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**Class: 11**
**Subject: Mathematics**
**Topic: Straight Lines**
**No. of Questions: 20**
**Duration: 60 Min**
**Maximum Marks: 60**

1. The area of the quadrilateral formed by the points (1, 2), (-1, 3), (1, -4) and (2, 0) is
   a. 18
   b. 9
   c. 8
   d. None of these

   Ans. B

   Solution:

   Area of the quadrilateral=area of the triangle formed by(1,2),(2,0),(1,-4)+area of the triangle .formed by (1,2),(-1,3),(1,-4)

   $$= \left|\frac{1}{2}[-6]\right| + \frac{1}{2}(12) = 9$$

2. A line 3x + 4y + λ = 0 meets the coordinate axes at A and B. The area of AOB is 24 sq. units. Then the value of λ is
   a. ± 1
   b. ± 24
   c. ± 5
   d. None of these

   Ans. B
   Solution:

   $$given..line..meet..x..axis..at(0,-\frac{\theta}{4})$$

   $$y..axis..at(-\frac{\theta}{3},0)$$

   $$\frac{1}{2}(-\frac{\theta}{4})(-\frac{\theta}{3}) = 24$$

   $$\theta = \pm 24$$

3. The number of integral values of m for which the x-coordinate of the point of intersection of the lines 3x + 4y = 9 and y = mx + 1 is also an integer, is
   a. 0
   b. 1
   c. 2
   d. 4

   Ans. C
   Solution:
   $$y = \frac{9-3x}{4} = mx + 1$$
   $$x = \frac{9-4}{4m+3}$$
   $x - coordinate...is..an..int\ eger..$
   $therefore..x = 1, -1$
   $when...m = 1/2, -2$

4. The equation of the altitude through A of the triangle formed by the points A (2, -2), B (-1, 0) & C (1, 1) is
   a. 3x - 2y - 1 = 0
   b. 2x + y - 2 = 0
   c. x + 2y = 0
   d. 2x + y + 6 = 0
   Ans. B
   Solution:
   $Slope...of..BC = 1/2$
   $slope..of..the..line..\perp r..to..BC = -2$
   $reqd..equation$
   $y + 2 = -2(x - 2)$
   $y + 2x = 2$

5. The mid points of the sides BC, CA and AB of a Δ ABC are D (2, 4), E (4, 5) and F (1, 2) respectively. Then the slope of the median AD is
   a. $-\frac{2}{3}$
   b. $\frac{1}{5}$
   c. $-\frac{1}{7}$
   d. 0
   Ans. C
   Solution:

$$mid..point\ ...of..EF = (3/2, 7/2)$$

$$AD..passes..through...(3/2, 7/2)$$

$$slope..of..AD = \frac{\frac{7}{2} - 4}{\frac{3}{2} + 2} = \frac{\frac{-1}{2}}{\frac{7}{2}} = -\frac{1}{7}$$

6. Let PS be the median of a triangle with vertices P (2, 2), Q (6, -1) and R (7, 3). The equation of the line through (1, -1) and parallel to PS is
   a. 2x - 9y - 7 = 0
   b. 2x - 9y - 11 =0
   c. 2x + 9y - 11 = 0
   d. 2x + 9y + 7 = 0

   Ans. D
   Solution:

   $$S \equiv (\frac{13}{2}, 1)$$

   $$slope..of..PS = -\frac{2}{9}$$

   $$reqd..equation$$

   $$y + 1 = -\frac{2}{9}(x - 1)$$

   $$2x + 9y + 7 = 0$$

7. If G $(-\frac{4}{3}, 2)$ is the centroid of a Δ PQR where P ≡ (2,3), Q≡ (−2,5), then the area of the Δ PQR is
   a. $\frac{16}{3}$
   b. 16
   c. 8
   d. None of these

   Ans. B
   Solution:

$$coordinate..of..R = (m, n)$$

$$\frac{2-2+m}{3} = -\frac{4}{3}$$

$$m = -4$$

$$now \frac{3+5+n}{3} = 2$$

$$n = -2$$

$$area = \frac{1}{2}[10+4-12+6+20+4] = 16$$

8. The points (-4, -1), (-2, -4), (4, 0) and (2, 3) are the vertices of a
   a. Rhombus
   b. Rectangle
   c. Square
   d. Trapezium

   Ans. B
   Solution:
   Plotting the points in the graph paper, we can say that they form a rectangle

9. The image of the point (3, 3) on the line x + y = 0 is
   a. (-3, 3)
   b. (3, -3)
   c. (2, 2)
   d. (-3, -3)

   Ans. D
   Solution:

$$slope..of..the..line..y = -x............(1)$$

$$is = -1$$

$$\perp r..slope = 1$$

$$equation$$

$$y - 3 = 1(x - 3)$$

$$y = x........(2)$$

$$point..of..intersection..of.(1)...and...(2)...is(0,0)$$

$$now(0,0)..is..the..mid..point...of(3,3)and..its...image$$

$$image..point(-3,-3)$$

10. The equations of two sides of a triangle are x + 2y = 5 and 2x + y = 5. If the origin is the midpoint of the third side, then the equation of a median is
    a. x = y
    b. x + y = 0
    c. 2x - y = 0
    d. x - 2y = 0

    Ans. A

    Solution:

    $their..point..of...intersection$

    $(5/3,5/3)$

    $this..median..passes..through (0,0) and (5/3,5/3)$

    $equation$

    $$y-0=\frac{5/3-0}{5/3-0}(x-0)$$

    $$y=x$$

11. The points (2a, 4a), (2a, 6a) and (2a + √3a,5a), a > 0, and the vertices of a triangle which is
    a. right angled
    b. right angled isosceles
    c. equilateral
    d. obtuse angled

    Ans. C

    Solution:

    $distance..between..(2a,4a) and (2a,6a)$

    $$=\sqrt{(2a-2a)^2+(4a-6a)^2}=2a$$

    $distance..between..(2a,4a) and (2a+\sqrt{3}a,5a)$

    $$=\sqrt{(2a-2a-\sqrt{3}a)^2+(4a-5a)^2}=2a$$

    $distance..between..(2a,6a) and (2a+\sqrt{3}a,5a)$

    $$=\sqrt{(2a-2a-\sqrt{3}a)^2+(6a-5a)^2}=2a$$

12. 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. none of these

    Ans. A

Solution:

$$slope..of..the..segment = \frac{1}{6}$$

$$mid..po\text{int}(2,7)$$

$$\perp r..slope = -6$$

$$reqd..equation$$

$$y-7 = -6(x-2)$$

$$y+6x-19=0$$

13. The line joining A (1- √3, 1) and B(1, 2) is rotated about A through an angle 15° in the anticlockwise direction. The equation of AB in the new position is
    a. x + y = √3
    b. x - y = √3
    c. x - y + √3 = 0
    d. none of these

Ans. C
Solution:

$$slope..of..this..line...\tan\theta = \frac{2-1}{1-1+\sqrt{3}} = \frac{1}{\sqrt{3}}$$

$$\theta = 30$$

$$when\theta = 45$$

$$equation$$

$$y-1 = \tan 45(x-1+\sqrt{3})$$

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

14. The angle between the lines x $\cos\frac{\pi}{4} + y\sin\frac{\pi}{4} = 5$ and x $\cos\frac{\pi}{8} + y\sin\frac{\pi}{8} = 7$ is
    a. 0°
    b. $\frac{3\pi}{8}$
    c. $\frac{\pi}{4}$
    d. None of these

Ans. D
Solution:

$x\cos\frac{\pi}{4} + y\sin\frac{\pi}{4} = 5$

$slope = m1 = -\cot(\frac{\pi}{4})$

and $x\cos\frac{\pi}{8} + y\sin\frac{\pi}{8} = 7$

slope $= m2 = -\cot\frac{\pi}{8}$

$angle\,\theta$

$\tan\theta = \frac{m1 - m2}{1 + m1m2} = \frac{1}{\cot(\frac{\pi}{4} - \frac{\pi}{8})} = \tan\frac{\pi}{8}$

15. The line 3x + 2y = 24 meets the y-axis at A and the x-axis at B. The bisector of AB meets the line through (0, -1) parallel to x axis at the point
    a. (13/2, - 1)
    b. $(-\frac{13}{2}, -1)$
    c. $(-\frac{7}{2}, -1)$
    d. None of these

Ans. B
Solution:

$coordinate..of..A \equiv (0,12)$

$B \equiv (8,0)$

$mid..point..ofAB = (4,6)$

$slope..of..AB = -3/2$

$slope..of..the..line..\perp..toAB = 2/3$

$equation..of..the..line$

$y - 6 = (2/3)(x - 4)$

$when..y = -1$

$x = -\frac{-13}{2}$

$required..point(-\frac{13}{2}, -1)$

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16. The area of Δ ABC is 9 sq. units. If B ≡ (5, 2) and C ≡ (3, 4), the length of the altitude through A is
    a. $\frac{9\sqrt{2}}{2}$
    b. $2\sqrt{2}$
    c. $9\sqrt{2}$
    d. None of these

    Ans. A

$$\text{base} = BC = \sqrt{(5-3)^2 + (2-4)^2} = \sqrt{8}$$
$$length..of..the..altitude = h$$
$$area = \frac{1}{2}\sqrt{8}h = 9$$
$$h = \frac{9\sqrt{2}}{2}$$

17. The diagonals of a parallelogram PQRS are along the lines x + 3y = 4 and 6x - 2y = 7. Then PQRS must be a
    a. Rectangle
    b. Square
    c. cyclic quadrilateral
    d. rhombus

    Ans. D
    Solution:

$$slope..of..the..given..lines = -\frac{1}{3}, 3$$
$$lines..are..perpendicular$$
$$diagonals..are..perpendicular..$$
$$therefore..the.parallelogram..square..or..rhombus..$$
$$but..not..given..that..2..diagonals...are..equal$$
$$therefore..rhombus$$

18. The line parallel to the x - axis and passing through the intersection of the lines ax + 2by + 3b = 0 and bx - 2ay - 3a = 0, where (a, b) ≠ 0, is
    a. below x-axis at a distance 2/3 from it
    b. below x-axis at a distance 3/2 from it
    c. above x-axis at a distance 2/3 from it
    d. above x-axis at a distance 3/2 from it

    Ans. B
    Solution:

$ax + aby + 3b = 0$

$bx - 2ay - 3a = 0$

$solving..we..have(0, -\frac{3}{2})$

$line..parallel..to..x - axis..passes..through.this..point$

$the..line..is..below..x - axis..at..the..distance..3/2..from..it$

19. The distance of the line x + y = 3 from the point (0, 0) measured along the line making an angle of $\tan^{-1}2$ with the positive direction of x-axis is
    a. 3
    b. √5
    c. 2
    d. None of these

    Ans. B
    Solution:

$slope..\tan\theta = 2$

$equation..of..the..line$

$y = 2x$

$point..of..intersection..of..2.lines\ (1,2)$

$required..distance = \sqrt{(1-0)^2 + (2-0)^2} = \sqrt{5}$

20. The lines ax + by + c = 0, bx + cy + a = 0 and cx + ay + b = 0, a≠ b ≠c ≠0, are concurrent, the point of concurrence is
    a. (0, 0)
    b. (-1, -1)
    c. (1, 1)
    d. Can't determine

    Ans. C
    Solution:

$if..2..or..more..lines..intersect..at..the..same..point..,then..they..are..known..as..$

$concurrent..lines\ \ and..this..point..is..called..concueernce..point$

$.x = 1, y = 1$

$we..get..a + b + c = 0..for..3..lines$

$point..of..concurrence(1,1)$