

ALGEBRA REVISION

PAPER2

1. If $3x^2 - 8x + 2 = 0$, then $x =$

(A) $\frac{-8 \pm \sqrt{40}}{6}$ (B) $\frac{8 \pm \sqrt{40}}{6}$

(C) $\frac{8 \pm \sqrt{88}}{6}$ (D) $\frac{-8 \pm \sqrt{88}}{6}$

2. Which of the following expression is an equivalent of for $x^2 + y^2$

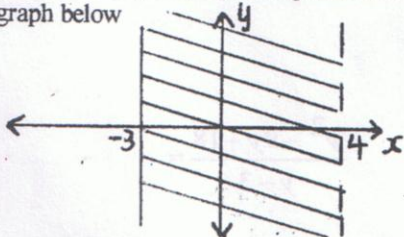
(A) $(x+y)(x+y)$

(B) $(x+y)(x-y)$

(C) $(x+y)(x-y) - 2xy$

(D) $(x+y)(x+y) - 2xy$

3. Write the inequality which represents the graph below



(A) $-3 \leq x < 4$

(B) $-3 \leq x \leq 4$

(C) $-3 < x \leq 4$

(D) $-3 < x < 4$

4. Given that $n(X) = 18$, $n(Y) = 22$, $X \cap Y = m$, and X and Y are disjoint sets. Find the possible range of values of m.

(A) $\{m: 0 < m \leq 21, m \in \mathbb{Z}\}$

(B) $\{m: 1 \leq m \leq 18, m \in \mathbb{Z}\}$

(C) $\{m: 0 < m \leq 22, m \in \mathbb{Z}\}$

(D) $\{m: 1 \leq m \leq 17, m \in \mathbb{Z}\}$

5. If $(x+2)(x-3)(x+1) = 0$, then $x =$

(A) -2, -1, 3 (B) -3, 2, 1

(C) -2, -1, 0 (D) 0, -1, 3

6. Given that $f(x) = x^2 - 6x - 4$, then $f(-2) =$

(A) 4 (B) -20 (C) -12 (D) 12

7. $(xz - xy)(z - y) =$

(A) $2x$ (B) x (C) $-x$ (D) $-2x$

8. Given that $P = \begin{pmatrix} 4 & 1 \\ 5 & 0 \end{pmatrix}$, then $P \times P =$

(A) $\begin{pmatrix} 21 & 4 \\ 20 & 5 \end{pmatrix}$ (B) $\begin{pmatrix} 16 & 1 \\ 25 & 0 \end{pmatrix}$

(C) $\begin{pmatrix} 8 & 2 \\ 1 & 0 \end{pmatrix}$ (D) $\begin{pmatrix} 2 & 1 \\ 25 & 0 \end{pmatrix}$

9. Given that $P = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ and that $Q = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$,

Find $2p - 3q$

(A) $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$ (B) $\begin{pmatrix} 14 \\ 1 \end{pmatrix}$

(C) $\begin{pmatrix} -16 \\ -9 \end{pmatrix}$ (D) $\begin{pmatrix} -8 \\ -9 \end{pmatrix}$

10. Given that $f: x \rightarrow mx^2 + 4$, $f(-2) = 12m$ then $f(1) =$

(A) 4 (B) 5 (C) 2 (D) 6

11. If a and b are positive find
 $\{(a,b):10a+3b < 36\} \cap \{(a,b):2a-b > 4\}$

- (A) $\{(a,b):a < 3, b < 5\}$
 (B) $\{(a,b):0 < a < 3, 0 < b < 2\}$
 (C) $\{(a,b):a > 3, b < 5\}$
 (D) $\{(a,b):0 < a < 3, 0 < b < 5\}$

12. If $(2t-4)\binom{2}{3} = 14$ then $t =$
 (A) 1.5 (B) -0.4 (C) 1.1 (D) 0.5

13. Write down the equation which satisfy the table of values

x	0	1	2	3	4
f	1	3	5	7	9

- (A) $y = x^2 + 1$
 (B) $y = 3^x$
 (C) $y = 2x + 1$
 (D) $y = 2^x + 1$

14. $\begin{pmatrix} 2 & x \\ y & 2 \end{pmatrix} \begin{pmatrix} 2 \\ 4 \end{pmatrix} = \begin{pmatrix} 8 \\ 12 \end{pmatrix}$ Then $(x, y) =$
 (A) (2, 1) (B) (0, 2)
 (C) (1, 2) (D) (2, 0)

15. If $m \Delta n = 3m + 4n$ and $t \Delta 5 = 23$ then
 $t =$
 (A) 4 (B) 7 (C) 1 (D) 4.6

16. If $P = \{u:30 < u \leq 250, u \in Z\}$ then
 $n(P) =$
 (A) 218 (B) 219
 (C) 221 (D) 220

17. What is the axis of symmetry of the graph
 of $y = x^2 + 4x + 3, x =$

- (A) 2 (B) -2 (C) 4 (D) -1.

18. Given that the $n(P \cap Q) = 14,$
 $n(Q \cap R) = 10, n(R \cap P) = 6$ and
 $n(P \text{ only}) = 0, n(Q \text{ only}) = 0,$
 $n(P \cap Q \cap R) \neq 0,$
 $n(P \cup Q \cup R) = 20$ then $n(R) =$

- (A) 19 (B) 10 (C) 5 (D) 11

19. Which of the following matrices has no
 inverse?

- (A) $\begin{pmatrix} -8 & 4 \\ 3 & 2 \end{pmatrix}$ (B) $\begin{pmatrix} 5 & 4 \\ 1 & 1 \end{pmatrix}$
 (C) $\begin{pmatrix} 5 & 10 \\ 2 & 4 \end{pmatrix}$ (D) $\begin{pmatrix} 6 & 0 \\ 8 & -2 \end{pmatrix}$

20. $\frac{y^2 - 9y + 18}{y - 3} =$

- (A) $y - 6$ (B) $y + 6$
 (C) $y + 3$ (D) $y - 15$

21. Given that $2\sqrt[3]{y} = 6$ then $y =$
 (A) 27 (B) 9
 (C) -3, -2, 9 (D) -9, -3, 2

22. What is maximum value of the
 function $-3(x-2)^2 + 3$
 (A) -3 (B) 3 (C) 2 (D) -2

23. If $16p^3 - 54q^3 = 0$ then $\frac{p}{q} =$
 (A) $\frac{3}{2}$ (B) $\frac{2}{3}$ (C) $\frac{8}{27}$ (D) $\frac{4}{9}$

24. If $P = \{1, 2, 4\}$ and $Q = \{5, 6, 7\}$ then
 (A) $P = Q$ (B) $P \subset Q$
 (C) one-to-one (D) $P \neq Q$

25. Given that $X = \{1, 2, 3\}$, $Y = \{1, 4\}$ then the cartesian product of x and $y =$
 (A) $\{(1, 1), (1, 4), (1, 2), (2, 4), (1, 3), (3, 4)\}$
 (B) $\{(1, 1), (1, 4), (2, 1), (2, 4), (3, 1), (3, 4)\}$
 (C) $\{(1, 1), (1, 4), (1, 2), (4, 2), (1, 3), (4, 3)\}$
 (D) $\{(1, 1), (1, 4), (2, 1), (4, 2), (3, 1), (3, 4)\}$

26. Factorise $pq - 2p - 3q + 6$
 (A) $(p - q)(q - 3)$ (B) $(p - 3)(q - 2)$
 (C) $(p - 3)(q + 2)$ (D) $(p - 2)(q + 3)$

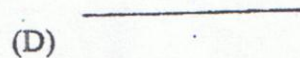
27. Which of the following domain is possible for the graph $y = \sqrt{x + 1}$
 (A) $x > 1$ (B) $x \leq 1$
 (C) $x \geq 1$ (D) $x \geq -4$

28. If $\frac{x}{2} + 2x = 3x - 1$ then $x =$
 (A) -2 (B) 2 (C) $\frac{2}{11}$ (D) $\frac{-2}{11}$

29. Simplify $\frac{\frac{1}{4}p + \frac{1}{2}q}{\frac{1}{4}p + \frac{3}{4}q} =$
 (A) $\frac{p+2q}{p+3q}$ (B) $\frac{2p+q}{p+3q}$
 (C) $\frac{2p+q}{3p+q}$ (D) $\frac{p+2q}{3p+q}$

30. If $n(X) = 10$, $n(Y) = 8$, $n(Z) = 9$, and $n(E) = 30$, then a possible value of $n(X \cap Y \cap Z) =$
 (A) 10 (B) 9 (C) 8 (D) 13

31. Which of the following is a ray?



32. Given that $Q = \{(x, y) : y = 6\}$, $P = \{(x, y) : x = 5\}$ then $n(P \cap Q) =$
 (A) 11 (B) 5 (C) 2 (D) 1

33. Given that $OM = \begin{pmatrix} 2 \\ 3 \\ -1 \end{pmatrix}$ and

$ON = \begin{pmatrix} 1 \\ 2 \\ -2 \end{pmatrix}$, then $OM - 2ON =$

(A) $\begin{pmatrix} 0 \\ 1 \\ -3 \end{pmatrix}$ (B) $\begin{pmatrix} 0 \\ 1 \\ 5 \end{pmatrix}$

(C) $\begin{pmatrix} 0 \\ -1 \\ -3 \end{pmatrix}$ (D) $\begin{pmatrix} 0 \\ -1 \\ 3 \end{pmatrix}$

34. $\frac{x^2 + 3x - 10}{x^2 - 25} =$

(A) $\frac{x-2}{x-5}$ (B) $\frac{x+2}{x+5}$

(C) $\frac{x-2}{x+5}$ (D) $\frac{x+2}{x-5}$

35. M varies as N and inversely as t. M = 8 when N = 4 and t = 2. Calculate M when N = 6 and t = 4

(A) $2\frac{2}{3}$ (B) 8

(C) 6 (D) 16

36. If $OT = \begin{pmatrix} 3 \\ 4 \\ 6 \end{pmatrix}$ and

$|OT| = \sqrt{(9+16+36)}$. Given that

$OS = \begin{pmatrix} 2 \\ 4 \\ 6 \end{pmatrix}$, find $|OS|$

(A) 7 (B) 6

(D) $2\sqrt{14}$ (D) $2\sqrt{7}$

37. Given that $h: x \rightarrow x + 4$ and

$kh: x \rightarrow x^2 - 8x + 18$, then k is:

(A) $x^2 + 2x + 1$

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

(C) $x^2 + 1$

(D) $x^2 + 2$

38. Given that $\begin{pmatrix} 3 & 5 \\ 2 & -1 \end{pmatrix} \begin{pmatrix} p \\ q \end{pmatrix} = \begin{pmatrix} 4 \\ 7 \end{pmatrix}$ then

(P, q) =

(A) (3, 1) (B) (3, -1)

(C) (-3, 1) (D) (-3, -1)

39. Simplify $p(p + q - 2) - 2p(p + 3q + 1)$

(A) $-p^2 + 5pq + 4p$

(B) $-p^2 - 5pq - 4p$

(C) $p^2 - 4pq + 4p$

(D) $-p^2 - 5pq + 4p$

40. Given that $k(x) = 3x - 1$, then $k(x + 1) =$

(A) $3x + 4$ (B) $3x$

(C) $3x - 2$ (D) $3x + 2$

41. If $p : q = 3 : 4$ and $q : r = 5 : 6$ then $p : q : r$

(A) $3 : 5 : 6$ (B) $24 : 20 : 15$

(C) $15 : 20 : 24$ (D) $3 : 4 : 6$

42. Given that $4^y = 8^3$, then $y =$

(A) 6 (B) 8 (C) $4\frac{1}{2}$ (D) 9

43. $\{x : x \geq 3\} \cup \{x : x \geq -2\} =$

(A) $\{x : x \geq 3\} \cup \{x : x \geq 2\}$

(B) $\{x : -3 \leq x \leq 2\}$

(C) $\{x : x \geq -2\}$

(D) $\{x : x \geq 3\}$

44. Given that $p \Omega q = 4p - 3q$ and $3 \Omega x = 24$, then $x =$
- (A) 8 (B) 4 (C) -4 (D) -8

45. $\frac{3}{x-2} - \frac{1}{x+3} =$

(A) $\frac{2x+7}{(x-2)(x+3)}$

(B) $\frac{2x+11}{(x-2)(x+3)}$

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

(D) $\frac{13x}{(x-2)(x+3)}$

46. The solution to

$\{(x, y): 3x + 4y - 1 = 0\} \cap \{(x, y): 2x - 3y - 12 = 0\}$
is:

(A) $(\frac{1}{3}, 0)$

(B) $(0, \frac{1}{4})$

(C) (3, -2)

(D) $\{(x, y): x = -3, y = 2\}$

47. Which of the following matrices represents a reflection?

(A) $\begin{pmatrix} 3 & 5 \\ -2 & -3 \end{pmatrix}$ (B) $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

(C) $\begin{pmatrix} 3 & 1 \\ -4 & -1 \end{pmatrix}$ (D) $\begin{pmatrix} 4 & 3 \\ 1 & 1 \end{pmatrix}$

48. Factorise $(x+2)^2 + x + 2$

(A) $(x+2)(x+2)$

(B) $(x+2)(x+3)$

(C) $(x+4)(x+2)$

(D) $(x+4)(x+3)$

49. Find the HCF of $(x^2 + 3x - 18)$ and $x^2 - 36$

(A) $x + 6$

(B) $x - 6$

(C) $(x-3)(x-6)$

(D) $(x-3)(x-6)(x+6)$

50. Given that $Q = \begin{pmatrix} 5 & 2 \\ 1 & 0 \end{pmatrix}$, then $Q \times Q =$

(A) $\begin{pmatrix} 27 & 10 \\ 5 & 2 \end{pmatrix}$ (B) $\begin{pmatrix} 25 & 4 \\ 1 & 0 \end{pmatrix}$

(C) $\begin{pmatrix} 10 & 4 \\ 2 & 0 \end{pmatrix}$ (D) $\begin{pmatrix} 25 & 4 \\ 2 & 0 \end{pmatrix}$

51. $x^3 + 2x^2 - 5x - 6 = (x^2 + hx + 3)(x - 2)$, then $h =$

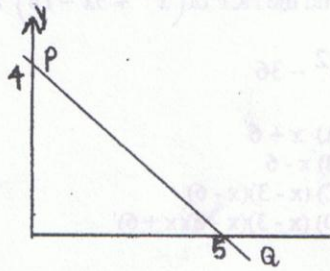
(A) 2 (B) -4 (C) 4 (D) -5

52. Find the inverse of $\begin{pmatrix} 9 & 8 \\ 1 & 1 \end{pmatrix}$

(A) $\begin{pmatrix} -1 & 8 \\ 1 & -9 \end{pmatrix}$ (B) $\begin{pmatrix} 1 & -8 \\ -1 & 9 \end{pmatrix}$

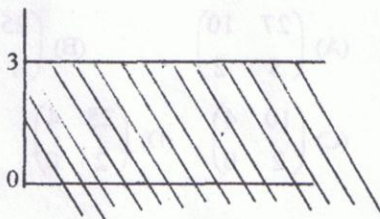
(C) $\begin{pmatrix} 1 & 1 \\ 8 & 9 \end{pmatrix}$ (D) $\begin{pmatrix} -1 & 1 \\ 8 & -9 \end{pmatrix}$

53. The equation of PQ is



- (A) $y = 5x + 4$ (B) $y = -5x + 4$
 (C) $y = \frac{-4x}{5} + 4$ (D) $y = \frac{4x}{5} + 4$

54. The shaded region in the diagram in



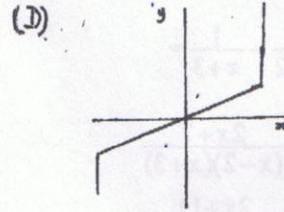
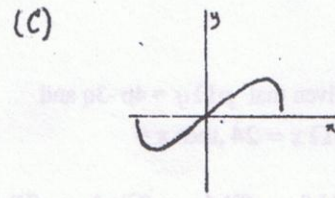
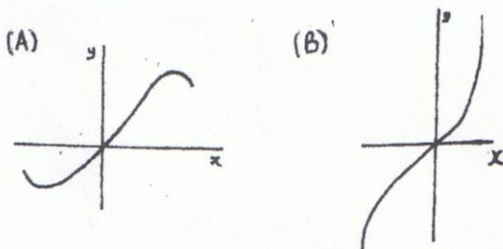
- (A) $y < 3$ (B) $y > 3$
 (C) $y \leq 3$ (D) $y \geq 3$

55. The value of \bar{x} from the table is

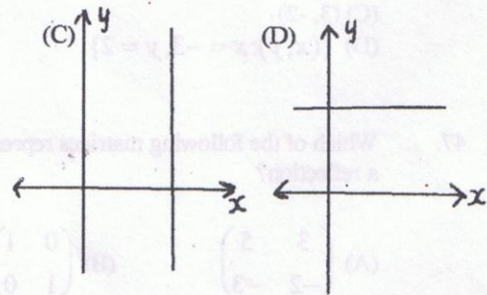
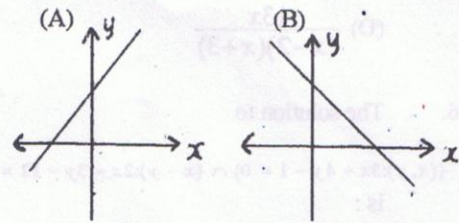
Marks	3 - 6	7 - 13	14 - 20	21 - 27	28 - 34
Freq.	3	4	10	8	3

- (A) 18.17 (B) 17
 (C) 18.75 (D) 18.2

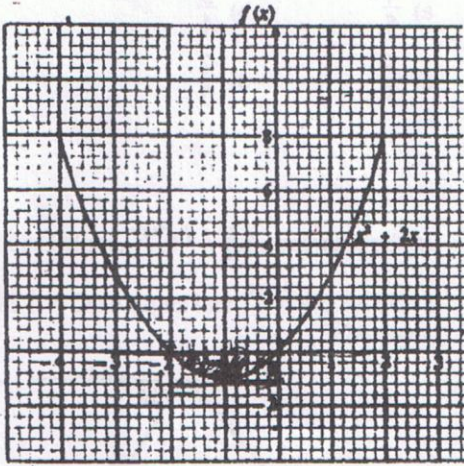
56. Which of the following could be a sketch of the graph $y = x^3$?



57. Which of the following diagram shows a line with negative gradient?

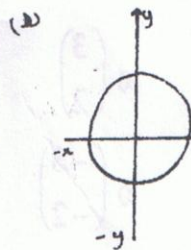
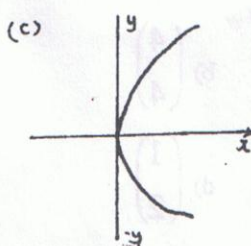
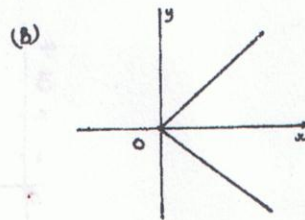
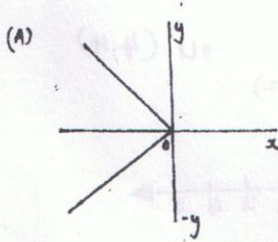


58. The graph below represents the function $f(x) = x^2 + 2x$. For what values of the domain is $f(x)$ negative?



- (A) $\{x: -2 < x < 0\}$
 (B) $\{x: 2 \leq x < 0\}$
 (C) $\{x: -2 \leq x \leq 0\}$
 (D) $\{x: -2 > x, x > 0\}$

59. Which of the following could be a sketch of the graph? $y^2 = x$



60. Which of the following shaded region below shows the set of points (x, y) for which $x - y \leq 2$ and $x + y \geq 2$?

