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. Find the slope of a line, which passes through the origin, and the mid-point of the line segment joining the points P (0, – 4) and B (8, 0).

Solution:

The co-ordinates of mid-point of the line segment joining the points P (0, – 4) and B (8, 0) are (0+8)/2, (-4+0)/2 = (4, -2)

The slope 'm' of the line non-vertical line passing through the point (x_1, y_1) and

(x_2, y_2) is given by m = $(y_2 – y_1)/(x_2 – x_1)$ where, x ≠ x_1

The slope of the line passing through (0, 0) and (4, -2) is (-2-0)/(4-0) = -1/2

∴ The required slope is -1/2.

6. Without using the Pythagoras theorem, show that the points (4, 4), (3, 5) and (–1, –1) are the vertices of a right-angled triangle.

Solution:

The vertices of the given triangle are (4, 4), (3, 5) and (–1, –1).

The slope (m) of the line non-vertical line passing through the point (x_1, y_1) and

(x_2, y_2) is given by m = $(y_2 – y_1)/(x_2 – x_1)$ where, x ≠ x_1

So, the slope of the line AB (m_1) = (5-4)/(3-4) = 1/-1 = -1

the slope of the line BC (m_2) = (-1-5)/(-1-3) = -6/-4 = 3/2

the slope of the line CA (m_3) = (4+1)/(4+1) = 5/5 = 1

It is observed that, $m_1.m_3$ = -1.1 = -1

Hence, the lines AB and CA are perpendicular to each other

∴ given triangle is right-angled at A (4, 4)

And the vertices of the right-angled ∆ are (4, 4), (3, 5) and (-1, -1)

7. Find the slope of the line, which makes an angle of 30° with the positive direction of y-axis measured anticlockwise.

Solution:

We know that, if a line makes an angle of 30° with the positive direction of y-axis measured anti-clock-wise , then the angle made by the line with the positive direction of x- axis measure anti-clock-wise is 90° + 30° = 120°

∴ The slope of the given line is tan 120° = tan (180° − 60°)

= − tan 60°

= −√3

8. Find the value of x for which the points (x, − 1), (2, 1) and (4, 5) are collinear.

Solution:

If the points (x, − 1), (2, 1) and (4, 5) are collinear, then Slope of AB = Slope of BC

Then, (1+1)/(2-x) = (5-1)/(4-2)

2/(2-x) = 4/2

2/(2-x) = 2

2 = 2(2-x)

2 = 4 − 2x

2x = 4 − 2

2x = 2

x = 2/2

= 1

∴ The required value of x is 1.