NARAYANA EDUCATIONAL INSTITUTIONS

STRAIGHT LINES

MATHS

1. Equation of a straight line passes through the point (2,3) and equally inclined to lines 3x-4y-7=0 and 12x-5y+6=0 are
   1) 9x-7y+3=0; 7x-9y-41=0 2) 9x-7y+3=0; 7x+9y-41=0
   3) 7x-9y-41=0; 9x+7y+3=0 4) 7x-9y+41=0; 9x+7y+3=0
2. Equation of straight lines passes through point (2,3) and having an intercept of length 2 units between the lines 2x+y=3 and 2x+y=5 are
   1) 3x+4y+18=0; x-2=0 2) 3x+4y=18; x-2=0 3) 4x-3y-18=0; y-2=0 4) 4x-3y+18=0; y-2=0
3. Two sides of a square are lie on lines x+y=1 and x+y+2=0 then area is
   1) $\frac{7}{2}$ 2) $\frac{11}{2}$ 3) $\frac{9}{2}$ 4) 6
4. Find the distances of a point (2,5) from the line 3x+y+4=0 measured parallel to line having slope $\frac{3}{4}$
   1) 5 2) 4 3) 2 4) 10
5. Perpendicular from the origin to a line meets at the point (-2,9) then equation of a line
   1) 3x-2y+51=0 2) 2x-9y+85=0 3) 2x+9y-85=0 4) 3x+2y-49=0
6. Two opposite vertices of a square are (3,4) and (1,-1) then co-ordinates of other vertices
   1) $\left(\frac{9}{2},\frac{1}{2}\right),\left(\frac{-1}{2},\frac{5}{2}\right)$ 2) $\left(\frac{9}{2},\frac{1}{2}\right),\left(\frac{1}{2},\frac{-5}{2}\right)$ 3) $\left(\frac{-9}{2},\frac{1}{2}\right),\left(\frac{1}{2},\frac{5}{2}\right)$ 4) $\left(\frac{9}{2},\frac{1}{2}\right),\left(\frac{-1}{2},\frac{-5}{2}\right)$
7. A straight line through the point (2,2) interests the lines $\sqrt{3}x+y=0$ and $\sqrt{3}x-y=0$ at the points A and B. The equation to the line AB so that ΔOAB is an equilateral is
   1) y+2=0 2) y-2=0 3) x-2=0 4) x+2=0
8. The equation of a line through the point of intersection of lines x-3y+1=0 and 2x+5y-9=0 and whose distance from the origin is $\sqrt{5}$ is
   1) 2x+y-5=0 2) 2x-y+5=0 3) 2x+y-10=0 4) 2x-y-10=0
9. A line passes through print of intersection of lines 100x+50y=1 and 75x+25y+3=0 and makes equal intercepts on axes then equation
   1) 25x+25y-1=0 2) 5x-5y+3=0 3) 25x+25y=4 4) y=14
10. The points A(0,1) and B(2,0) and p be a point on the line 4x+3y+9=0. The co-ordinates of P such that $|PA-PB|$ is minimum are
    1) $\left(\frac{-12}{5},\frac{17}{5}\right)$ 2) $\left(\frac{-84}{5},\frac{13}{5}\right)$ 3) $\left(\frac{-6}{5},\frac{17}{5}\right)$ 4) $\left(\frac{-24}{5},\frac{17}{5}\right)$
11. The straight line 7x-2y+10=0 and 7x+2y-10=0 form an Isosceles triangle with the line y=2 then area of triangle is (sq.units)
    1) $\frac{15}{7}$ 2) $\frac{10}{7}$ 3) $\frac{18}{7}$ 4) None of these
12. The number of possible straight lines passes through (2,3) and form a triangle with axes whose area is 12 sq.units
    1) one 2) two 3) three 4) four
13. A straight line L with negative slope passes through points (8,2) and cuts the positive co-ordinate axes at points (8,2) and cuts the positive co-ordinate axes at points P and Q. As L varies the absolute minimum value of OP+OQ is (o is origin)
    1) 10 2) 18 3) 16 4) 12

14. Y- intercept of line that is parallel to y=3x and which bisects the area of a rectangle with corners are (0,0),(4,0),(4,2) and (0,2)
1) (0,-7) 2) (0,-6) 3) (0,-5) 4) (0,-4)

15. A man starts from the point P (-3,4) and reaches the point Q (0,1) touching the X-axes at R such that PR+RQ is minimum then R is
1) $\left(\frac{3}{5},0\right)$ 2) $\left(\frac{13}{5},0\right)$ 3) $\left(\frac{-3}{5},0\right)$ 4) $(-3,0)$

16. Assenting that the line x-3y+4=0 is working as a mirror for the point (1,2) then co-ordinates of image
1) $\left(\frac{1}{5},\frac{2}{5}\right)$ 2) $\left(\frac{2}{5},\frac{3}{5}\right)$ 3) $\left(\frac{3}{5},\frac{6}{5}\right)$ 4) $\left(\frac{6}{5},\frac{7}{5}\right)$

17. The co-ordinate of foot of perpendicular from (a,0) on the line $y = mx + \frac{a}{m}$ are
$\left(0,\frac{-a}{m}\right)$ 2) $\left(\frac{-a}{m},0\right)$ 3) $\left(0,\frac{a}{m}\right)$ 4) None of these

18. The equation of straight line which passes through the point of intersection of straight lines x+2y=5 and 3x+7y=17 and is perpendicular to straight line 3x+4y=10 is
1) 4x+3y+2=0 2) 4x-y+2=0 3) x-2=0 4) 4x-3y+2=0

19. If A(-2,1),B(2,3) and C(-2,-4) are three points, then the angle between BA and BC is $\text{Tan}^{-1}(\frac{a}{3})$ then a=
1) 7 2) 2 3) 4 4) 8

20. If the vertices of a triangle are (1,2),(4,-6) and (3,5) and its area is A then value of 2An
1) 25 2) 50 3) 20 4) 12

21. Equation of line midway between the parallel lines are 9x+6y-7=0 and 3x+2y+6=0 is
1) $3x+2y+\frac{11}{5}=0$ 2) $3x+2y+\frac{11}{6}=0$ 3) y-3=0 4) None of these

22. Equation of lines passes through point (1,0) and at a distance $\frac{\sqrt{3}}{2}$ from the origin is
1) $\sqrt{3}x \pm y + \sqrt{3} = 0$ 2) $\sqrt{3}x + y \pm 2\sqrt{3} = 0$ 3) x-y=2 4) $x \pm y = 2$

23. Locus of a point which moves such a way the square if its distance from the point (3,-2) is numerically equal to its distance from 5x-12y=13 is
1) $13(x^2+y^2)-83x+64y+182=0$ (or) $13(x^2+y^2)-73x+40y+156=0$ 2) $4x^2+3y^2=192$
3) $3x^2+4y^2=192$ 4) $x^2+y^2=100$ (or)y=0

24. The reflection of a point (4,-13) about the line 5x+y+6=0 is
1) (-1,-14) 2) (3,4) 3) (0,0) 4) (1,2)

25. The equation of a line with slope $\frac{-3}{2}$ and which is concurrent with the lines 4x+3y-7=0 and 8x+5y-1=0 is
1) 3x+2y-63=0 2) 3x+2y-2=0 3) 2y-3x-2=0 4) None of these

26. The length of perpendiculars from points P (m^2,2m) and Q(mn,m+n) and R (n^2,2n) to the line $x\cos^2\theta + \sin^2\theta + y\sin\theta\cos\theta = 0$ are a,b,c respectively then
1) 2b=a+c 2) $\frac{2}{b} = \frac{1}{a} + \frac{1}{c}$ 3) b^2=ac 4) None of these

27. The number of integral points (x,y) (i.e. x and y both are integers) which lie in first quadrant but not on axes and lie on straight line 3x+5y=2007 is
1) 133 2) 135 3) 138 4) 140

28. Two parallel lines makes intercepts p and q on x,y axes then distance between them is
1) $\frac{1}{2}$ pq 2) pq 3) $\frac{|pq|}{\sqrt{p2+q2}}$ 4) None of these

29. The area bounded by the lines x=1 and $\sqrt{\frac{x}{x}} + \sqrt{\frac{y}{x}} = 4$
1) $4\sqrt{3}$ 2) $2\sqrt{3}$ 3) $8\sqrt{3}$ 4) 4

30. If two adjacent sides of a cyclic quadrilateral are 2 and 5 and angle between them is 60^0. If the third side is 3 then remain in fourth side is

1) 2 2) 3 3) 4 4) 5

	MATHS									
61-70	2	2	3	**1**	2	1	**2**	1	**3**	4
71-80	**3**	3	**2**	3	3	**4**	3	4	2	1
81-90	2	1	1	1	2	3	1	3	1	1

HINTS & SOLUTIONS

STRAIGHT LINES

MATHS

1. Let 'm' be slope and point p (2,3)

y-3=m (x-2) $\longrightarrow$ ①

(1) is equally indined to lines 3x-4y-7=0 and 12x-5y+6=0

$$\frac{\frac{3}{4}-m}{1+\frac{3}{4}m}=-\left(\frac{\frac{12}{5}-m}{1+\frac{12}{5}m}\right)$$

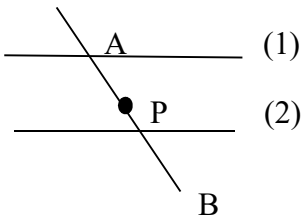
m=9/7 (or) -7/9

$\therefore (1) \Rightarrow 9x-7y+3=0 \; and \; 7x+9y-41=0$

2. P (2,3) lines 2x+y=3 $\rightarrow$ (1)

2x+y=5 $\rightarrow$ (2)

Equation of a line y-3=m (x-2) $\rightarrow$ (3)



Solve (1), (3) $A=\left(\frac{2m}{m+2},\frac{6-m}{m+2}\right)$

Solve (2), (3) $B=\left(\frac{2m+2}{m+2},\frac{m+6}{m+2}\right)$

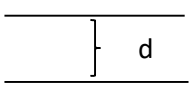
$\because AB=2 \Rightarrow AB^2=4$

$1+m^2=m^2+4m+4 \rightarrow (4)$

From(4), m=$\propto$ (or) m= $\frac{-3}{4}$

$\therefore (3) \Rightarrow 3x+4y=18 \; and \; x-2=0$

3. Distance between parallel lines = $\frac{3}{\sqrt{2}}=d$

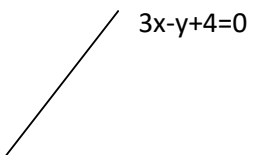


$\therefore Area; A=d^2=\frac{9}{2}$

4. m=$Tan\theta=3/4$

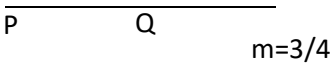
$p(x_1,y_1)=(2,5)$

PQ = r



$\frac{x-2}{4/5}=\frac{y-5}{3/5}=r\Rightarrow Q\left(2+\frac{4r}{5},5+\frac{3r}{5}\right)$

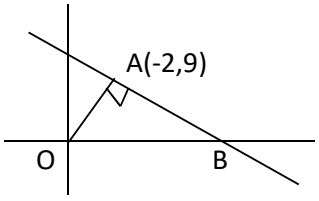
$\because Q line on\ 3x+y+4=0\Rightarrow 3r=-5\Rightarrow |r|=5$



5. Slope, $\overline{OA}$; m = $\frac{-9}{2}$

Slope of $\overline{AB}$ = $\frac{2}{9}$

$\therefore Euation\ of\ line\ AB\ is\ 2x-9y+85=0$



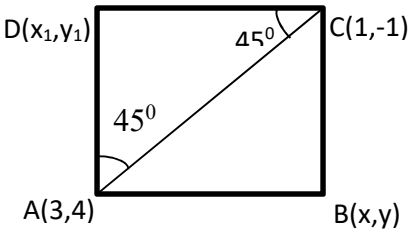
6. Slope of AC = $\frac{5}{2}$

$Tan\,45^0=\left|\frac{m-5/2}{1+5m/2}\right|$

m= -7/3 (or) 3/7

equation of AD is 7x+3y-33=0

equation of CD is 3x-7y-10=0



7. $\sqrt{3}x+y=0$ makes an angle of 120^0 with OX

$\sqrt{3}x-y=0$ makes an angle 60^0 with XO

$\therefore$ Equation of line is y=2

8. P.O.T of x-3y+1=0; 2x+5y-9=0 is A(2,1)

Slope of $\overline{OA}$ is $\frac{1}{2}\Rightarrow$ Slope of line; m = -2

$\therefore$Equation of line A (2,1) and m = -2

2x+y-5=0

9. P.O.I of line 100x+50y-1=0 and 75x+25y+3=0 is $P\left(\frac{-7}{50},\frac{15}{50}\right)$

Equation of a line x+y=a $\rightarrow$①

(1) $passes\ p\Rightarrow a=\frac{8}{50}$

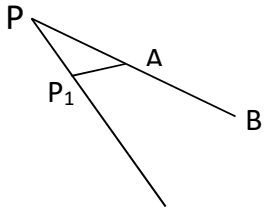
$\therefore (1)\Rightarrow 25x+25y-4=0$

10. Equation of line $\overline{AB}$ is x+2y-2=0

$|PA-PB|\le AB$

$|PA-PB|$ is maximum if the points A,B,P collinear

The $p\left(\frac{-24}{5},\frac{17}{5}\right)$



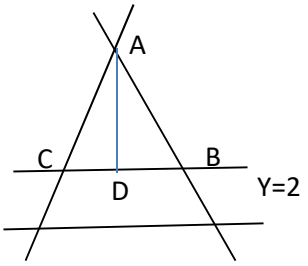
11. $7x-2y+10=0\rightarrow(1)$

$7x-2y+10=0\rightarrow(2)$

B(6/7,2), C$\left(\frac{-6}{7},2\right)$

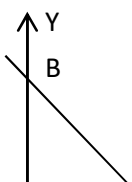
BC = $\frac{12}{7}$; $AD=3$

$\therefore Area;\Delta=\frac{1}{2}\left(\frac{12}{7}\right)3=\frac{18}{7}$

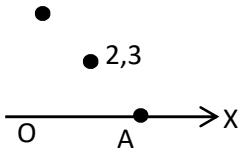


12. Equation of a line y-3=m(x-2)

mx-y=2m-3



area; $\Delta = \frac{1}{2}\left|\frac{2m-3}{m}\right| = 12 \Rightarrow \Delta \pm 12$



$\therefore m = \frac{-3}{2}(or)\, 4m^2 - 36m + 9 = 0\,(D > 0)$

∴ 3 straight lines are possible

∴ no of lines =3

13. Equation of line y-2= m(x-8); m<0

Co-ordinates of P and Q are $p\left(8 - \frac{2}{m}, 0\right)$

And Q (0,2-8m)

OP+OQ=$\left(8 - \frac{2}{m}\right) + \left(2 - 8m\right)$

=10+$\frac{2}{-m}$+8(-m)

$\geq 10 + 2\sqrt{\frac{-2}{m}.8(-m)}\,(Am \geq Gm)$

≥18

14. Midpoints (2,1)

Slope of line y=3x parallel to y=3x+k$\longrightarrow$(1)

Then m=3

∴ Equation of line through (2,1) is

y-1=3(x-2)

y=3x-5

∴ y-intercept = (0,-5)

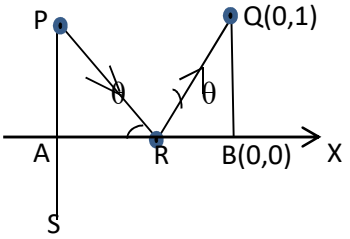
15. Let S be image of P w.r.to x-axis

then PR=SR and R(∝,0)

SQ meets X-axis at R

S(-3,-4) (Image of P with X-axis)

P(-3,4), A(03,0) from $\triangle APR, \triangle BQR$ are similar



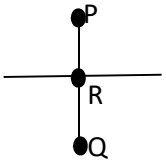
$\frac{AR}{BR} = \frac{PA}{QB} \Rightarrow \frac{AR}{BR} = \frac{PA}{QB} \Rightarrow \frac{-3-\alpha}{\alpha - 0} = \frac{4}{1}$

$$\alpha = \frac{-3}{5}$$

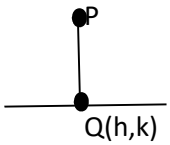
$$\therefore R(\alpha, 0) = \left(\frac{-3}{5}, 0\right)$$

16. Image formula

R= midpoint of PQ lies on x-3y+4=0



17. $\frac{h - x_1}{a} = \frac{k - y_1}{b} = \frac{-\left(ax_1 + by_1 + c\right)}{a^2 + b^2}$



18. $L_1 + \lambda L_2 = 0$

$m_1 = \frac{-\left(1 + 3\lambda\right)}{2 + 7\lambda}$ and Slope of 3x+4y=10 is

$m_2 = \frac{-3}{4}$; $m_1 m_2 = -1$

Find λ *and put in* $L_1 + \lambda L_2 = 0$

19. $m_1 = Slope\ of\ BA = \frac{1}{2}$

$m_2 = Slope\ of\ BC = \frac{7}{4}$

$Tan^{-1}\left(\frac{a}{3}\right) = Tan^{-1}\left(\frac{m_2 - m_1}{1 + m_1 m_2}\right)$

a=2

20. area; $A = \frac{1}{2}\begin{vmatrix} x_1 - x_2 & x_1 - x_3 \\ y_1 - y_2 & y_1 - y_3 \end{vmatrix}$

$A = \frac{25}{2}$

∴2A=25

21. Given lines $3x + 2y - \frac{7}{3} = 0 \rightarrow (1)$

$3x + 2y + 6 = 0 \rightarrow (2)$

Let midway line $3x + 2y + \lambda = 0 \rightarrow (3)$

Distance between (1),(3) = Distance between (2),(3)

$\left(\frac{\lambda + \frac{7}{3}}{\sqrt{9+4}}\right) = \frac{|\lambda - 6|}{\sqrt{9+4}} \Rightarrow \lambda = \frac{11}{6}$

$\therefore (3) \Rightarrow 3x + 2y + \frac{11}{6} = 0$

22. Let the equation of line y-0=m(x-1) $\longrightarrow$ (1)

$\perp$ r distance from (0,0) to (1) $= \frac{\sqrt{3}}{2}$

$\frac{|-m|}{\sqrt{m^2+1}} = \frac{\sqrt{3}}{2} \Rightarrow m = \pm\sqrt{3}$

$\therefore (1) \Rightarrow \sqrt{3}x \pm y + \sqrt{3} = 0$

23. Let S(3,2), P(x,y) line is 5x-12y=13

SP=PM ($\perp$ r distance)

$\sqrt{(x-3)^2 + (y+2)^2} = \frac{|5x - 12y - 13|}{\sqrt{25+144}}$

$13(x^2 + y^2) - 83x + 64y + 182 = 0$

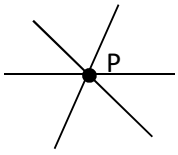
(or)

$13(x^2 + y^2) - 73x + 40y + 156 = 0$

24. Image formula

25. Find P.O.I of 4x+3y-7=0

8x+5y-1=0 P(-8,13)



And m= -3/2

∴ equation of a line 3x+2y-2=0

26. Use $\perp$ r distance from P and Q,R (1),(2),(3) lines

Let $a=\left|\frac{(m\cos\theta+\sin\theta)^2}{\cos\theta}\right|$

$b=\left|\frac{(m\cos\theta+\sin\theta)(n\cos\theta+\sin\theta)}{\cos\theta}\right|$

$c=\left|\frac{(m\cos\theta+\sin\theta)^2}{\cos\theta}\right|$

Verify $b^2=ac$

27. 3x+5y=2007

$x+\frac{5y}{3}=669$

3must divide 5y then

Y=3k; KEN

$5k\le 668(\because x=1)$

$k\le\frac{668}{5}\Rightarrow k\le 133$

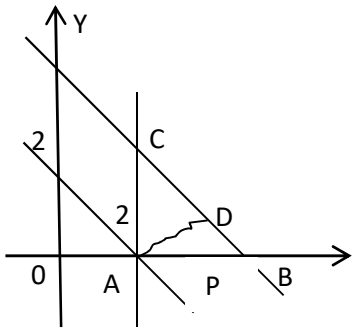
28. Area of

$\Delta ABC=\frac{1}{2}h\sqrt{p^2+q^2}$

But $\Delta\frac{1}{2}pq$

$\therefore\frac{1}{2}pq=\frac{h}{2}\sqrt{p^2+q^2}$

$h=\frac{pq}{\sqrt{p^2+q^2}}$



29. Put $\sqrt{\frac{x}{y}}=t$

$t+\frac{1}{t}=4$

$t^2-4t+1=0$

If $t=2\pm\sqrt{3}$

$\sqrt{\frac{y}{x}}=2+\sqrt{3}$

$\frac{y}{x}=\left(2+\sqrt{3}\right)^2$

$y=\left(7+4\sqrt{3}\right)x$

If $t=2-\sqrt{3}$

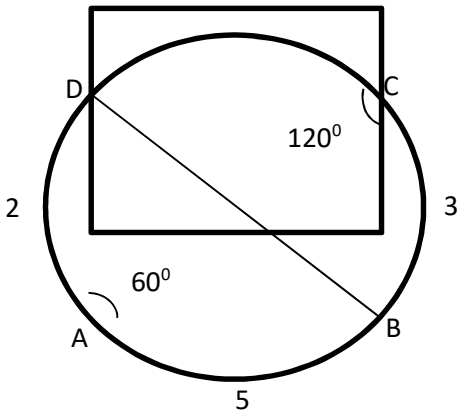
$\sqrt{\frac{y}{x}}=2-\sqrt{3}$

$\frac{y}{x}=7-4\sqrt{3}$

$y=(7-4\sqrt{3})x$

$\therefore Area=\frac{1}{2}(1)AB=\frac{1}{2}(8\sqrt{3})$

$= 4\sqrt{3}$



30. In ΔABD,

$\cos 60^0 = \dfrac{2^2 + 5^2 - BD^2}{2(2)(5)}$

$BD^2 = 19$

In $\Delta BCD, \cos 120 = \dfrac{x^2 + 9 - 19}{2(3)x}$

$x^2 + 3x - 10 = 0$

$x = 2 (or)\, x \neq -5$

$\therefore$ Length of fourth side=2