MATHS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

STRAIGHT LINE

Exercise 1 Topical Problems

1. Let PS be the median of the triangle with vertices $P(2, 2), Q(6, -1) and R(7, 3)$ Then equation of the line passing through $(1, -1)$ and parallel to PS is $2x - 9y - 7 = 0$

$2x - 9y - 11 = 0 \ 2x + 9y - 11 = 0 \ 2x + 9y + 7 = 0$

A. 4x -7y -11 =0

B. 2x + 9y +7=0

C. 4x+7y+3=0

D. 2x-9y -11=0

Answer: B

2. Let a,b, c and d be non-zero numbers. If the point of intersection of the lines $4ax + 2ay + c = 0$ and $5bx + 2by + d = 0$ lies in the fourth quadrant and is equidistant from the two axes, then

A. 2bc-3ad=0

B. 2bc+3ad=0

C. 2ad - 3bc =0

D. 3bc + 2ad =0

Answer: C

3. Find the value of λ , if the line

$3x - 4y - 13 = 0, 8x - 11y - 33 = 0 \, and \, 2x - 3y + \lambda = 0$ are

concurrent.

    A. 20

    B. -7

    C. 7

    D. -20

Answer: B

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4. The points (2,5) and (5,1) are two opposite vertices of a rectangle. If

other two vertices are points on the straight line y =2x + k , then the

value of k is

A. 4

B. 3

C. -4

D. -3

Answer: C

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5. A straight line perpendicular to the line 2x +y =3 is passing through

(1,1) Its y-intercept is

A. 1

B. 2

C. 3

D. $\dfrac{1}{2}$

Answer: D

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6. The ratio by which the line 2x + 5y -7=0 divides the straight line joining the points (-4,7) and (6,-5) is

    A. $1:4$

    B. $1:2$

    C. $1:1$

    D. $2:3$

Answer: C

7. The straight lines $x + y = 0, 5x + y = 4$ and $x + 5y = 4$ form (A) an isosceles triangle (B) an equilateral triangle (C) a scalene triangle (D) a right angled triangle

    A. an isosceles triangle

    B. an equilateral triangle

    C. a scalene triangle

    D. a right angled triangle

Answer: A

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8. The equation of a line through the point (1, 2) whose distance from the point $(3, 1)$ has the greatest value is $y = 2x$ (b) $y = x + 1$ $x + 2y = 5$ (d) $y = 3x - 1$

    A. y=2x

B. y=x +1

C. x +2y =5

D. y =3x -1

Answer: C

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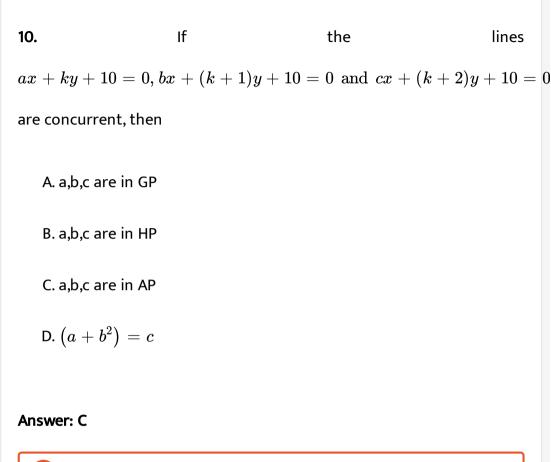**9.** If a line with y-intercept 2, is perpendicular to the line 3x -2y =6, then its x-intercept is

A. 1

B. 2

C. -4

D. 3

Answer: D

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10. If the lines

$$ax + ky + 10 = 0, \ bx + (k+1)y + 10 = 0 \ \text{and} \ cx + (k+2)y + 10 = 0$$

are concurrent, then

    A. a,b,c are in GP

    B. a,b,c are in HP

    C. a,b,c are in AP

    D. $\left(a + b^2\right) = c$

Answer: C

11. The equation of the line bisecting perpendicularly the segment joining the points (-4,6) and (8,8) is

A. 6x +y -19=0

B. y=7

C. 6x + 2y -19=0

D. x+2y-2=0

Answer: A

12. If the lines x +3y -9 = 0, 4x + by -2 = 0 and 2x -y -4 = 0 are concurrent , the b is equal to

A. -5

B. 5

C. 1

D. 0

Answer: A

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13. A straight line passes through the points $(5, 0)$ and $(0, 3)$. The length of perpendicular from the point $(4, 4)$ on the line is

A. $\dfrac{15}{\sqrt{34}}$

B. $\dfrac{\sqrt{17}}{2}$

C. $\dfrac{17}{2}$

D. $\sqrt{\dfrac{17}{2}}$

Answer: D

14. If p is the length of the perpendicular from the origin to the line, whose intercepts with the coordinate axes are $\dfrac{1}{3}$ and $\dfrac{1}{4}$, then the value of p is :

A. $\dfrac{3}{4}$

B. $\dfrac{1}{12}$

C. 5

D. $\dfrac{1}{5}$

Answer: D

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15. If p and q are respectively the perpendiculars from the origin upon the straight lines, whose equations are $x \sec\theta + y \cos ec\theta = a$ and $x \cos\theta - y \sin\theta = a \cos 2\theta, then\ 4p^2 + q^2$ is equal to

A. $5a^2$

B. $4a^2$

C. $3a^2$

D. a^2

Answer: D

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16. If the point $P(p, q)$ is equidistant from the points

$A(a + b, b - a)$ and $B(a - b, a + b)$, then

A. x-y=0

B. ax + by =0

C. bx +ay =0

D. x+y=0

Answer: A

17. For $a > b > c > 0$ if the distance between (1,1) and the point of intersection of the lines ax + by +c=0 and bx + ay+c=0 is less than $2\sqrt{2}$ then

    A. $a + b - c > 0$

    B. $a - b + c < 0$

    C. $a - b + c > 0$

    D. $a + b - c < 0$

Answer: A

18. 26, The distance between the lines 3x + 4y = 9 and 6x + 8y + 15-0 is 3

10 10 (d) none of these

A. $\dfrac{3}{2}$

B. $\dfrac{3}{10}$

C. 6

D. None of these

Answer: B

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19. The line L given by $\dfrac{x}{5} + \dfrac{y}{b} = 1$ passes through the point (13, 32). The line K is parallel to L and has the equation $\dfrac{x}{c} + \dfrac{y}{3} = 1$ Then the distance between L and K is (1) $\sqrt{17}$ (2) $\dfrac{17}{\sqrt{15}}$ (3) $\dfrac{23}{\sqrt{17}}$ (4) $\dfrac{23}{\sqrt{15}}$

A. $\dfrac{23}{\sqrt{15}}$

B. $\sqrt{17}$

C. $\dfrac{17}{\sqrt{15}}$

D. $\dfrac{23}{\sqrt{17}}$

Answer: D

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20. The equation of one of the line parallel to 4x -3y=5 and at a unit distance from the point (-1,-4) is

    A. 3x + 4y -3 =0

    B. 3x + 4y + 3=0

    C. 4x-3y + 3 =0

    D. 4x -3y-3=0

Answer: D

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21. A line has slope m and y- intercept 4. The distance betwee the origin and the line is equal to

A. $\dfrac{4}{\sqrt{1 - m^2}}$

B. $\dfrac{4}{\sqrt{m^2 - 1}}$

C. $\dfrac{4}{\sqrt{m^2 + 1}}$

D. $\dfrac{4m}{\sqrt{1 + m^2}}$

Answer: C

22. The distance of the point (1,2) from the line x+y+5=0 measured along the line parallel to 3x -y=7 is equal to

A. $4\sqrt{10}$

B. 40

C. $\sqrt{40}$

D. $10\sqrt{2}$

Answer: C

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23. The equation of straight line equally inclined to the axes and equidistant from the point $(1, \; -2)$ and $(3, 4)$ is:

A. a=1,b=-1, c=3

B. a=1, b=-1, c=-3

C. a=1,b=1,c=-3

D. None of these

Answer: C

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24. The angle between the straight lines x $-y$ $\sqrt{3} = 5$ and $\sqrt{3}x + y = 7$ is

A. $90°$

B. $60°$

C. $75°$

D. $30°$

Answer: A

25. The angle between the line joining the points (1,-2) , (3,2) and the line x+2y -7 =0 is

A. π

B. $\pi/2$

C. $\pi/3$

D. $\pi/6$

Answer: B

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26. The equation of the straight line perpendicular to 5x-2y=7 and passing through the point of intersection of the lines 2x + 3y =1 and 3x +4y =6 is

A. 2x+5y +17=0

B. 2x+5y -17=0

C. 2x -5y+17=0

D. 2x -5y =17

Answer: A

27. If PM is the perpendicular from P(2,3) on the line $x + y = 3$, then the coordinate of M are

A. 2,1

B. $-1, 4$

C. 1,2

D. $4, -1$

Answer: C

28. A line passes through the point $(2, 2)$ and is perpendicular to the line $3x + y = 3,$ then its y-intercept is

A. 2

B. $\dfrac{5}{3}$

C. $\dfrac{4}{3}$

D. $\dfrac{3}{4}$

Answer: C

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29. If (a, a^2) falls inside the angle made by the lines $y = \dfrac{x}{2}, x > 0$ and $y = 3x, x > 0,$ then a belongs to the interval

A. $3, \infty$

B. $\dfrac{1}{2}, 3$

C. $-3, -\dfrac{1}{2}$

D. $0, \dfrac{1}{2}$

Answer: B

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30. A line passing through $(0, 0)$ and perpendicular to $2x + y + 6 = 0, 4x + 2y - 9 = 0$ then the origin divids the line in the ratio of

A. $1 : 2$

B. $2 : 1$

C. $4 : 2$

D. $4 : 3$

Answer: D

31. The position of reflection of the point (4,1) about the line y=x -1 is

A. 1,2

B. 3,4

C. $-1, 0$

D. 2,3

Answer: D

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32. Given three straight lines $2x + 11y - 5 = 0, 24x + 7y - 20 = 0,$ and $4x - 3y - 2 = 0$. Then, they form a triangle one line bisects the angle between the other two two of them are parallel

A. form a triangle

B. are only concurrent

C. are concurrent with one line bisecting the angle between the other two

D. None of the above

Answer: C

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33. The line, which is parallel to X-axis and crosses the curve $y = \sqrt{x}$ at an angle $45°$, is

A. y=1/4

B. y=1/2

C. y=1

D. y=4

Answer: B

34. Let P = (-1, 0), Q = (0, 0) and R = (3, $3\sqrt{3}$) be three points. The equation of the bisector of the angle PQR

A. $y = \sqrt{3}x$

B. $\sqrt{3}y = x$

C. $y = -\sqrt{3}x$

D. $\sqrt{3}y = -x$

Answer: C

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35. Equation of the bisector of the acute angle between lines 3x+4y+5=0 and 12x -5y-7=0 is

A. 21x + 77y + 100=0

B. 99x -27y +30=0

C. 99x +27y +30=0

D. 21x-77y -100=0

Answer: C

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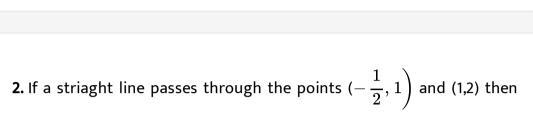**Exercise 2 Miscellaneous Problems**

1. A straight line L through the point (3,-2) is inclined at an angle $60°$ to the line $\sqrt{3}x + y = 1$ If L also intersects the x-axis then the equation of L is

A. $y + \sqrt{3}x + 2 - 3\sqrt{} = 0$

B. $-\sqrt{3}x + 2 + 3\sqrt{3} = 0$

C. $\sqrt{3}y - x + 3 + 2\sqrt{3} = 0$

D. $\sqrt{3}y + x - 3 + 2\sqrt{3} = 0$

Answer: B

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2. If a striaght line passes through the points $\left(-\dfrac{1}{2}, 1\right)$ and (1,2) then its x-intercept is

   A. -2

   B. -1

   C. 2

   D. 1

Answer: A

3. The equation of the line passing through (0,0) and intersection point of 3x-4y=2 and x+2y=-4 is

   A. 7x = 6y

   B. 6x=7y

   C. 5x=8y

   D. x=0

Answer: A

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4. Determine the ratio in which the line $3x + y - 9 = 0$ divides the segment joining the points (1,3) and $(2, 7)$.

   A. 3:4 externally

   B. 3:4 iternally

C. 4:5 internally

D. 5:6 externally

Answer: B

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5. The equations $y = \pm\sqrt{3}x, y = 1$ are the sides of

A. an equilateral triangle

B. a right angled triangle

C. an isosceles triangle

D. a scalene triangle

Answer: A

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6. The slopes of the lines, which make an angle $45°$ with the line 3x -3y-25=0 is

A. $1, \; -1$

B. $\dfrac{1}{2}, \; -1$

C. $1, \; \dfrac{1}{2}$

D. $-2, \; \dfrac{1}{2}$

Answer: D

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7. The image of the origin with reference to the line 4x+3y -25=0 is

A. $(-8, 6)$

B. 8,6

C. $-3, 4$

D. $8, \; -6$

8. The length of perpendicular from the point ($a \cos \alpha \, , a \sin \alpha$) upon the striaght line y = x $\tan \alpha \; + c$ (where c gt 0) is

A. c

B. $c \sin^2 \alpha$

C. $c \cos \alpha$

D. $c \sec^2 \alpha$

9. L is a variable line such that the algebraic sum of the distances of the points (1,1) (2,0) and (0,2) from the line is equal to zero. The line L will always pass through a. (1,1) b. (2,1) c. (1,2) d. none of these

A. 1,1

B. 2,1

C. 1,2

D. 2,2

Answer: A

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10. The perpendicular bisector of the line segment joining P (1, 4) and Q (k, 3) has yintercept -4. Then a possible value of k is (1) 1 (2) 2 (3) -2 (4) -4

A. -4

B. 1

C. 2

D. -2

Answer: A

11. A line passes through the point of intersection of the line $3x + y + 1 = 0$ and $2x - y + 3 = 0$ and makes equal intercepts with axes. Then, equation of the line is

A. 5x+5y-3=0

B. x+5y-3=0

C. 5x-y-3=0

D. 5x+5y+3=0

Answer: A

12. The point P(a,b) lies on the straight line $3x + 2y = 13$ and the point $Q(b, a)$ lies on the straight line $4x - y = 5$, then the equation of the line PQ is

A. x-y=5

B. x+y=5

C. x+y=-5

D. x-y=-5

Answer: B

13. The equations of the perpendicular bisectors of the sides $ABandAC$ of triangle ABC are $x - y + 5 = 0$ and $x + 2y = 0$,

respectively. If the point A is $(1, -2)$, then find the equation of the line BC.

A. 14x+23y -40=0

B. 14x-23y+40=0

C. 23x+14y -40=0

D. 23x-14y+40=0

Answer: A

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14. If the lines kx-2y-1=0 and 6x-4y-m=0 are identical (coindent) lines, then the values of k and m

A. k=3, m=2

B. k=-3, m=2

C. k=-3, m=-2

D. k=3, m=-2

Answer: A

15. The st. lines $3x + 4y = 5$ and $4x - 3y = 15$ interrect at a point $A(3, -1)$. On these linepoints B and C are chosen so that $AB = AC$. Find the possible eqns of the line BC pathrough the point $(1, 2)$

A. $-7, 1/2$

B. 7,1/7

C. 7,-1/2

D. 3,-1/3

Answer: A

16. The line passing through the point of intersection of $x + y = 2, x - y = 0$ and is parallel to $x + 2y = 5$, is

    A. x+2y=1

    B. x+2y=2

    C. x+2y=4

    D. x+2y=3

Answer: D

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17. The equation of the line passing through the point of intersection of the line $x - 3y + 2 = 0$ and $2x + 5y - 7 = 0$ and perpendicular to the line $3x + 2y + 5 = 0$ is

    A. 2x-3y+1=0

    B. 6x-9y+11=0

C. 2x-3y+5=0

D. 3x-2y+1=0

Answer: A

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18. A ray of light along $x + \sqrt{3}y = \sqrt{3}$ gets reflected upon reaching x-axis, the equation of the reflected ray is

A. $y = x + \sqrt{3}$

B. $\sqrt{3}y = x - \sqrt{3}$

C. $y = \sqrt{3}x - \sqrt{3}$

D. $\sqrt{3}y = x - 1$

Answer: B

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19. If $(\sin\theta, \cos\theta)$ and $(3, 2)$ lie on the same side of the line $x + y = 1$, then θ lies between

A. $0, \dfrac{\pi}{2}$

B. $0, \pi$

C. $\dfrac{\pi}{4}, \dfrac{\pi}{2}$

D. $0, \dfrac{\pi}{4}$

Answer: D

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20. The equation to the line bisecting the join of (3,-4) and (5,2) and having intercepts on the x-axis and y-axis in the ratio of 2:1 is:

A. x+y-3=0

B. 2x-y=9

C. x+2y=2

D. 2x+y=7

Answer: C

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21. A straight line through the point (1,1) meets the X-axis at A and Y-axis at B. The locus of the mid-point of AB is

A. 2xy+x+y=0

B. x+y-2y=0

C. x+y+2=0

D. x+y-2=0

Answer: B

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22. The equation of the line passing through the point of intersection of the straight lines $\frac{x}{a} + \frac{y}{b} = 1$, $\frac{x}{b} + \frac{y}{a} = 1$ and having slope zero is

A. bx-ay=0

B. x+y=0

C. ax-by=0

D. x-y=0

Answer: D

23. The three straight lines ax+by=c, bx+cy=a and cx +ay =b are collinear, if

A. b+c=a

B. c+a=b

C. a+b+c=0

D. a+b=c

Answer: C

24. The coordinates of the foot of the perpendicular drawn from the point (3,4) on the line 2x +y-7 =0 are

A. $\dfrac{9}{5}, \dfrac{17}{5}$

B. 1,5

C. $-5, 1$

D. 1,-5

Answer: A

25. If the foot of the perpendicular from the origin to a straight line is at $(3, -4)$, then find the equation of the line.

    A. 3x-4y=25

    B. 3x-4y+25=0

    C. 4x+3y-25=0

    D. 4x-3y+25=0

Answer: A

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26. The equation of the perpendicular bisector of the line segment joining A(2,-3) and B(-6,5) is

    A. x-y=-1

    B. x-y=3

C. x+y=3

D. x+y=1

Answer: B

27. If $A(2, \ -1) and B(6, 5)$ are two points, then find the ratio in which the food of the perpendicular from $(4, 1)$ to AB divides it.

A. $8 : 15$

B. $5 : 8$

C. $-5 : 8$

D. $-8 : 5$

Answer: B

28. If 3 and 4 are intercepts of a line L = 0 then the distance of L =0 from the origin is

   A. 5 units

   B. 12 units

   C. $\dfrac{5}{12}$ unit

   D. $\dfrac{12}{5}$ units

Answer: D

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29. If the equation of base of an equilateral triangle is $2x - y = 1$ and the vertex is $(-1, 2),$ then the length of the sides of the triangle is

$\sqrt{\dfrac{20}{3}}$ (b) $\dfrac{2}{\sqrt{15}}$ $\sqrt{\dfrac{8}{15}}$ (d) $\sqrt{\dfrac{15}{2}}$

   A. $\sqrt{\dfrac{20}{3}}$

B. $\dfrac{2}{\sqrt{15}}$

C. $\dfrac{\sqrt{8}}{15}$

D. $\dfrac{\sqrt{15}}{2}$

Answer: A

30. A line through the point A(2,0) which makes an angle of $30°$ with the positive direction of X-axis is rotated about A in clockwise direction through an angle of $15°$. Then, the equation of the striaght line in the new position is

A. $\left(2, \ - \sqrt{3}\right)x + y - 4 + 2\sqrt{3} = 0$

B. $\left(2 - \sqrt{3}\right)x - y + 2\sqrt{3} = 0$

C. $\left(2 - \sqrt{3}\right)x - y + 4 + 2\sqrt{3} = 0$

D. $\left(2 - \sqrt{3}\right)x + y + 4 + 2\sqrt{3} = 0$

Answer: B

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