

# FIRST: ALGEBRA

Choose the correct answer:

- (1) If  $(a+5, 3) = (8, b-1)$  then  $\sqrt{a^2 + b^2} = \dots\dots\dots$   
 (a) 7 (b) 3 (c) 9 (d) 5
- (2) If  $(X^5, Y+1) = (32, \sqrt[3]{27})$ , then  $X - Y = \dots\dots\dots$   
 (a) 0 (b) 4 (c) 2 (d) 5
- (3) If  $n(X^2) = 9$ , then  $n(X) = \dots\dots\dots$   
 (a) 3 (b)  $\pm 3$  (c) 9 (d)  $\pm 9$
- (4) If  $n(Y) = 3$  and  $n(X \times Y) = 12$ , then  $n(X^2) = \dots\dots\dots$   
 (a) 4 (b) 16 (c) 9 (d) 2
- (5) If  $n(X^2) = 9$  and  $n(X \times Y) = 6$ , then  $n(Y^2) = \dots\dots\dots$   
 (a) 3 (b) 2 (c) 4 (d) 8
- (6) If  $X = \{2\}$  and  $Y = \{3\}$ , then  $X \times Y = \dots\dots\dots$   
 (a) 6 (b)  $\{6\}$  (c)  $(2, 3)$  (d)  $\{(2, 3)\}$
- (7) If  $X = \{5\}$ , then  $n(X^2) = \dots\dots\dots$   
 (a) 1 (b) 25 (c) 10 (d) 5
- (8) If  $X = \{1, 2\}$  and  $Y = \{3, 4\}$ , then  $(3, 4) \in \dots\dots\dots$   
 (a)  $X \times Y$  (b)  $Y \times X$  (c)  $X^2$  (d)  $Y^2$
- (9) If  $n(X) = 2$  and  $Y = \{1, 2\}$ , then  $n(X \times Y) = \dots\dots\dots$   
 (a) 4 (b) 3 (c) 5 (d) 6

- (10) For any two sets A and B, then the set  $\{(x,y): x \in A, y \in B\}$  refers to .....
- a  $n(A \times B)$       b  $A \times B$       c  $n(B \times A)$       d  $B \times A$
- (11) If  $X = \{3,4\}$ , then  $n(X \times \emptyset) = \dots\dots\dots$
- a 0      b 1      c 2      d  $\emptyset$
- (12) If  $n(X) = k-2$ ,  $n(Y) = k+2$  and  $n(X \times Y) = 5$ , then  $k = \dots\dots\dots$
- a 3      b -3      c  $\pm 3$       d 0
- (13) If  $\{2\} \times \{x,y\} = \{(2,4), (2,3)\}$ , then  $x-y = \dots\dots\dots$
- a 1      b -1      c  $\pm 1$       d 0
- (14) If the point  $(a,5) \in Y\text{-axis}$ , then  $a = \dots\dots\dots$
- a 0      b 5      c -5      d 25
- (15) If the point  $(5,b-7) \in X\text{-axis}$ , then  $b = \dots\dots\dots$
- a 2      b 5      c 7      d 12
- (16) If  $b < 3$ , then the point  $(5,b-3)$  lies in the ..... quadrant.
- a first      b second      c third      d fourth
- (17) If  $(a,b)$  lies in the third quadrant, then  $a$  b ..... zero
- a =      b <      c >      d  $\leq$
- (18) If  $(|x|,4) = (3,y^2)$  and  $(x,y)$  lies in 2<sup>nd</sup> quadrant, then  $x+y = \dots\dots\dots$
- a 7      b 1      c -1      d -7
- (19) If  $(x-2,x-4)$  lies in 4<sup>th</sup> quadrant, then  $x = \dots\dots\dots$
- a 0      b 2      c 3      d 4
- (20) If  $(k^2-4,k)$  lies on the negative direction of Y-axis, then  $k = \dots\dots\dots$
- a 2      b  $\pm 2$       c -2      d 0

(21) If  $X \times Y = \{(1,2), (1,3), (1,4)\}$ , then  $n(X^2) = \dots\dots\dots$

- a** 0                      **b** 1                      **c**  $\{(1,1)\}$                       **d** 9

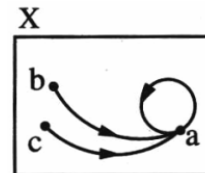
(22)  $\{3\} \times [0,2]$  is represented by the figure .....



(23) If  $R = \{(1,3), (2,5), (4,3)\}$  represent a function, then its domain = .....

- a**  $\{1,2,4\}$                       **b**  $\{3,5,4\}$                       **c**  $\mathbb{Z}$                       **d**  $\mathbb{N}$

(24) The opposite figure represent the arrow diagram of a function on X.  
The range = .....



- a**  $\{a\}$                       **b**  $\{a,b\}$                       **c**  $\{a,b,c\}$                       **d**  $\{b,c\}$

(25) The set of images of each element of the domain of the function is called the .....

- a** domain                      **b** codomain                      **c** range                      **d** rule

(26) If the function  $f : X \rightarrow Y$ , then the range  $\subset \dots\dots\dots$

- a**  $X \times Y$                       **b**  $X$                       **c**  $Y$                       **d**  $Y \times X$

(27) The function  $f(x) = x^5 - 3x^4 + 1$  is of ..... degree.

- a** 4<sup>th</sup>                      **b** 9<sup>th</sup>                      **c** 5<sup>th</sup>                      **d** 2<sup>nd</sup>

(28) The function  $f(x) = x(x - x^2)$  is a polynomial of ..... degree.

- a** 1<sup>st</sup>                      **b** 2<sup>nd</sup>                      **c** 3<sup>rd</sup>                      **d** 4<sup>th</sup>

(29) The function  $f(x) = x^2 - (x^2 - 3x)$  is a polynomial of ..... degree.

- a** 1<sup>st</sup>                      **b** 2<sup>nd</sup>                      **c** 3<sup>rd</sup>                      **d** 4<sup>th</sup>

- (30) If  $a = 0$  and  $b \neq 0$ , then the polynomial  $f(x) = ax^2 + bx + c$  is of ..... degree.
- a 1<sup>st</sup>      b 2<sup>nd</sup>      c 3<sup>rd</sup>      d 4<sup>th</sup>
- (31) If  $f(x) = x^2 - 1$ , then  $f(1) = \dots\dots\dots$
- a 0      b 2      c -2      d 1
- (32) If  $f(x) = x^2 - \sqrt{2}x$ , then  $f(\sqrt{2}) = \dots\dots\dots$
- a 4      b 2      c 6      d 0
- (33) If  $f(x) = kx + 8$  and  $f(2) = 0$ , then  $k = \dots\dots\dots$
- a 8      b 6      c 4      d -4
- (34) If  $f(x) = nx^2 + 3x^n - 3$ , the set of all possible values of  $n$  that makes the function is of 2<sup>nd</sup> degree is .....
- a {2,3}      b {1,-1}      c {0,1,2}      d {2,1}
- (35) If  $(a,a) \in f$  where  $f(x) = 2x + 3$ , then  $a = \dots\dots\dots$
- a 3      b -3      c 0      d 1
- (36) If  $X = \{1,2,3\} \rightarrow f(x) = x^2 - 1$ , then  $f(4) = \dots\dots\dots$
- a 15      b 17      c 3      d undefined
- (37) If the curve that represents the function  $f(x) = x^2 + c$  passes through the point  $(0,2)$ , then  $c = \dots\dots\dots$
- a 3      b 2      c -3      d 1
- (38) The vertex of the curve that represents the function  $f(x) = 2x^2 - 4x + 5$  is .....
- a (1,3)      b (3,1)      c (-1,3)      d (3,-1)
- (39) If  $f(x) = 5$ , then  $f(-3) = \dots\dots\dots$
- a 5      b -5      c -3      d -15

- (40) If  $f(x) = 2$ , then  $f(3) - f(1) = \dots\dots\dots$   
 a 0                      b  $f(2)$                       c 2                      d 10
- (41) If  $f(x) = 4$ , then  $f(4) \div f(10) = \dots\dots\dots$   
 a 4                      b  $\frac{2}{5}$                       c 1                      d 10
- (42) If  $f(2x) = 4$ , then  $f(-x) = \dots\dots\dots$   
 a -2                      b -4                      c 4                      d 2
- (43)  $f(x) = 3x$  is represented by a straight line passes through the point .....  
 a (3,3)                      b (3,0)                      c (0,0)                      d (0,3)
- (44) If the straight line that represents the function  $f(x) = 2x - a$  passes through the origin, then  $a = \dots\dots\dots$   
 a -3                      b 2                      c 0                      d 3
- (45) If  $(a, 4) \in f$  where  $f(x) = 2x + b$ , then  $6a + 3b = \dots\dots\dots$   
 a 12                      b 9                      c 6                      d 3
- (46) If  $f(x) = x^2$  and  $x \in [-2, 2]$ , then  $f(x) \in \dots\dots\dots$   
 a  $[0, 4]$                       b  $]0, 4[$                       c  $[0, 1]$                       d  $[-4, 4]$
- (47) If  $(x, 7)$  is located on Y-axis, then  $5x + 1 = \dots\dots\dots$   
 a 0                      b 1                      c 5                      d 6
- (48) If  $(a, 3)$  lies on the straight line that represents  $f(x) = 2x - 5$ , then  $a = \dots\dots\dots$   
 a 1                      b 2                      c -2                      d 4
- (49) If  $f(x) = 3x + b$  and  $f(4) = 13$ , then  $b = \dots\dots\dots$   
 a 1                      b 2                      c 0                      d 3

- (50) If  $f(x) = x - 6$  and  $\frac{1}{3}f(a) = -2$ , then  $a = \dots\dots$   
 a 1                      b 0                      c 2                      d 6
- (51) The ordered pair  $(x,y)$  where  $x > 0$  and  $y < 0$  is located in the ..... quadrant.  
 a 1<sup>st</sup>                      b 2<sup>nd</sup>                      c 3<sup>rd</sup>                      d 4<sup>th</sup>
- (52) If  $2x = 7y$ , then  $\left(\frac{x}{y}\right)^{-1} = \dots\dots\dots$   
 a  $\frac{2}{7}$                       b  $\frac{7}{2}$                       c  $\frac{49}{4}$                       d  $\frac{4}{49}$
- (53) If  $a,b,2,3$  are proportional, then  $\frac{b}{a} = \dots\dots\dots$   
 a  $\frac{3}{2}$                       b  $\frac{2}{3}$                       c 3                      d 2
- (54) If  $a,1,b,2$  are proportional, then  $\frac{a}{b} = \dots\dots\dots$   
 a 3                      b  $\frac{1}{2}$                       c  $\frac{1}{3}$                       d  $\frac{1}{4}$
- (55) If  $4x^2 = 9y^2$ , then  $\frac{x}{y} = \dots\dots\dots$   
 a  $\frac{9}{4}$                       b  $\frac{3}{2}$                       c  $\pm \frac{2}{3}$                       d  $\pm \frac{3}{2}$
- (56) If  $\frac{a+2b}{a-b} = \frac{2}{3}$ , then  $\frac{b}{a} = \dots\dots\dots$   
 a  $\frac{1}{8}$                       b 8                      c  $-\frac{1}{8}$                       d -8
- (57) If  $5a - 4b = 0$ , then  $\frac{a}{b} = \dots\dots\dots$   
 a  $\frac{4}{5}$                       b  $\frac{5}{4}$                       c  $-\frac{4}{5}$                       d  $-\frac{5}{4}$

(58) If  $\frac{5a - 7b}{8a + 11} = 0$ , then  $\frac{b}{a} = \dots\dots$

**a**  $\frac{5}{7}$

**b**  $\frac{7}{5}$

**c**  $-\frac{8}{7}$

**d** 0

(59) If  $\frac{4}{x} = \frac{7}{y} = \frac{b}{y - x}$ , then b = .....

**a** 3

**b** -3

**c** 11

**d** -11

(60) If  $\frac{a}{3} = \frac{b}{8} = \frac{a + \frac{1}{2}b}{x}$ , then x = .....

**a** 7

**b** 11

**c** 9

**d** 5

(61) If  $\frac{a}{b} = \frac{c}{d} = m$  where  $m \neq 0$ , then  $\frac{a \times c}{b \times d} = \dots\dots$

**a**  $2m^2$

**b**  $m^2$

**c** m

**d** 2m

(62) If  $\frac{a}{5} = \frac{b}{7}$ , then  $7a - 5b + 3 = \dots\dots$

**a** 3

**b** 7

**c** 5

**d** 2

(63) If  $\frac{x}{5} = \frac{y}{4} = \frac{x + 2y}{k}$ , then k = .....

**a** 9

**b** 14

**c** 13

**d** 8

(64) If  $\frac{a}{4} = \frac{b}{5}$  and  $2a + 3b = 46$ , then a = .....

**a** 2

**b** 4

**c** 5

**d** 8

(65) If  $\frac{a}{b} = \frac{2}{3}$  and  $\frac{a}{c} = \frac{4}{5}$ , then b : c = .....

**a** 3 : 4

**b** 5 : 6

**c** 6 : 5

**d** 4 : 3

(66) The positive middle proportional between a and b is .....

**a**  $\sqrt{ab}$

**b**  $-\sqrt{ab}$

**c**  $\pm \sqrt{ab}$

**d** ab



- (67) The third proportional of 9 and -12 is .....
- a** -16                      **b** 8                      **c** 16                      **d** 108
- (68) If 6 is the middle proportional between m and 2, then m = .....
- a** 8                      **b** 12                      **c** 18                      **d** 36
- (69) If  $\frac{a}{b} = \frac{b}{c} = \frac{c}{5} = 2$ , then a = .....
- a**  $5 \times 2^2$                       **b** 40                      **c** 10                      **d**  $2 \times 5^3$
- (70) If  $\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = 2$ , then  $\frac{a}{d} =$  .....
- a** 2                      **b** 4                      **c** 8                      **d** 16
- (71) If a, 2, 4, b are in a continued proportional, then a + b = .....
- a** 8                      **b** 1                      **c** 9                      **d** 7
- (72) The middle proportional between (x-2) and (x+2) is .....
- a**  $\sqrt{x+2}$                       **b**  $\sqrt{x^2-4}$                       **c**  $x^2-4$                       **d**  $\pm \sqrt{x^2-4}$
- (73) The number that must be added to the numbers 1, 3, 6 to be in a continued proportional is .....
- a** 1                      **b** 2                      **c** 3                      **d** 4
- (74) If 7, x,  $\frac{1}{y}$  are in a continued proportional, then  $x^2y =$  .....
- a** 7                      **b** 14                      **c** 49                      **d** 1
- (75) If y is the middle proportional between x and z, then  $\frac{x}{z} =$  .....
- a**  $\frac{x^2}{y^2}$                       **b**  $\frac{y^2}{z^2}$                       **c**  $\frac{z^2}{y^2}$                       **d**  $\frac{y^2}{x^2}$
- (76) If  $y = \frac{m}{x^2}$  where m is a constant  $\neq 0$ , then  $y \propto$  .....
- a**  $x^2$                       **b** x                      **c**  $\frac{1}{x}$                       **d**  $\frac{1}{x^2}$



(77) If  $x - 2y = 0$ , then  $x \propto$  .....

- a**  $y$                       **b**  $y^2$                       **c**  $\frac{1}{y}$                       **d**  $\frac{1}{y^2}$

(78) The relation that represents a direct variation between  $x$  and  $y$  is .....

- a**  $xy = 5$                       **b**  $y = x + 2$                       **c**  $\frac{x}{3} = \frac{4}{y}$                       **d**  $\frac{x}{5} = \frac{y}{2}$

(79) If  $y$  varies inversely as  $x$  and  $x = \sqrt{3}$  when  $y = \frac{2}{\sqrt{3}}$ , then the proportion constant = .....

- a**  $\frac{3}{2}$                       **b**  $\frac{2}{3}$                       **c**  $2$                       **d**  $6$

(80) If  $xy^5 = \text{constant}$ , then  $x$  varies inversely as .....

- a**  $\frac{1}{5}$                       **b**  $y^5$                       **c**  $y$                       **d**  $y^2$

(81) If  $y \propto \frac{1}{\sqrt{x}}$ , then  $x$  varies .....

- a** directly as  $y^2$                       **b** inversely as  $y^2$   
**c** inversely as  $\sqrt{y}$                       **d** inversely as  $y$

(82) If  $y = 3x - 6$ , then  $y \propto$  .....

- a**  $x$                       **b**  $\frac{1}{x}$                       **c**  $x-2$                       **d**  $3x-6$

(83) If  $\frac{y+3}{y} = \frac{x+2}{x}$ ,  $x \neq 0$ ,  $y \neq 0$ , then  $y \propto$  .....

- a**  $x$                       **b**  $\frac{1}{x}$                       **c**  $x+2$                       **d**  $x+5$

(84) If  $y - x = \frac{2}{y} - \frac{2}{x}$ ,  $x \neq y$ , then .....

- a**  $y \propto x + 1$                       **b**  $y \propto x$                       **c**  $y \propto \frac{1}{x}$                       **d**  $y \propto \frac{1}{x^2}$

- (85) If  $9, 2x, \frac{1}{y^2}$  are proportional, then  $x \propto y = \dots\dots\dots$
- (a)  $\frac{3}{2}$                       (b)  $-\frac{3}{2}$                       (c)  $\pm \frac{3}{2}$                       (d)  $\pm \frac{2}{3}$
- (86) If  $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = m$ , then  $\frac{ace}{bdf} = \dots\dots\dots$
- (a)  $3m$                       (b)  $m^2$                       (c)  $m^3$                       (d)  $m$
- (87) If  $y \propto x$  and  $y = 2$  as  $x = 4$ , then  $y = \dots\dots x$
- (a)  $4$                       (b)  $3$                       (c)  $2$                       (d)  $\frac{1}{2}$
- (88) The mean of the values 7, 3, 6, 9, 5 is  $\dots\dots\dots$
- (a)  $3$                       (b)  $6$                       (c)  $4$                       (d)  $12$
- (89) The range of the values 23, 22, 15, 18, 17 is  $\dots\dots\dots$
- (a)  $8$                       (b)  $18$                       (c)  $19$                       (d)  $23$
- (90) If 67 is the greatest value and the range is 27, then the smallest value is  $\dots\dots\dots$
- (a)  $67$                       (b)  $40$                       (c)  $27$                       (d)  $94$
- (91) The most common value of set of individuals is called  $\dots\dots\dots$
- (a) median                      (b) range                      (c) mode                      (d) mean
- (92) If the mean of the values  $3k-3$ ,  $3k-1$ ,  $2k+1$ ,  $2k+3$ ,  $2k+5$  is 13, then  $k = \dots\dots\dots$
- (a)  $-5$                       (b)  $10$                       (c)  $5$                       (d)  $\frac{1}{5}$
- (93) If the range of values 2, 7,  $a$ , 6 is 8 where  $a > 0$ , then  $a = \dots\dots\dots$
- (a)  $4$                       (b)  $9$                       (c)  $-1$                       (d)  $10$
- (94) If  $(x - \bar{x})^2 = 28$  for the set 7 values, then  $\sigma = \dots\dots\dots$
- (a)  $28$                       (b)  $7$                       (c)  $4$                       (d)  $2$

(95) If the function  $f(x) = (k-3)x^3 + 2x^m + 1$  is of 2<sup>nd</sup> degree, then  $k+m = \dots\dots\dots$

- a** 5                      **b** 3                      **c** 2                      **d** -5

(96) The difference between the greatest value and the smallest value is called .....

- a** median              **b** mean              **c** range              **d** mode

(97) If the standard deviation for the values 5,  $x+2$  and  $2y+1$  is zero, then  $x + y = \dots\dots\dots$

- a** 10                      **b** 5                      **c** 15                      **d** 0

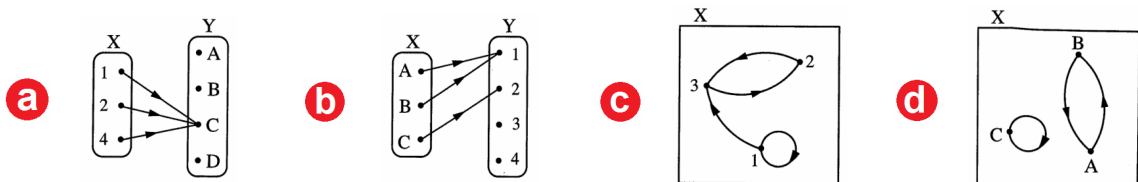
(98) The standard deviation for the values 7, 7, 7 is .....

- a** 49                      **b** 7                      **c** 3                      **d** 0

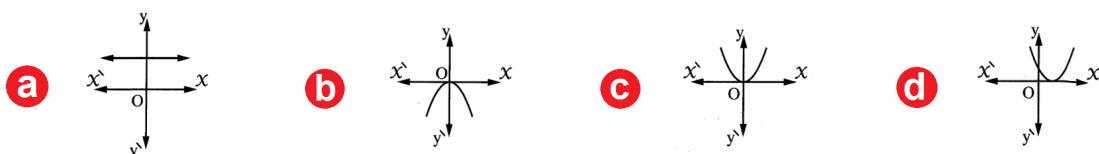
(99) If all individuals are equal, then .....

- a**  $\bar{X}=0$               **b**  $\bar{X} = 0$               **c**  $\sigma=0$               **d** mode=0

(100) Which of the following arrow diagrams does not represent a function



(101) The graph of the function  $f$  where  $f(x) = x^2 - 2x + 1$  is the graph number .....



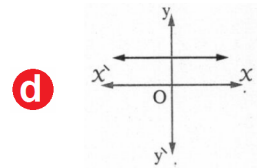
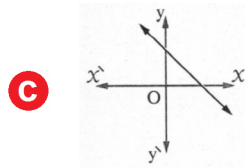
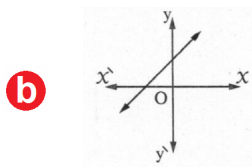
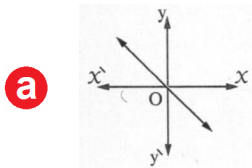
(102) If the curve of the function  $f$  where  $f(x) = x^2 - a$  passes through the point (1, 0), then  $a = \dots\dots\dots$

- a**  $\pm 1$                       **b** -1                      **c** 1                      **d** zero

(103) If  $f(x) = x^{k+3} + 2k$  is a quadratic function, then  $f(2) = \dots\dots$

- a** 1                      **b** -1                      **c** 2                      **d** -2

(104) The graph which represents the direct variation is number .....



### Essay problems:

(1) If  $X = \{1, 5, 6\}$  and  $Y = \{5\}$  and  $Z = \{2, 3\}$ , Find:

- (a)**  $n(X \times Z)$ .  
**(b)**  $(Y \cap X) \times (X - Y)$ .

(2) If  $X \times Y = \{(2, 3), (2, 6), (2, 7)\}$ , Find:

- (a)**  $X$  and  $Y$ .  
**(b)**  $Y^2$ .  
**(c)**  $n(X^2)$ .

(3) If  $X = \{2, 3\}$ ,  $Y = \{3, 4\}$  and  $Z = \{4, 5\}$ , Find:

- (a)**  $Z \times (X \cap Y)$   
**(b)**  $(Z - Y) \times X$

(4) If  $(x+3, 8) = (5, 2^y)$ , then find the value of  $x$  and  $y$ .

(5) If  $(x-2, 9) = (5, x+y)$ , find the value of  $\sqrt{3x+2y}$ .

(6) If  $(x^2, |x|) = (4, 3)$  and  $(x, y)$  located in the 3<sup>rd</sup> quadrant, then find  $x+y$ .

(7) If  $X = \{1, 3, 5\}$  and  $Y = \{1, 2, 4, 5, 6\}$  and  $R$  is a relation from  $X$  to  $Y$  where  $aRb$  means  $a+b=7$  for  $a \in X$  and  $b \in Y$ . Write  $R$ , represent it by the arrow diagram, show that  $R$  is a function and write its range.

- (8) If  $X=\{1,3,5\}$  and  $R$  is a function on  $X$  where  $R=\{(a,3), (b,1), (1,5)\}$ . Find the value of  $a+b$ .
- (9) If  $f(x)=2x^2-5x+2$ , prove that  $f(2)=f(\frac{1}{2})$
- (10) If  $f$  is a function on  $X$  where  $X=\{3,4,5,6\}$  and  $f(3)=3$ ,  $f(4)=5$ ,  $f(5)=5$ ,  $f(6)=5$ . represent  $f$  by an arrow diagram, write  $f$  and find its range.
- (11) If the straight line which represents the function  $f(x)=ax+b$  intersects  $X$ -axis at  $(3,0)$  and  $Y$ -axis at  $(0,-3)$ , find the value of  $a$  and  $b$ .
- (12) If  $(2a,5a) \in f$  where  $f(x)=2x+5$ , find the value of  $a$  and identify the intersection points of the straight line with the coordinates axes.
- (13) If  $f(x)=(3-a)x^2+(b+5)x+4$  is a constant function. Find the value of  $a+b$ .
- (14) If the vertex of the curve of the function  $f(x)=x^2-ax+3$  is  $(2,k)$ . Find the value of  $a$  and  $k$ .
- (15) Represent graphically the function  $f(x)=4-x^2$ , where  $x \in [-3,3]$  and from the graph identify:  
 (a) The vertex.  
 (b) The equation of the axis of symmetry.  
 (c) The maximum or minimum value.
- (16) Represent graphically the function  $f(x)=x^2+2x+1$ , where  $x \in [-4,2]$  and from the graph identify:  
 (a) The vertex.  
 (b) The equation of the axis of symmetry.  
 (c) The maximum or minimum value.
- (17) If  $\frac{x-2y}{x+3y} = \frac{1}{3}$ , find the value  $\frac{y}{x}$ .

- (18) If  $\frac{x}{y} = \frac{2}{3}$ , find the value of  $\frac{3x + 2y}{6y - x}$ .
- (19) Find the number that if added to the two terms of the ratio 7:11 it becomes 2:3
- (20) Find the number must be added to each of the numbers 3,5,8 and 12 to be proportional.
- (21) Find the number if subtract its triple from the two terms of the ratio 49:69 it becomes 2:3.
- (22) Find the number if we added its square to the two terms of the ratio 7:11 it becomes 4:5
- (23) If  $\frac{a + b}{b} = \frac{c + d}{d}$ , **prove that** a, b, c and d are proportional.
- (24) If  $\frac{a}{b - a} = \frac{c}{d - c}$ , **prove that** a, b, c and d are proportional.
- (25) If a, b, c and d are proportional, **prove that**:
- $\frac{3a + c}{5a - 2c} = \frac{3b + d}{5b - 2d}$
  - $\frac{a^2 + b^2}{ab + cd} = \frac{a}{b}$
  - $\frac{ac}{bd} = \left(\frac{a - c}{b - d}\right)^2$ .
- (26) If  $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$ , **prove that**  $\frac{2y - z}{3x - 2y + z} = \frac{1}{2}$ .
- (27) If  $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - b + 5c}{3x}$ , **find** the value of x.
- (28) If  $\frac{x}{a - b + c} = \frac{y}{b - c + a} = \frac{z}{c - a + b}$ , **prove that**  $\frac{x + y}{a} = \frac{y + z}{b}$ .



(29) If  $\frac{x}{2a+b} = \frac{y}{2b-c} = \frac{z}{2c-a}$ , prove that

$$\frac{2x+y}{4a+4b-c} = \frac{2x+2y+z}{3a+6b}.$$

(30) If  $\frac{a+b}{4} = \frac{b+c}{5} = \frac{c+a}{7}$ , prove that  $\frac{a+b+c}{8} = \frac{a}{3}$ .

(31) If a, 3, 9, b are in a continued proportion, find the value of a and b.

(32) If  $\frac{a^2+b^2}{b^2} = \frac{b^2+c^2}{c^2}$ , prove that b is a middle proportion between a and c where ac is a positive quantity.

(33) If b is a middle proportion between a and c, prove that:

(a)  $\frac{a}{c} = \frac{b^2}{c^2}$ .

(b)  $\frac{a^2+b^2}{b^2+c^2} = \frac{a}{c}$ .

(34) If Y varies directly as X and Y=20 as X=7, Find the relation between X and Y, then find the value of X as Y=4.

(35) If  $Y \propto X$  and Y=14 as X=42, Find:

(a) The relation between Y and X.

(b) The value of Y as X=60.

(36) If  $Y \propto \frac{1}{x}$  and Y=3 as X=2, Find:

(a) The relation between Y and X.

(b) The value of Y as X=1.5

(37) If  $\frac{a+2b}{6} = \frac{b+3c}{3}$ , prove that  $a \propto b$ .

(38) If  $x^2y^2 - 6xy + 9 = 0$ , prove that  $y \propto \frac{1}{x}$ .



(39) If  $4x^2 + 9y^2 = 12xy$ , prove that  $y \propto x$ .

(40) From the opposite table:

X	2	4	6
Y	6	3	2

(a) Determine the type of variation.

(b) Find the constant of variation.

(c) Find the value of  $y$  as  $x=3$

(41) If  $y=z+5$ ,  $z \propto \frac{1}{x}$  and  $y=6$  as  $x=2$ . Find the relation between  $x$  and  $y$ , then find the value of  $y$  as  $x=1$

(42) Calculate the mean and the standard deviation of the following values:

(a) 15, 6, 8, 12, 4.

(b) 5, 6, 7, 8, 9.

(43) Calculate the standard deviation of the following frequency distributions:

(a)

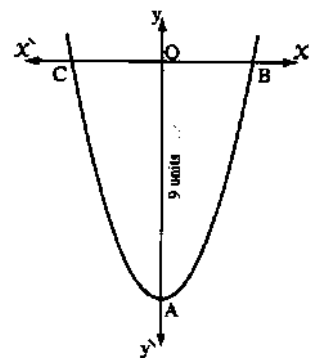
Values	0	1	2	3	4	5
Frequency	9	15	17	25	20	14

(b)

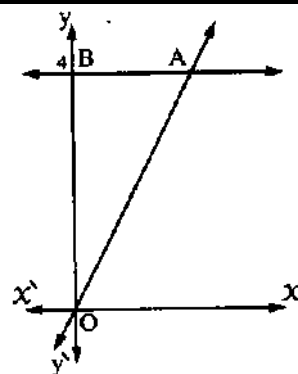
Sets	0-	2-	4-	6-	8-
Frequency	1	5	9	3	2

Drawn problems:

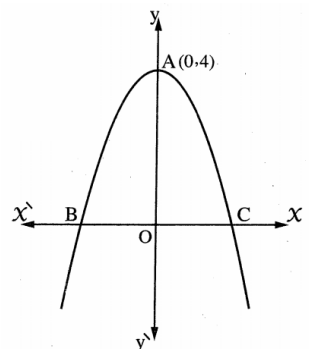
- (1) The opposite figure represents the curve of the function  $f$  where  $f(x) = x^2 + k$ . Find:
- The value of  $k$ .
  - The coordinates of B and C.
  - the area of triangle with vertices A, B, C



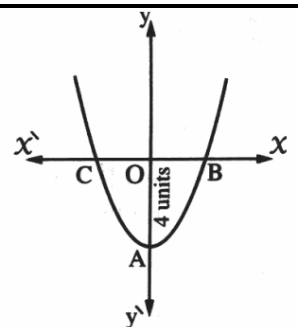
- (2) The  $\overleftrightarrow{AO}$  represents a linear function  $f$  where  $f(x) = nx + k$  and the area of the  $\triangle ABO$  is 4 square units. Find the value of  $n$  and  $k$ .



- (3) The opposite figure represents the curve of the quadratic function  $f$  where  $f(x) = 4 - kx^2$ , if the area of  $\triangle ABC$  is 8 square units, Find:
- The value of  $k$ .
  - The coordinates of B.
  - The maximum or minimum value.
  - The equation of the axis of symmetry.



- (4) The opposite figure represents the curve of the function  $f$  where  $f(x) = x^2 - m$ , Find:
- The value of  $m$ .
  - The area of  $\triangle ABC$ .



# SECOND: GEOMETRY

Choose the correct answer:

- (1) The straight line whose slope  $m_1=2$  intersects a straight line in one point, then the slope  $m_2 \neq$  .....  
 (a) 2                      (b) -2                      (c)  $\frac{1}{2}$                       (d)  $-\frac{1}{2}$
- (2) The area of triangle that bounded by the straight lines:  $x = 0$ ,  $y = 0$  and  $3x-4y=12$  is ..... square unit  
 (a) 4                      (b) 6                      (c) 12                      (d) 10
- (3) ABCD is a square in which A(1,0) and B(5,-3), then the perimeter of the square is ..... length unit  
 (a) 5                      (b) 10                      (c) 20                      (d) 15
- (4) If C(2,-1) is the midpoint of  $\overline{AB}$ , A(2,3), then the coordinates of B is .....  
 (a) (1,2)                      (b) (2,1)                      (c) (2,-5)                      (d) (-5,2)
- (5) The distance between (0,0) and (3,-4) is ..... length unit.  
 (a) 1                      (b) 5                      (c) -1                      (d) 7
- (6) The equation of the straight line passes through (3,5) and parallel to X-axis is .....  
 (a)  $Y=3$                       (b)  $X=3$                       (c)  $Y=5$                       (d)  $X=5$
- (7)  $\overline{AB}$  is a diameter in the circle M, A(-2,3) and B(6,-5), then the coordinates of M is .....  
 (a) (4,4)                      (b) (-2,1)                      (c) (2,-1)                      (d) (-1,2)

- (8) The straight line whose equation:  $3x+4y-9=0$  is perpendicular to the straight line whose slope .....
- a  $\frac{3}{4}$       b  $\frac{4}{3}$       c  $-\frac{4}{3}$       d  $-\frac{3}{4}$
- (9) The distance between the point  $(3, -4)$  and the X-axis equals ..... length unit.
- a -3      b 4      c -4      d 3
- (10) The straight line whose slope equals to the additive identity is parallel to the straight line whose equation is .....
- a  $y=x$       b  $y=1$       c  $x=1$       d  $y=-x$
- (11) If the X-axis bisect  $\overline{AB}$  where  $A(4,2)$  and  $B(-2,y)$ , then  $y=.....$
- a 3      b 2      c -2      d 4
- (12) Two perpendicular straight lines, the slope of the first is  $-\frac{1}{4}$  and the slope of the second is  $4k$ , then  $k = .....$
- a 4      b 1      c -4      d  $\frac{1}{4}$
- (13) If the two straight lines:  $x+y=5$  and  $kx+2y=0$  are parallel, then  $k = .....$
- a -2      b -1      c 1      d 2
- (14) If the straight line whose equation  $bx+a=cy$  and passing through the origin, then ..... = 0
- a  $b \times c$       b  $c$       c  $b$       d  $a$
- (15) The straight line whose equation  $y=x$  passing through .....
- a  $(-1,0)$       b  $(0,0)$       c  $(1,0)$       d  $(0,-1)$
- (16) The slope of the straight line whose equation  $cx+ay=b$  is .....
- a  $-\frac{a}{b}$       b  $-\frac{a}{c}$       c  $-\frac{b}{c}$       d  $-\frac{c}{a}$

(17) If  $\frac{5}{4}$  and  $\frac{k}{2}$  are two slopes of two perpendicular straight lines, then  $k = \dots\dots\dots$

- a  $-\frac{5}{8}$       b  $\frac{5}{8}$       c  $\frac{8}{5}$       d  $-\frac{8}{5}$

(18) A circle, its center is the origin point, and its radius length is 3 length units, then the point  $\dots\dots\dots$  belongs to the circle.

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

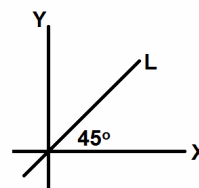
(19) The perpendicular distance between  $y=3$  and  $y=-2$  is  $\dots\dots\dots$

- a 1      b 2      c 3      d 5

(20) If  $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$  and the slope of  $\overleftrightarrow{AB} = -2$ , then the slope of  $\overleftrightarrow{CD}$  is  $\dots\dots\dots$

- a -2      b  $-\frac{1}{2}$       c  $\frac{1}{2}$       d undefined

(21) The equation of the straight line L is  $\dots\dots\dots$



- a  $X=1$       b  $Y=1$       c  $Y=X$       d  $Y=-X$

(22) ABCD is a parallelogram, then slope of  $\overleftrightarrow{AB} =$  the slope of  $\dots\dots\dots$

- a  $\overleftrightarrow{AD}$       b  $\overleftrightarrow{AC}$       c  $\overleftrightarrow{BC}$       d  $\overleftrightarrow{CD}$

(23) The length of the intercepted part of Y-axis by the straight line  $3y=4x-12$  equals  $\dots\dots\dots$  length unit.

- a 3      b -4      c 4      d 12

(24) The circumference of a circle whose center (0,0) and passing through the point (3,4) is  $\dots\dots\dots$  length unit.

- a  $5\pi$       b  $10\pi$       c  $4\pi$       d  $6\pi$

(25) The slope of the straight line which makes an angle of measure  $\theta$  with the positive direction of X-axis is .....

- a  $\sin \theta$       b  $\cos \theta$       c  $\tan \theta$       d  $\sin \theta + \theta$

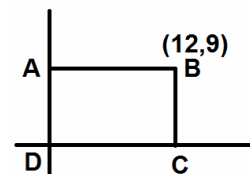
(26)  $\overline{AB}$  is a diameter in a circle where  $A(-1,5)$  and  $B(3,1)$ , then the coordinates of the center is .....

- a  $(2,6)$       b  $(1,3)$       c  $(4,-4)$       d  $(-4,4)$

(27) The slope of the straight line that parallel to the Y-axis (perpendicular to X-axis) is .....

- a 0      b 1      c -1      d undefined

(28) In the opposite figure: ABCD is a rectangle. AD = ..... length unit.



- a 9      b 12      c 13      d 0

(29) If  $(0,a)$  belongs to the straight line  $3x-4y+12=0$ , then  $a = \dots$

- a -3      b 4      c 3      d -4

(30) The equation of the straight whose slope is 1 and passing through the origin is .....

- a  $X=1$       b  $Y=1$       c  $Y=X$       d  $Y=-X$

(31) The slope of the straight line which makes an angle of measure  $45^\circ$  with the positive direction of X-axis is .....

- a 1      b -1      c 0      d 2

(32) If  $\overleftrightarrow{AB}$  is parallel to x-axis where  $A(8,3)$  and  $B(2,k)$ , then  $k=...$

- a 8      b 0      c 3      d 2

(33) If  $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$ ,  $A(-1,2)$  and  $B(0,0)$ , then the slope of  $\overleftrightarrow{CD}$  is .....

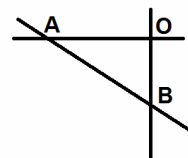
- a -2      b  $\frac{1}{2}$       c  $-\frac{1}{2}$       d 2



- (34) If the distance between  $(a,0)$  and  $(0,1)$  is 1 length unit, then  $a$  = .....
- a -1                      b 0                      c 1                      d  $\pm 1$
- (35) If the slope of the straight line  $ax-y+5=0$  is 3, then  $a$  = .....
- a 5                      b -5                      c 1                      d 3
- (36) The straight line passing through  $(-1,-1)$  and  $(4,4)$  makes an angle with positive direction of X-axis of measure .....°
- a 30                      b 45                      c 60                      d 135
- (37) The slope of the straight line  $2y = \frac{1}{2}(3 - 5x)$  is .....
- a  $-\frac{5}{2}$                       b  $-\frac{5}{4}$                       c  $\frac{3}{4}$                       d  $\frac{3}{2}$
- (38) The straight line  $3x+4y=9$  is perpendicular to the straight line whose slope is .....
- a  $\frac{4}{3}$                       b  $\frac{3}{4}$                       c  $-\frac{4}{3}$                       d  $-\frac{3}{4}$
- (39) ABCD is a square and  $A(2,-5)$  ,  $B(-1,-1)$ , then its perimeter is ..... length unit.
- a 5                      b 20                      c 7                      d 28
- (40) If the slopes of two straight lines are equal, then the two straight lines are .....
- a perpendicular                      b parallel  
c intersecting                      d skew
- (41) The length of the Y intercept by the straight line  $2x-3y=6$  equals ..... length unit.
- a -6                      b -2                      c 6                      d 2



- (42) The equation of Y-axis is .....
- a  $X=0$                       b  $Y=0$                       c  $Y=X$                       d  $XY=1$
- (43) The points  $(-3,0)$  ,  $(0,3)$  and  $(3,0)$  are vertices of triangle whose type .....
- a scalene                                      b isosceles  
c obtuse-angled                              d isosceles and right-angled
- (44) If the slope of a straight line is greater than 0, then the angle with the positive direction of X-axis is .....
- a obtuse                      b acute                      c right                      d straight
- (45) If the slope of the straight line  $y+ax+b=0$  is -3 and passing through  $(1,4)$ , then  $a+b=$ .....
- a 4                      b 7                      c -4                      d -7
- (46) If the slope of the straight line passing through the two points  $(k,2k+1)$  and  $(k-2,4k-1)$  is 3, then  $k =$  .....
- a 2                      b -2                      c 3                      d -3
- (47) If the straight line  $y=(a-1)x +5$  is parallel to the straight line that passing the two points  $(1,2)$  and  $(3,8)$ , then  $a =$  .....
- a 3                      b 4                      c -4                      d 7
- (48) In the opposite figure:  $3 OA = 4 OB$ , then the equation of  $\overleftrightarrow{AB}$  is .....



- a  $y = -\frac{3}{4}x + 3$                                       b  $y = -\frac{3}{4}x - 3$   
c  $y = -\frac{4}{3}x + 3$                                       d  $y = -\frac{4}{3}x - 3$

- (49) If the straight line  $x - \sqrt{3}y = 2$  makes an angle with the positive direction of x-axis of measure  $(2k+20)^\circ$ , then  $k = \dots\dots$
- (a) 30                      (b) 20                      (c) 10                      (d) 5
- (50) If  $\sin \theta = \cos 2\theta$  where  $\theta$  is an acute angle, then  $\theta = \dots\dots^\circ$
- (a) 45                      (b) 30                      (c) 60                      (d) 15
- (51)  $\frac{\sin \theta}{\cos \theta} = \dots\dots$
- (a) 1                      (b)  $\tan \theta$                       (c)  $\sin \theta$                       (d)  $\cos \theta$
- (52) ABC is an isosceles triangle and  $\tan\left(\frac{A}{2}\right) = 1$ , then  $\tan B = \dots\dots$
- (a) 1                      (b)  $\frac{1}{2}$                       (c) 2                      (d)  $45^\circ$
- (53)  $\tan \theta \times \cos \theta = \dots\dots$
- (a)  $\cos \theta$                       (b)  $\sin \theta$                       (c) 1                      (d) 0
- (54) ABC is a right-angled triangle at B and  $AB = \frac{1}{2} AC$ , then  $\cos A = \dots\dots$
- (a)  $\frac{1}{2}$                       (b)  $\frac{\sqrt{3}}{2}$                       (c)  $\frac{1}{\sqrt{2}}$                       (d)  $\frac{1}{\sqrt{3}}$
- (55) ABC is a triangle where  $m(\angle B) = m(\angle A) + m(\angle C)$ , then  $\tan \frac{B}{2} = \dots\dots$
- (a) 45                      (b) 1                      (c)  $\frac{1}{2}$                       (d)  $\frac{\sqrt{3}}{2}$
- (56)  $4 \cos 30 \tan 60 = \dots\dots$
- (a) 3                      (b)  $2\sqrt{3}$                       (c) 6                      (d) 12
- (57) If  $\cos 2\theta = \frac{1}{2}$  where  $\theta$  is an acute angle, then  $\theta = \dots\dots^\circ$
- (a) 15                      (b) 30                      (c) 45                      (d) 60

(58) If  $\tan \frac{3x}{2} = 1$  where  $x$  is an acute angle, then  $m(\angle x) = \dots^\circ$

- a 10                      b 30                      c 45                      d 60

(59) If  $\cos \frac{x}{2} = \frac{\sqrt{3}}{2}$  where  $x$  is an acute angle, then  $\sin x = \dots$

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

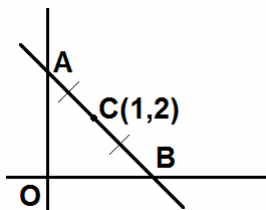
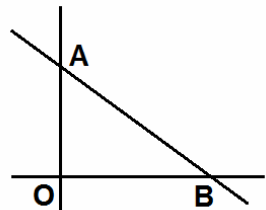
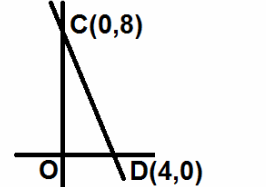
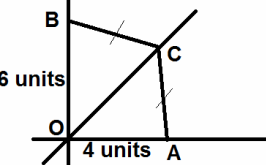
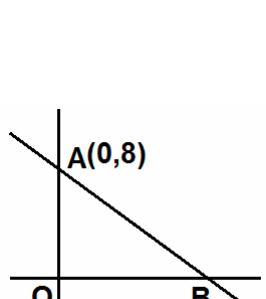
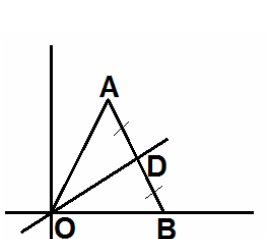
### Essay problems:

- (1) If  $2 \sin x = \sin 30^\circ \cos 60^\circ + \cos 30^\circ \sin 60^\circ$ , **find** the value of  $x$ .
- (2) ABC is a right angled triangle at B and  $2AB = \sqrt{3} AC$ , **find** the trigonometrical ratios of  $(\angle B)$ .
- (3) If the ratio between two supplementary angles is 3:5, **find** the measure of each of them.
- (4) If  $\sin (2x+20) = \cos (x+50)$ , **find** the value of  $x$ .
- (5) ABC is a right-angled triangle at C,  $AB=13$  cm,  $BC=12$ cm. **Prove that:**  $\sin A \cos B + \cos A \sin B = 1$
- (6) Find the equation of a straight line whose slope is 2 and intercepts the positive direction of Y-axis a part of length 7 units.
- (7) Find the equation of a straight line whose slope  $-\frac{1}{2}$  and passing through the point (3,5).
- (8) Find the equation of a straight line which passes through the points (2,3) and (-3,2).

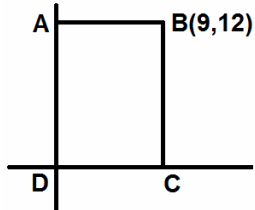
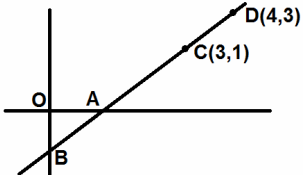
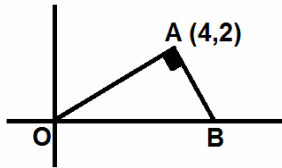
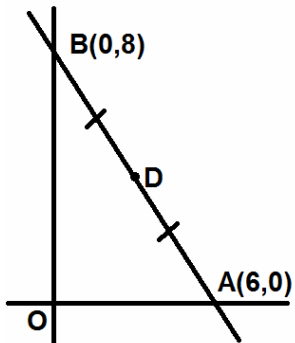
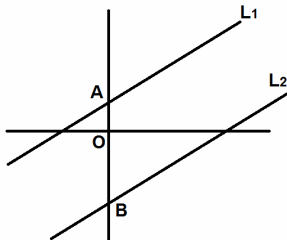
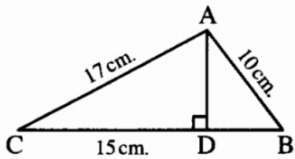
- (9) Find the equation of a straight line which passes through the point (3, -5) and parallel to the straight line  $x+2y-7=0$
- (10) Find the equation of a straight line which passes through the point (1, 2) and perpendicular to the straight line which passes through the points (3, 2) and (5, -4).
- (11) Find the equation of a straight line whose slope equals the slope of the straight line  $\frac{y-1}{x} = \frac{1}{3}$  and intercepts the negative direction of Y-axis a part of length 3 units.
- (12) Find the equation of a straight line which intercepts the two axes two positive parts of length 4 and 9 respectively.
- (13) ABCD is a square in which A(5, 4) and C(-1, 6). Find the equation of  $\overleftrightarrow{BD}$ .
- (14) ABCD is a rhombus in which A(1, 3) and C(6, 0). Find the equation of  $\overleftrightarrow{BD}$ .
- (15) Find the equation of the straight line which passes through A(2, 3) and B(-1, 3) then prove that  $C \in \overleftrightarrow{AB}$  where  $C(2k+1, 4k+1)$ .
- (16) ABC is a triangle where A(1, 3), B(5, -2), C(3, 4), D is the midpoint of  $\overline{AB}$ ,  $\overleftrightarrow{DE} \parallel \overleftrightarrow{BC}$  intersects  $\overline{AD}$  in E. Find:  
(a) the length of  $\overline{DE}$ . (b) the equation of  $\overleftrightarrow{DE}$
- (17) The opposite table represents a linear relation:
- |      |   |   |   |
|------|---|---|---|
| x    | 1 | 2 | 3 |
| f(x) | 1 | 3 | a |
- (a) Find the equation of the straight line.  
(b) Find the length of y intercept.  
(c) Find the value of a.
- (18) If A(-3, 4), B(5, -1) and C(3, 5). Find the equation of the straight line which passes through A and the mid point of  $\overline{BC}$ .

- (19) Find the equation of the straight line which passes through the point (3,5) and intercepts a part of the positive direction of X-axis of length 4 units.
- (20) Find the equation of line of symmetry of  $\overline{XY}$  where X(3,-2) and Y(-5,6).
- (21) If the distance between (a,5) and (6,1) is  $2\sqrt{5}$ , **find** the value of a.
- (22) If A(x,3), B(3,2), C(5,1) and AB=BC, **find** the value of x.
- (23) If C(x,-3) is the midpoint of AB where A(-3,y) and B(9,-7), **find** the value of x and y.
- (24) Prove that A(4,3), B(1,1) and C(-5,-3) are collinear.
- (25) If (1,1), (3,5) and (5,a) are collinear, **find** the value of a.
- (26) Prove that the triangle whose vertices are A(5,-5), B(-1,7) and C(15,15) is right-angled at B, then **find** its area.
- (27) Determine the type of  $\triangle ABC$  according to the length of its sides where A(-2,4), B(3,1) and C(4,5).
- (28) If A(5,3), B(6,-2), C(1,-1) and D(0,4). Prove that ABCD is a rhombus and **find** its area.
- (29) ABCD is a parallelogram in which A(3,4), B(2,-1), C(-4,-3). **Find** the coordinates of D.
- (30) If A(3,-2), B(-5,0), C(8,-9) and D(0,7) **prove that** ABDC is a parallelogram.

**Drawn Problems:**

(1)	<p>From the opposite figure, <b>Find:</b>  <b>(a)</b> the coordinates of A and B  <b>(b)</b> The area of <math>\triangle AOB</math>.</p>	
(2)	<p>In the opposite figure, if <math>\overleftrightarrow{AB}</math> intercepts Y-axis in the positive direction a part of 3 units and <math>AB = 5</math> units.  <b>Find:</b> the equation of <math>\overleftrightarrow{AB}</math></p>	
(3)	<p>The equation of <math>\overleftrightarrow{AB}</math> is <math>CX+Y+D=0</math>, find the value of C and D.</p>	
(4)	<p>The equation of <math>\overleftrightarrow{OC}</math> is <math>Y=X</math>, find the coordinates of C.</p>	
(5)	<p>In the opposite figure, if <math>\tan(\angle ABO) = \frac{4}{3}</math>,  <b>Find:</b>  <b>(a)</b> <math>m(\angle BAO)</math>  <b>(b)</b> the coordinates of B  <b>(c)</b> The slope of <math>\overleftrightarrow{AB}</math>.  <b>(d)</b> The equation passes through O and perpendicular to <math>\overleftrightarrow{AB}</math></p>	
(6)	<p>In the opposite figure, ABO is an equilateral triangle, D is the midpoint of AB, <b>Find:</b>  <b>(a)</b> The slope of <math>\overleftrightarrow{AB}</math>.  <b>(b)</b> The equation of <math>\overleftrightarrow{OD}</math>.  <b>(c)</b> If <math>(5\sqrt{3}, k) \in \overleftrightarrow{OD}</math>, find the value of k.</p>	

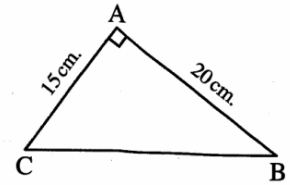


(7)	ABCD is a rectangle, find length of $\overline{AD}$ .	
(8)	Find the length of each $\overline{AD}$ and $\overline{OB}$	
(9)	Find: (a) The coordinates of B. (b) The equation of $\overleftrightarrow{AB}$ . (c) $\tan (\angle ABO)$	
(10)	From the opposite figure, Find: (a) The length of $\overline{AB}$ . (b) The coordinates of D. (c) $m(\angle ABO)$ . (d) The slope of the perpendicular to $\overleftrightarrow{AB}$ . (e) The equation of the straight line which is parallel to $\overleftrightarrow{AB}$ and passes through the origin. (f) $\sin A \cos B + \cos A \sin B$	
(11)	If $L_1 \parallel L_2$ , the equation of $L_1$ is $y = \frac{2}{3}x + 2$ and $AB = 5$ units. Find the equation of $L_2$ .	
(12)	In the opposite figure : $\overline{AD} \perp \overline{BC}$ , $AC = 17$ cm. , $DC = 15$ cm. , $AB = 10$ cm. Find the value of : $3 \tan (\angle C) + \sin (\angle B)$	



**(13) In the opposite figure :**

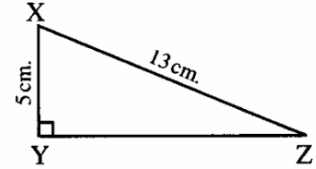
ABC is a triangle in which :  $m(\angle A) = 90^\circ$   
 , AC = 15 cm. and AB = 20 cm.



**Prove that :**  $\cos C \cos B - \sin C \sin B = \text{zero}$

**(14) In the opposite figure :**

XYZ is a triangle ,  $m(\angle Y) = 90^\circ$   
 XY = 5 cm. , XZ = 13 cm.

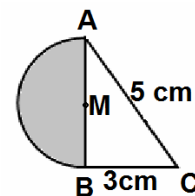


**Find:**  $\sin X \cos Z + \cos X \sin Z$

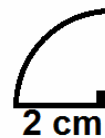
## THIRD: ACCUMULATIVE SKILLS

- (1) The sum of measure of accumulative angles at point = .....°  
 a 90                      b 180                      c 270                      d 360
- (2) The sum of measures of interior angles of the pentagon = .....°  
 a 180                      b 360                      c 540                      d 720
- (3) The number of diagonals of the hexagon = .....  
 a 6                      b 3                      c 12                      d 9
- (4) ABC is a triangle in which  $m(\angle B) = 3m(\angle A) = 90^\circ$ , then  $m(\angle C) = \dots^\circ$   
 a 30                      b 45                      c 60                      d 90
- (5) ABCD is a parallelogram  $m(\angle A) : m(\angle B) = 1 : 3$ , then  $m(\angle B) = \dots^\circ$   
 a 45                      b 135                      c 120                      d 115
- (6) If 3, 7, L are lengths of sides of triangle, then L may = .....  
 a 3                      b 4                      c 7                      d 10
- (7) ABC is an isosceles triangle, the lengths of two sides 3cm and 7cm, then the third side may = ..... cm  
 a 3                      b 7                      c 4                      d 10
- (8) ABC is a triangle in which  $AB = AC$  and  $m(\angle A) = 60^\circ$ , then the number of axes of symmetry of this triangle = .....  
 a 1                      b 3                      c 0                      d 2
- (9) The number of axes of symmetry of a circle is .....  
 a 0                      b 1                      c 4                      d infinite

- (10) ABC is a triangle in which  $m(\angle B) > m(\angle C)$ , then .....  
 a  $AC - AB < 0$     b  $AC - AB \leq 0$     c  $BC \leq AB$     d  $AC > AB$
- (11) The base angles of the isosceles triangle are .....  
 a congruent    b supplementary  
 c equal    d complementary
- (12) The angle of measure ..... supplements an angle of measure  $120^\circ$ .  
 a 120    b 240    c 60    d 30
- (13) The quadrilateral whose diagonals perpendicular and equal in length is called .....  
 a square    b rhombus    c circle    d rectangle
- (14) The volume of a cuboid whose dimensions  $\sqrt{2}, \sqrt{3}, \sqrt{6}$  is .....  $\text{cm}^3$   
 a  $2\sqrt{6}$     b  $3\sqrt{6}$     c  $2\sqrt{3}$     d 6
- (15) The measure of exterior angle of an equilateral triangle is ...°  
 a 60    b 80    c 100    d 120
- (16) IF  $\overline{AB} \equiv \overline{CD}$ , then  $AB - CD =$  .....  
 a 0    b 1    c -1    d 2
- (17) The image of the point  $(-3, 7)$  by reflection in Y-axis is .....  
 a  $(3, 7)$     b  $(-3, -7)$     c  $(3, -7)$     d  $(-3, 7)$
- (18) From the opposite figure, the area of the shaded part is .....  $\text{cm}^2$



- (19) The opposite figure represents a quarter of a circle of radius length 2cm, then the perimeter of the figure is ..... cm



- a  $2\pi$       b  $5\pi$       c  $\pi+4$       d  $4\pi+4$
- (20) In  $\triangle ABC$ , if  $m(\angle C) = m(\angle A) + m(\angle B)$ , then ABC is .....
- a acute-angled triangle      c right-angled triangle  
 b isosceles triangle      d obtuse-angled triangle
- (21) In any triangle ABC,  $AB + BC - AC > \dots\dots\dots$
- a 0      b 1      c AC      d otherwise
- (22) The sum of lengths of any two sides in a triangle is ..... the length of the third side.
- a more than      b less than      c equal to      d twice
- (23) The type of the angle of measure  $108^\circ$  is .....
- a right      b obtuse      c acute      d reflex
- (24) If ABCD is a parallelogram, then  $AB + CD = \dots\dots\dots$
- a  $2AC$       b  $2BC$       c  $2BD$       d  $2CD$
- (25) If ABCD is a parallelogram and  $m(\angle A) + m(\angle C) = 150^\circ$ , then  $m(\angle B) = \dots\dots\dots^\circ$
- a 75      b 30      c 105      d 100
- (26) Two equal complementary angles, the measure of each of them is ..... $^\circ$
- a 50      b 60      c 45      d 30
- (27) The length of side opposite to the angle of measure  $30^\circ$  in the right angled triangle equals ..... the length of the hypotenuse.
- a 2      b  $\frac{1}{2}$       c  $\frac{1}{3}$       d  $\frac{2}{3}$

- (28) In the  $\triangle ABC$ , if  $AB > AC$ , then  $m(\angle B) \dots\dots\dots m(\angle C)$ .
- a  $>$                       b  $<$                       c  $=$                       d  $\equiv$
- (29) The concurrence point of medians of triangle divides each median in the ratio ..... : ..... from the vertex.
- a 1:1                      b 2:3                      c 1:2                      d 2:1
- (30) The circumference of a circle whose its diameter length 14 cm is ..... cm
- a 7                      b 22                      c 44                      d 14
- (31) The image of  $(-4,5)$  by a translation  $(2,-3)$  is .....
- a  $(-2,-2)$               b  $(2,-2)$               c  $(2,2)$               d  $(-2,2)$
- (32) ABC is a right-angled triangle at B,  $AB = 3\text{cm}$ ,  $BC = 4\text{cm}$ , then the area of triangle = .....  $\text{cm}^2$
- a 9                      b 6                      c 12                      d 7
- (33) If the perimeter of a square is 16 cm, then its area = .....  $\text{cm}^2$
- a 64                      b 16                      c 8                      d 4
- (34) The sum of measure of two supplementary angles = ..... $^\circ$
- a 360                      b 270                      c 180                      d 90
- (35) Which of the following are sides of a right-angled triangle?
- a 3,4,6                      b 5,12,13              c 6,8,9                      d 9,5,14
- (36) The isosceles trapezium has ..... axes of symmetry
- a 1                      b 2                      c 0                      d 3
- (37) The rhombus (rectangle) has ..... axes of symmetry
- a 0                      b 1                      c 2                      d 3
- (38) The square has ..... axes of symmetry
- a 1                      b 2                      c 3                      d 4