frac{x}{6} + \frac{y}{3} = \frac{1}{3}$ and $\frac{x}{2} + \frac{2y}{3} = 1$ $\{(2,0)\}$

3 Find the values of a and b knowing that $(3,-1)$ is the solution set of the two equations :

$ax + by - 5 = 0$ and $3ax + by = 17$ (Gharbia 16 , Damietta 17 , Luxor 18) $(a = 2, b = 1)$

4 Find the values of a and b , If : $(a, 2a)$ is a solution for the two equations :

$3x - y = 5$ and $x + y = -1$ (Dakahlia 17) $(a = 1, b = -1)$

5 A rectangle is with a length more than its width by 4 cm. If the perimeter of rectangle is 28 cm.

Find the area of the rectangle. (Alex 12 , Cairo 17 , Kalyoubia 19) $(45\ cm^2)$

6 Two acute angles in a right-angled triangle , the difference between their measures is $50°$.

Find the measure of each angle. (Sharkia 12 , Damietta 17 , Kalyoubia 18 , Beheira 19 , Dakahlia 21) $(70°, 20°)$

7 A two-digit number , the sum of its digits is 11 , if the two digits reversed , then the resulted number will be more than the original number by 9. what is the original number. (Kafr El Sheikh 16) (45)

8 Find algebraically in $\mathbb{R} \times \mathbb{R}$ the solution set of :

the equations represented by the two straight lines : $2x - y = 1$ and the straight line passes through the two points $(1,-2)$ and $(-1,-4)$ $\{(-2,5)\}$

9 If the straight lines whose equations are : $x + y = 3$, $3x - 2y + 1 = 0$ and $y + kx = 4$ intersects at the same point , then Find the value of k . $(k = 2)$

10 If the two points $(3,1)$, $(5,5)$ lies on the straight line $ax + by = 5$

Find the value of a and b. $(a = 2, b = -1)$

SOLVING AN EQUATION OF THE SECOND DEGREE IN ONE UNKNOWN

1 Find in $\mathbb{R}$ the solution set of the following equations using the general formula

1 $x^2 - 4x + 1 = 0$ (rounding the result to two decimal digits) (Beheira 11 , Alex 13 , Aswan 14 , Giza 17) { 0.27 , 3.73 }

2 $2x^2 - 4x + 1 = 0$ (Approximating the result to the nearest three decimal places)

(Qena 12 , Dakahlia 19 , Kalyoubia 19) { 0.293 , 1.707 }

3 $3x^2 = 5x - 1$ (Approximating the result to two decimals) (Helwan 11 , Luxor 17 , Monofia 19) { 0.23 , 1.43 }

4 $x(x-1) = 4$ (taking $\sqrt{17} \approx 4.12$) (Sharkia 17 , Souhag 19) { – 1.56 , 2.56 }

5 $x + \frac{4}{x} = 6$ (rounding the result to one decimal digit) (Damietta 19) { 0.8 , 5.2 }

6 $(x-4)(x-2) = 1$ (taking $\sqrt{2} \approx 1.41$) (Monofia 17) { 1.59 , 4.41 }

2 Graph the function f where $f(x) = x^2 - 2x + 3$ over the interval $[-1, 3]$, then from the graph

, **find the solution set of the equation** : $x^2 - 2x + 3 = 0$ (Qena 19) « ϕ »

3 Find in $\mathbb{R}$ the solution set of the following equations using the general formula

1 $\frac{3}{x} + \frac{5}{x+1} = 2$ (rounding the result to two decimal digits) { – 0.44 , 3.44 }

2 $\frac{x+1}{x+2} = \frac{2x+3}{3x+4}$ (rounding the result to two decimal digits) $\{-\sqrt{2}, \sqrt{2}\}$

4 If : $x = 3$ is the equation of the symmetry axis of the curve of the function f where

$f(x) = x^2 + ax + 8$, Then, **find the solution set of the equation** : $f(x) = 0$ { 2 , 4 }

5 If : (2 , – 3) is the point of the vertex of the curve of the function f where

$f(x) = x^2 + ax + b$, Then, **find the solution set of the equation** : $f(x) = 0$ { – 0.24 , 4.24 }

6 If the solution set of the equation : $x^2 + ax + b = 0$ is $\{3, -5\}$

, then : **find the values** of a and b. ($a = 2, b = -15$)

7 If $x = 3$ is one of the two roots of the function : $x^2 + ax + b = 0$ and $a - b = 1$

, then : **find** the other root. (– 1)

8 find the solution set of the equation in $\mathbb{R}$: $(x+2)^4 + 16 = 5x^2 + 20x$ { 0 , – 4 , – 1 , – 3 }

SOLVING TWO EQUATION OF THE FIRST DEGREE IN TWO VARIABLES

1 Find in $\mathbb{R} \times \mathbb{R}$ the solution set of the two equations :

1. $x - y = 0$ and $\frac{x}{y} = 4$ *(Ismaillia 18 , Dakahlia 19)* $\{(2,2),(-2,-2)\}$
2. $x - y = 1$ and $x^2 + y^2 = 25$ *(Port Said 18 , Aswan 19 , Giza 21)* $\{(-3,-4),(4,3)\}$
3. $x - y = 0$ and $x^2 + xy + y^2 = 27$ *(Alex 19 , Kalyoubia 21)* $\{(3,3),(-3,-3)\}$
4. $y - x = 3$ and $x^2 + y^2 - xy = 13$ *(Kalyoubia 17 , S-Sini 21)* $\{(1,4),(-4,-1)\}$
5. $y + 2x = 7$ and $(y + 2x - 8)^2 + x^2 = 5$ *(Dakahlia 21)* $\{(2,3),(-2,11)\}$
6. $x + y = 2$ and $\frac{1}{x} + \frac{1}{y} = 2$ where $x \neq 0 , y \neq 0$ *(Menia 19)* $\{(1,1)\}$

2 The difference between two numbers is 5 and the product of them is 36 .

Find the two numbers *(Giza 12)* (4 and 9)

3 The sum of two integers is 9 and the difference between their squares is 27 .

Find the two numbers *(Dakahlia 12)* (6 and 3)

4 A right-angled triangle of hypotenuse length 13 cm. and its perimeter is 30 cm.

Find the lengths of the other two sides. *(Monofia 15)* (5 cm. , 12 cm.)

5 A right-angled triangle of hypotenuse length 13 cm. and its perimeter is 30 cm.

Find the lengths of the other two sides. *(Monofia 15)* (5 cm. , 12 cm.)

SOLVING TWO EQUATION OF THE FIRST DEGREE IN TWO VARIABLES

1 Find in $\mathbb{R}$ the set of zeroes of the following functions:

1. $f(x) = x^2 - 2x + 1$ *(S-Sinai 21)* $\{1\}$
2. $f(x) = x^3 + x^2 - 20x$ *(Beni-Suef 21)* $\{0,-5,4\}$
3. $f(x) = (x-2)(x+3) + 4$ *(Monofia 15)* $\{-2,1\}$
4. $f(x) = x^3 - 3x^2 - 4x + 12$ $\{-2,2,3\}$

2 If the set of zeroes of the function f where $f(x) = ax^2 + bx + 15$ is $\{3,5\}$, then : **Find the values** of a and b. *(Fayoum 19)* ($a = 1, b = -8$)

3 If the set of zeroes of the function f where $f(x) = ax^2 + x + b$ is $\{0,1\}$, then : **Find the values** of a and b. *(Alex 17)* ($a = -1, b = 0$)

2 ALGEBRIC FRACTIONS

The domain of the algebraic fractions – The common domain

Reducing the algebraic fractions – Operations on the algebraic fractions.

ALGEBRAIC FRACTIONAL FUNCTION

1 Find $n(x)$ in the simplest form , showing its domain.

1 $n(x) = \frac{x^2 - 4}{x^3 - 8}$

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

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

2 If : $n_1(x) = \frac{2x}{2x + 4}$, $n_2(x) = \frac{x^2 + 2x}{x^2 + 4x + 4}$.

Prove that : $n_1 = n_2$ (Menia 17 , Beheira 19 , Red sea 21)

3 If : $n_1(x) = \frac{x^2}{x^3 - x^2}$, $n_2(x) = \frac{x^3 + x^2 + x}{x^4 - x}$.

Prove that : $n_1 = n_2$ (Kafr El Sheikh 17 , Souhag 19 , South Sini 21)

4 If : $n_1(x) = \frac{x^2}{x^3 - x^2}$, $n_2(x) = \frac{x^2 + x + 1}{x^3 - 1}$.

Prove that : $n_1 = n_2$ for the values of x belong to the common domain. (Cairo 19 , Assiut 21)

5 If : $n_1(x) = \frac{x^2 + x - 6}{x^2 - 4}$, $n_2(x) = \frac{x^2 - 9}{x^2 - x - 6}$.

Show whether : $n_1 = n_2$ or not (Dakahlia 17 , Ismaillia 21)

OPERATIONS ON THE ALGEBRAIC FRACTIONS

1 Find $n(x)$ in the simplest form , showing the domain of n where :

1 $n(x) = \frac{x}{x - 4} - \frac{x + 4}{x^2 - 16}$. (Damietta 11 , Aswan 16 , North Sini 17 , Kalyoubia 18 , Red Sea 21 , Giza 21)

2 $n(x) = \frac{x^2 + 3x}{x^2 + 2x - 3} - \frac{x - 2}{x^2 - 3x + 2}$. (Dakahlia 17 , Suez 18)

3 $n(x) = \frac{x^2 - 2x + 4}{x^3 + 8} + \frac{x^2 - 1}{x^2 + x - 2}$. (Assiut 08 , Damietta 19)

4 $n(x) = \frac{x}{x^2 + 2x} + \frac{x + 2}{x^2 - 4}$. (Aswan 12 , Sharkia 14 , Souhag 15 , Port Said 21)

5 $n(x) = \frac{3x - 4}{x^2 - 5x + 6} + \frac{2x + 6}{x^2 + x - 6}$. (Cairo 11 , Cairo 12 , Beheira 14 , Qena 17)

6 📖 $n(x) = \frac{x^2+2x+4}{x^3-8} - \frac{9-x^2}{x^2+x-6}$. (Beheira 15 , Alex 17 , Sharkia 17 , Monofia 18)

7 $n(x) = \frac{x^2+x}{x^2-1} - \frac{5-x}{x^2-6x+5}$. (Luxor 17 , Menia 18 , Dakahlia 19 , Souhag 21)

8 $n(x) = \frac{x^2+2x+1}{2x-8} \times \frac{x-4}{x+1}$. (Ismaillia 15 , Cairo 16 , Suez 17)

9 📖 $n(x) = \frac{x^3-1}{x^2-2x+1} \times \frac{2x-2}{x^2+x+1}$. (Souhag 12 , Luxor 17 , Fayoum 17 , Monofia 18 , Kalyoubia 18 , Dakahlia 19 , Beheira 21)

10 $n(x) = \frac{x-1}{x^2-1} \div \frac{x^2-5x}{x^2-4x-5}$. (Aswan 14 , Beheira 15 , Menia 16 , Matrouh 19)

11 📖 $n(x) = \frac{x^2-2x-15}{x^2-9} \div \frac{2x-10}{x^2-6x+9}$. (Alex 16 , Beheira 18 , Gharbia 18)

12 📖 $n(x) = \frac{x^2-2x+1}{x^3-1} \div \frac{x-1}{x^2+x+1}$. (Alex 11 , Qalyubia 12 , Gharbia 17 , Dakahlia 18 , Suez 19)

13 📖 $n(x) = \frac{x^2-49}{x^3-8} \div \frac{x+7}{x-2}$ and find $n(1)$. (Gharbia 12 , Beheira 17 , Assiut 19 , Fayoum 19)

14 $n(x) = \frac{x^3-8}{x^2+x-6} \times \frac{x+3}{x^2+2x+4}$. (Souhag 19 , Red Sea 19 , Red Sea 21 , Dakahlia 21)

15 📖 $n(x) = \frac{x-3}{x^2-7x+12} - \frac{x-3}{3-x}$. (Assiut 19 , Luxor 19 , Alex 21)

2 If the domain of the Function n where $n(x) = \frac{b}{x} + \frac{9}{x+a}$ is $\mathbb{R} - \{0, 4\}$, $n(5) = 2$.

Find : the value of a and b. (Menia 14 , Beheira 15 , Kafr El Sheikh 16 , South Sini 17 , Sharkia 19)

3 If : $n(x) = \frac{x^2-2x}{(x-2)(x^2+2)}$.

1 **Find** : $n^{-1}(x)$, showing its domain.

2 If : $n^{-1}(x) = 3$, **What** : the value of x (Aswan 16 , Gharbia 17 , Port Said 17 , Kalyoubia 18 , Alex 19)

4 If the set of zeroes of the function f where $f(x) = \frac{ax^2-6x+8}{bx-4}$ is $\{4\}$ and its domain is $\mathbb{R} - \{2\}$

Find : the value of a and b. (Sharkia 17)

5 If the domain of n : $n(x) = \frac{L}{x} + \frac{9}{x-m}$ is $\mathbb{R} - \{0, -2\}$, $n(4) = 1$.

Find : the value of L and m. (Menia 17)

3 PROBABILITY

Operation on the events

(union – intersection – difference and complement)

1 If : A and B are two mutually exclusive events in a sample space of a random experiment and $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, Then **Find** $P(A \cup B)$.

(Aswan 17 , Qena 18 , Gharbia 18) ($\frac{5}{6}$)

2 If : A and B are two events in a sample space of a random experiment , $P(B) = \frac{1}{12}$, $P(A \cup B) = \frac{1}{3}$, Then **Find** $P(A)$ if :

1. A and B are two mutually exclusive events
2. $A \subset B$

(Cairo 11 , North Sini 14 , Luxor 17 , Kafr El Sheikh 17 , Port Said 18) « $\frac{1}{4}$, $\frac{1}{3}$ »

3 A box contains 12 balls , 5 of them are blue , 4 are red and the left are white. A ball is randomly drawn from the box . **Find** the probability that the drawn ball is :

1. Blue
2. Not red
3. Blue or red

(North Sini 12 , Alex 13 , Luxor 18 , Souhag 18) « $\frac{5}{12}$, $\frac{2}{3}$, $\frac{3}{4}$ »

4 If : X and Y are two events in a sample space of a random experiment where : $P(Y) = \frac{2}{5}$, $P(X) = P(X')$, $P(X \cap Y) = \frac{1}{5}$ Then **Find** :

1. $P(X)$
2. $P(X \cup Y)$

(Dakahlia 14 , Kalyoubia 16 , Kafr El Sheikh 18) « $\frac{1}{2}$, $\frac{7}{10}$ »

5 If : A and B are two events in a sample space of a random experiment , $P(A) = 0.7$, $P(B) = 0.4$, $P(A \cap B) = 0.2$, Then **Find** :

1. $P(A')$
2. $P(A \cup B)$

(Cairo 12) « 0.2 , 0.9 »

6 If : A and B are two events in a sample space of a random experiment , $P(A) = 0.6$, $P(B) = 0.3$, $P(A \cap B) = 0.2$, Then **Find** :

1. $P(A \cup B)$
2. $P(A - B)$

(Giza 12) « 0.7 , 0.4 »

7 A bag contains 20 identical card numbered from 1 to 20. A card is randomly drawn.

Find the probability that the number on the card is :

1. Divisible by 3
2. An odd and divisible by 5

(Sharkia 12) « $\frac{3}{10}$, $\frac{1}{10}$ »

8 If : A and B are two events in a sample space of a random experiment.

, $P(A) = 0.8$, $P(B) = 0.7$, $P(A \cap B) = 0.6$, Then **Find** :

1. The probability of non-occurrence of the event A
2. The probability of occurrence of the two events at least
3. The probability of occurrence of one event without the other

(Gharbia 17 , Sharkia 17 , Kalyoubia 19 , Beheira 19 , Beheira 21) « 0.2 , 0.9 , 0.3 »

Best wishes, mr Abdelrahman Essam