

ALGEBRA REVISION

PAPER 1

1. $2a^2b \times -6ab^3 =$

- (A) $-4ab^2$ (B) $12a^3b^4$
 (C) $-12a^3b^4$ (D) $-4a^3b^4$

2. $-2x - 6 = -7; x =$

- (A) $\frac{1}{2}$ (B) $-\frac{1}{2}$ (C) $-6\frac{1}{2}$ (D) $6\frac{1}{2}$

3. $(4x-1)^2 =$

- (A) $16x^2 - 1$ (B) $16x^2 + 1$
 (C) $16x^2 - x + 1$
 (D) $16x^2 - 8x + 1$

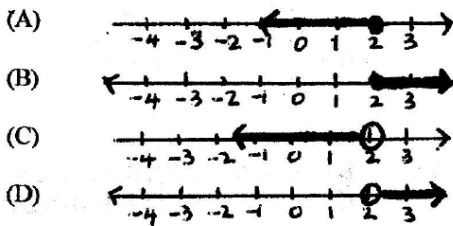
4. Given that $m = 3$ and $n = -1$, find $m^2 - mn$

- (A) 12 (B) 6 (C) 3 (D) 9

5. If $2(x-1) - 3x = 6$, then $x =$

- (A) 8 (B) -8 (C) 4 (D) -4

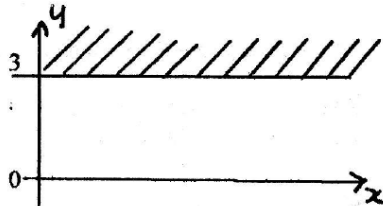
6. The graph of $x \geq 2$ on a number line is



7. If $P = \{x: 4 \leq x \leq 200, x \in \mathbb{Z}\}$ then $n(P) =$

- (A) 197 (B) 196 (C) 204 (D) 103

8. The inequality which defines the shaded area is



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

9. If $P + Q = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$ and $P = \begin{pmatrix} -3 & 4 \\ 0 & 2 \end{pmatrix}$, then $Q =$

- (A) $\begin{pmatrix} -3 & -4 \\ 0 & -2 \end{pmatrix}$ (B) $\begin{pmatrix} 3 & 4 \\ 0 & 2 \end{pmatrix}$
 (C) $\begin{pmatrix} -2 & -4 \\ 0 & -3 \end{pmatrix}$ (D) $\begin{pmatrix} 3 & -4 \\ 0 & -2 \end{pmatrix}$

10. Given that $f(x) = 2x$, then $f(x+1) =$

- (A) $2x+2$ (B) $2x+1$
 (C) $3x+1$ (D) $4x+1$

11. If $-2x + 6 = 18$, then $x =$

- (A) 6 (B) -6 (C) 12 (D) -4

12. $3(x-1) - (x+2) =$

- (A) $2x-5$ (B) $2x-1$
 (C) $2x+5$ (D) $4x+5$

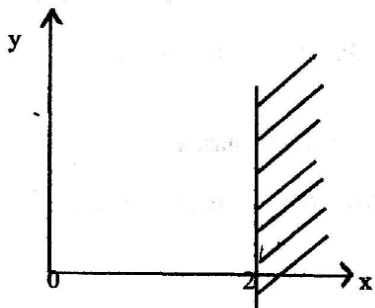
13. Factorise $8x^2 - 12x$
 (A) $4(2x^2 - 2x)$
 (B) $x(8x - 12)$
 (C) $4x(2x - 3)$
 (D) $(4 + x)(2x - 3)$
14. $X : y = 2 : 3, y : z = 9 : 10$, then $z : y : x =$
 (A) $6 : 9 : 10$ (B) $10 : 2 : 3$
 (C) $10 : 3 : 2$ (D) $10 : 9 : 6$

15. $2^5 - 2^0 =$
 (A) 31 (B) 30 (C) 32 (D) 33

16. $3^p = 9^2$ then $p =$
 (A) 2 (B) 3 (C) 4 (D) 5

17. $n(P) = 6, n(Q) = 7, n(P \cup Q) = 11$ and $n(P \cap Q) =$
 (A) 1 (B) 2 (C) $\frac{1}{6}$ (D) $\frac{1}{4}$

18. The inequality which defines the shaded region is



- (A) $x > 2$ (B) $y > 2$
 (C) $y \leq 2$ (D) $x \geq 2$

19. Given that $a \Delta b = 3a + 2b$ and $2 \Delta x = 8$, then $x =$
 (A) 4 (B) 6 (C) 2 (D) 1

20. $\frac{3x+1}{2} - \frac{x+1}{4} =$

- (A) $\frac{5x+3}{4}$ (B) $\frac{5x+1}{4}$
 (C) $\frac{7x+3}{4}$ (D) $\frac{7x+1}{4}$

21. $\{(x, y) : x + y = 5\} \cap \{(x, y) : x - y = 3\}$

- (A) $\{(x, y) : x = 4, y = 1\}$
 (B) $\{(x, y) : x = 5, y = 3\}$
 (C) $\{(x, y) : x = -4, y = -1\}$
 (D) $\{(x, y) : x = 8, y = 2\}$

22. $2^6 - 2^3 =$

- (A) 3 (B) 56 (C) 37 (D) 27

23. If $f : x \rightarrow x + 2, f(x^2) =$

- (A) $x^2 + 2$ (B) $x^2 + 4$
 (C) $x^2 + 4x + 4$ (D) $2x + 4$

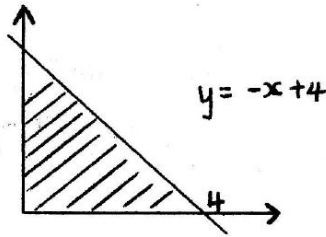
24. If $pa = p + bc$, then $p =$

- (A) $\frac{a-1}{bc}$ (B) $\frac{b+c}{a-1}$
 (C) $\frac{bc}{a}$ (D) $\frac{bc}{a-1}$

25. If $A = \{1, 3, 4, 5, 7\}, B = \{0, 3, 8\}$
 $C = \{1, 3, 4, 8, 9\}$, then $n(A \cap B \cap C) =$

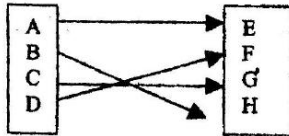
- (A) 3 (B) 4 (C) 1 (D) 8

26. The shaded region is



- (A) $\{(x, y): x \geq 0\} \cap \{(x, y): y \geq 0\} \cap \{(x, y): y \leq -x + 4\}$
 (B) $\{(x, y): x \leq 0\} \cap \{(x, y): y \leq 0\} \cap \{(x, y): y \leq -x + 4\}$
 (C) $\{(x, y): x \geq 0\} \cap \{(x, y): y \geq 0\} \cap \{(x, y): y \geq -x + 4\}$
 (D) $\{(x, y): x \leq 0\} \cap \{(x, y): y \geq 0\} \cap \{(x, y): y \leq -x + 4\}$

27. What relation does the diagram show?



- (A) a many - to - one relation
 (B) a one - to - one relation
 (C) a many - to - many relation
 (D) a one - to - many relation

28. If $P \Delta Q = 3P - Q$, then $2A - 3 =$

- (A) 3 (B) 9 (C) -1 (D) 5

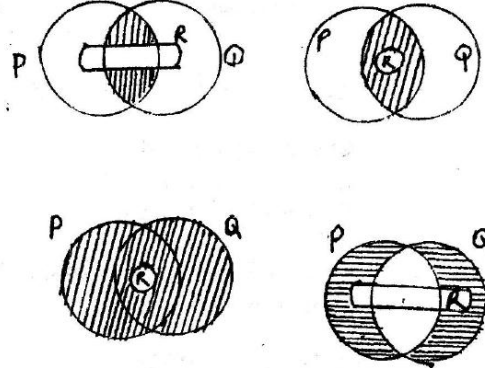
29. $2(x + 2y) - 4(x - y) =$

- (A) $-2x + 8y$ (B) $-2x$
 (C) $6x + 8y$ (D) $-2x + y$

30. Factorise $t^2 - 25$

- (A) $(t + 5)(t + 5)$
 (B) $(t - 5)(t + 5)$
 (C) $(t - 5)(t - 5)$
 (D) $(t - 5)(t + 2)$

31. Given that $P \cap Q \neq \emptyset$ and R is a subset of $P \cap Q$. Which diagram shows $(P \cap Q) \cap R$?



32. If $f: x \rightarrow 3x + 2$, then $f^2: \rightarrow$

- (A) $9x + 8$ (B) $9x^2 + 4$
 (C) $9x + 4$ (D) $9x^2 + 8$

33. If $x^2 + 3x - 18 \leq 0$, then the domain of x is:

- (A) $-3 \leq x \leq 6$
 (B) $-6 \leq x \leq 3$
 (C) $-2 \leq x \leq 9$
 (D) $-9 \leq x \leq 2$

34. $\begin{pmatrix} 2 & 3 \\ 4 & -6 \end{pmatrix} - \begin{pmatrix} -4 & 2 \\ 1 & 2 \end{pmatrix} =$

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

35. What value of x gives the function $2(x+1)^2 - 3$ a minimum value?

- (A) -1 (B) 1 (C) -3 (D) 3

36. The determinant of the matrix $\begin{pmatrix} 2 & -3 \\ 1 & 2 \end{pmatrix}$ is

- (A) -1 (B) -7 (C) 1 (D) 7

37. Solve $2x - 1 \leq 3x + 6$

- (A) $x \geq -7$ (B) $x \leq 7$
(C) $x > -7$ (D) $x < 7$

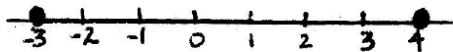
38. If $f: x \rightarrow 2x + 1$, $fg: x \rightarrow 6x + 3$ then the function g is

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

39. Given that p varies as q^2 and $p=8$, when $q=2$. Find p if $q=4$

- (A) 32 (B) 16 (C) 64 (D) 128

40. Which inequality is represented by the graph below?



- (A) $-3 \leq x \leq 4$
(B) $-3 < x \leq 4$
(C) $-3 \leq x < 4$
(D) $-3 < x < 4$

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

- (A) $\frac{4}{x-1}$ (B) $\frac{2}{x-1}$
(C) $\frac{x+4}{(x-1)(x+2)}$
(D) $\frac{x+8}{(x-1)(x+2)}$

42. If $2x^2 + 5x - 1 = 0$ then $x =$

- (A) $\frac{-5 \pm \sqrt{17}}{4}$ (B) $\frac{5 \pm \sqrt{17}}{4}$
(C) $\frac{-5 \pm \sqrt{33}}{4}$ (D) $\frac{5 \pm \sqrt{33}}{4}$

43. $\left(\frac{36}{25}\right)^{\frac{1}{2}} =$

- (A) $\frac{5}{6}$ (B) $\frac{6}{5}$ (C) $\frac{-18}{25}$ (D) $\frac{18}{25}$

44. In the mapping

$$\begin{pmatrix} a \\ b \end{pmatrix} \rightarrow \begin{pmatrix} p & q \\ r & s \end{pmatrix} \begin{pmatrix} a-0 \\ b-2 \end{pmatrix} + \begin{pmatrix} 0 \\ 2 \end{pmatrix},$$

$$\begin{pmatrix} p & q \\ r & s \end{pmatrix} \text{ is}$$

- (A) reflection in $x = 2$
(B) reflection in $y = 2$
(C) reflection in $y = 0$
(D) Reflection in $y = 2$, Translation with

$$\text{vector } \begin{pmatrix} 2 \\ 0 \end{pmatrix}$$

45. If $M = \{(x, y) : x - y = 3\}$ and $N = \{(x, y) : x + y = 5\}$ then

$$n(M \cap N) =$$

- (A) 4 (B) 2 (C) 1 (D) 0

46. Which of the following is a singular matrix

- (A) $\begin{pmatrix} 4 & 14 \\ 2 & 7 \end{pmatrix}$ (B) $\begin{pmatrix} 6 & 0 \\ 2 & 1 \end{pmatrix}$
(C) $\begin{pmatrix} 4 & 3 \\ -1 & 0 \end{pmatrix}$ (D) $\begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix}$

47. Factorise $1 - 16x^2$
 (A) $(1 - 8x)(1 + 2x)$
 (B) $(1 - 4x)(1 + 4x)$
 (C) $(1 + 4x)(1 + 4x)$
 (D) $(1 - 8x)(1 - 2x)$
48. Given that $n(P) = 20$, $n(Q) = 30$ and $n(P \cap Q) = x$, find the minimum possible value of x .
 (A) 0 (B) 1 (C) 10 (D) 2

49. $\begin{pmatrix} 3 \\ 6 \end{pmatrix} \begin{pmatrix} 2 & 4 \end{pmatrix} =$
 (A) 30 (B) 24
 (C) $\begin{pmatrix} 12 & 6 \\ 24 & 12 \end{pmatrix}$ (D) $\begin{pmatrix} 6 & 12 \\ 12 & 24 \end{pmatrix}$
50. The graph of the equation $y = (x - 5)(x + 2)$ cuts the y-axis at the point L. What is the y-coordinate at the point L.
 (A) 0 (B) -10 (C) 10 (D) -3

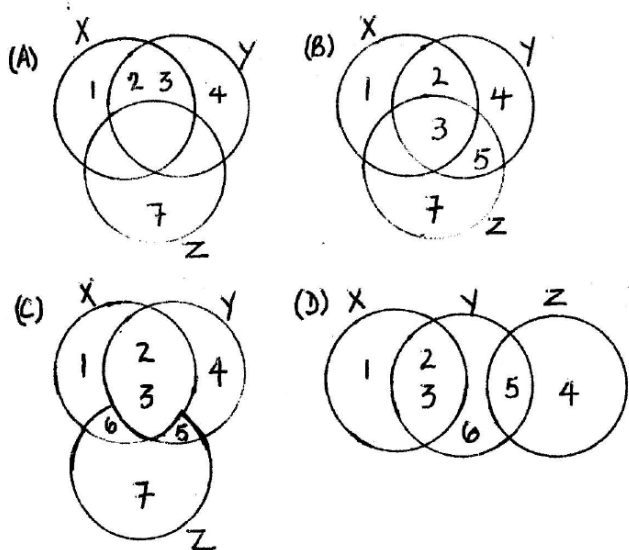
51. If the gradient of a line in a coordinate plane is 1, then the line is
 (A) parallel to y axis
 (B) parallel to x axis
 (C) parallel to $y = x$
 (D) perpendicular to $y = x + 4$

52. Solve the equation $x(x + 2)(x - 3) = 0$
 (A) -2, 3 (B) 2, 3
 (C) -2, -3 (D) 2, -3
53. What is the minimum value of the function $4(x - 3)^2 - 2$
 (A) 4 (B) 3 (C) -2 (D) -3

54. $4^{\frac{1}{2}} \times 2^5 =$
 (A) 2^6 (B) $8^{\frac{3}{2}}$ (C) 4^5 (D) $2^{\frac{3}{2}}$

55. Factorise $x^2 + x - ax - a =$
 (A) $(x + 1)(x + a)$
 (B) $(x + 1)(x - a)$
 (C) $(x - 1)(x - a)$
 (D) $(x - 1)(x + a)$

56. Given that $X = \{1, 2, 3, 6\}$, $Y = \{2, 3, 4, 5\}$, $Z = \{5, 6, 7\}$. The Venn diagram representing this information is;



57. $\{x : 2x > 4x + 8\} =$
 (A) $\{x : x < -4\}$ (B) $\{x : x \leq -4\}$
 (C) $\{x : x > -4\}$ (D) $\{x : x \geq -4\}$

58. $\frac{3}{x-4} - \frac{2}{x+2} =$
 (A) $\frac{x-2}{(x+2)(x-4)}$
 (B) $\frac{1}{2(x+2)}$
 (C) $\frac{x+14}{(x-4)(x+2)}$
 (D) $\frac{7}{-2(x-2)}$

59. If $\begin{pmatrix} x & y \\ 0 & 3 \end{pmatrix}$ is a singular matrix. Find x.

(A) 0 (B) 3 (C) $\frac{1}{3}$ (D) 1

60. Find the HCF of $2x^2y^3$ and $6x^3y$

(A) $2x^2y$ (B) $6x^3y^3$

(C) $2xy$ (D) $2x^2y^2$