Instructions

For the following questions answer them individually

Question 1

Find equation of the perpendicular bisector of segment joining the points (2,-5) and (0,7)?

A x - 6y = 5

B x + 6y = -5

C x - 6y = -5

D x + 6y = 5

Answer: C

Explanation:

Let line l perpendicularly bisects line joining A(2,-5) and B(0,7) at C, thus C is the mid point of AB.

Coordinates of C = $\left(\frac{2+0}{2}, \frac{-5+7}{2}\right)$

=> $\left(\frac{2}{2}, \frac{2}{2}\right) = (1,1)$

=

Now, slope of AB = $\frac{y_2-y_1}{x_2-x_1} = \frac{(7+5)}{(0-2)}$

=

Let slope of line $l = m$

Product of slopes of two perpendicular lines = -1

$m \times \frac{12}{-2} = -1$

=> $m = -6$

=> $m = \frac{1}{6}$

Equation of a line passing through point (x_1, y_1) and having slope m is $(y - y_1) = m(x - x_1)$

$\therefore$ Equation of line l

$(y - 1) = \frac{1}{6}(x - 1)$

=>

$6y - 6 = x - 1$

=>

$x - 6y = 1 - 6 = -5$

=>

=> Ans - (C)

Question 2

Find equation of the perpendicular to segment joining the points A(0,4) and B(-5,9) and passing throug the point P. Point P divides segment AB in the ratio 2:3.

A x - y = 8

B x - y = -8

C x + y = -8

D x + y = 8

Answer: B

Explanation:

Using section formula, the coordinates of point that divides line joining A = (x_1, y_1) and B = (x_2, y_2) in the ratio a : b

$\left(\frac{ax_2+bx_1}{a+b}, \frac{ay_2+by_1}{a+b}\right)$

=

Coordinates of A(0,4) and B(-5,9). Let coordinates of P = (x,y) which divides AB in ratio = 2 : 3

=> $x = \frac{(2\times-5)+(3\times0)}{2+3}$

=> $5x = -10$

=> $x = \frac{-10}{5} = -2$

Similarly, $y = \frac{(2\times9)+(3\times4)}{2+3}$

=> $5y = 18 + 12 = 30$

=> $y = \frac{30}{5} = 6$

=> Point P = (-2,6)

Slope of AB = $\frac{9-4}{-5-0} = \frac{5}{-5} = -1$

Let slope of line perpendicular to AB = m

Also, product of slopes of two perpendicular lines is -1

=> $m \times -1 = -1$

=> $m = 1$

Equation of lines having slope m and passing through point P(-2,6) is

=> $(y - 6) = 1(x + 2)$

=> $y - 6 = x + 2$

=> $x - y = -8$

=> Ans - (B)

Question 3

The co-ordinates of the centroid of a triangle ABC are (-1,-2) what are the co-ordinates of vertex C, if co-ordinates of A and B are (6,-4) and (-2,2) respectively?

A (-7,-4)

B (7,4)

C (7,-4)

D (-7,4)

Answer: A

Explanation:

Coordinates of centroid of triangle with vertices (x_1, y_1) , (x_2, y_2) and (x_3, y_3) is $(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3})$

Let coordinates of vertex C = (x, y)

Vertex A(6,-4) and Vertex B(-2,2) and Centroid = (-1,-2)

=> $-1 = \frac{-2+6+x}{3}$

=> $x + 4 = -1 \times 3 = -3$

=> $x = -3 - 4 = -7$

Similarly, => $-2 = \frac{-4+2+y}{3}$

=> $y - 2 = -2 \times 3 = -6$

=> $y = -6 + 2 = -4$

$\therefore$ Coordinates of vertex C = (-7,-4)

=> Ans - (A)

Question 4

What is the slope of the line parallel to the line passing through the points (4,-2) and (-3,5)?

A 3/7

B 1

C -3/7

D -1

Answer: D

Explanation:
Slope of line passing through points (4,-2) and (-3,5)

$= \frac{5+2}{-3-4} = \frac{7}{-7} = -1$

Slope of two parallel lines is always equal.

=> Slope of the line parallel to the line having slope -1 $= -1$

=> Ans - (D)

Question 5

The line passing through (-2,5) and (6,b) is perpendicular to the line 20x + 5y = 3. Find b?

A -7

B 4

C 7

D -4

Answer: C

Explanation:
Slope of line having equation $ax + by + c = 0$ is $\frac{-a}{b}$

=> Slope of line $20x + 5y = 3$ is $\frac{-20}{5} = -4$

Slope line passing through (-2,5) and (6,b) = $\frac{b-5}{6+2} = \frac{(b-5)}{8}$

Also, product of slopes of two perpendicular lines is -1

=> $\frac{(b-5)}{8} \times -4 = -1$

=> $b - 5 = \frac{8}{4} = 2$

=> $b = 2 + 5 = 7$

=> Ans - (C)

Question 6

Find k, if the line 4x+y = 1 is perpendicular to the line 5x+ky = 2?

A 20

B -20

C 4

D -4

Answer: B

Explanation:

Slope of line having equation : $ax + by + c = 0$ is $\frac{-a}{b}$

Thus, slope of line $4x + y = 1$ is $\frac{-4}{1} = -4$

Similarly, slope of line $5x + ky = 2$ is $\frac{-5}{k}$

Also, product of slopes of two perpendicular lines is -1

=> $\frac{-5}{k} \times -4 = -1$

=> $\frac{20}{k} = -1$

=> $k = -20$

=> Ans - (B)

Question 7

Find equation of the perpendicular bisector of segment joining the points (2,-6) and (4,0)?

A x + 3y = 6

B x + 3y = -6

C x - 3y = -6

D x - 3y = 6

Answer: B

Explanation:

Let line l perpendicularly bisects line joining A(2,-6) and B(4,0) at C, thus C is the mid point of AB.

=> Coordinates of C = $\left(\frac{2+4}{2}, \frac{-6+0}{2}\right)$

= $\left(\frac{6}{2}, \frac{-6}{2}\right) = (3, -3)$

Now, slope of AB = $\frac{y_2 - y_1}{x_2 - x_1} = \frac{(0+6)}{(4-2)}$

= $\frac{6}{2} = 3$

Let slope of line $l = m$

Product of slopes of two perpendicular lines = -1

=> $m \times 3 = -1$

=> $m = \frac{-1}{3}$

Equation of a line passing through point (x_1, y_1) and having slope m is $(y - y_1) = m(x - x_1)$

$\therefore$ Equation of line l

=> $(y + 3) = \frac{-1}{3}(x - 3)$

=> $3y + 9 = -x + 3$