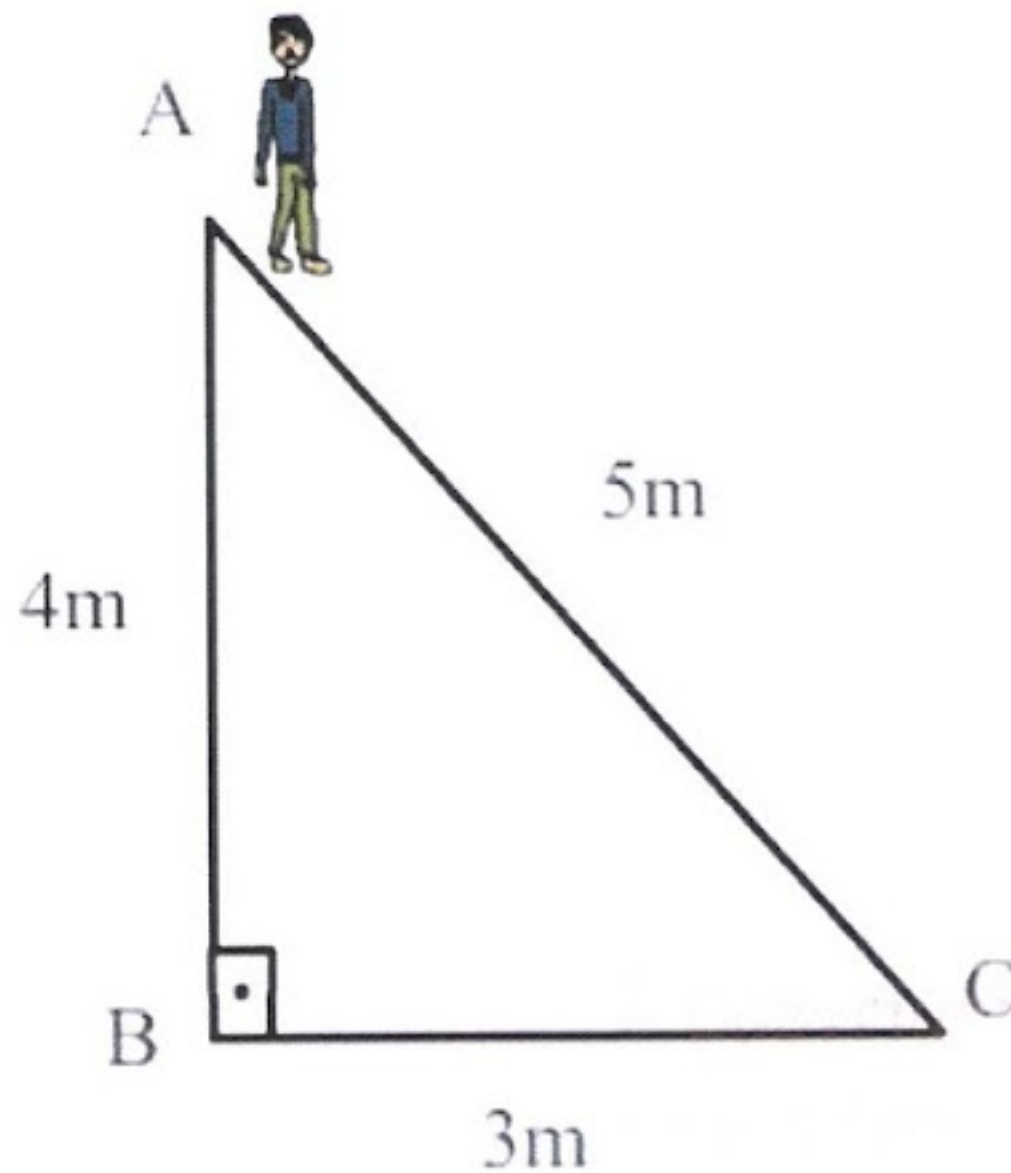


# MOTION EXAM

NAME AND SURNAME \_\_\_\_\_

1) Look at the following picture:



John walks from the point A to B to C.

- a) What is the distance he travelled? 5 points
- b) What is the displacement? 5 points

## SOLUTION:

a) The distance travelled ( $s$ ) is the length a moving object goes measured on a trajectory.

$$s = 4 + 3 = 7 \text{ m}$$

b) Displacement is the distance, in a straight line, which separates two positions of a moving object at different moments in time.

The displacement is the distance on a straight line between the initial point (A) and the final point (B).

$$\text{Displacement} = 5 \text{ m}$$

2) Emily rides her horse 48 km in 4 hours.

a) What is her average speed in kilometers per hour?

2 points

b) What is her average speed in meters per second?

2 points

SOLUTION:

a)

$$v_m = \frac{s}{t}$$

$$v_m = \frac{48 \text{ km}}{4 \text{ h}} = 12 \text{ km/h}$$

b)

$$v_m = 12 \frac{\text{km}}{\text{h}} \cdot \frac{1000 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 3,33 \text{ m/s}$$

3) An airplane flies with a constant speed of 1000 km/h. How far can it travel in 2 hours?

3 points

SOLUTION:

$$s = v \cdot t$$

$$s = 1000 \frac{\text{km}}{\text{h}} \cdot 2 \text{ h} = 2000 \text{ km}$$

4) Noah roller skates with a constant speed of 12 km/h. How long will he take to travel a distance of 42 kilometers?

3 points

SOLUTION:

$$v_m = \frac{s}{t} \Rightarrow t = \frac{s}{v_m}$$

$$t = \frac{42 \text{ km}}{12 \text{ km/h}} = 3,5 \text{ h}$$

5) A cyclist accelerates from 0 m/s to 8 m/s in 3 seconds. What is his acceleration ? Is this acceleration higher than that of a car which accelerates from 0 to 30 m/s in 8 seconds?

10 points

SOLUTION:

$$a = \frac{v_f - v_i}{t}$$

$$a_{cyclist} = \frac{8 - 0}{3} = 2,67 \text{ m/s}^2$$

$$a_{car} = \frac{30 - 0}{8} = 3,75 \text{ m/s}^2$$

THE ACCELERATION OF THE CAR IS HIGHER.

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