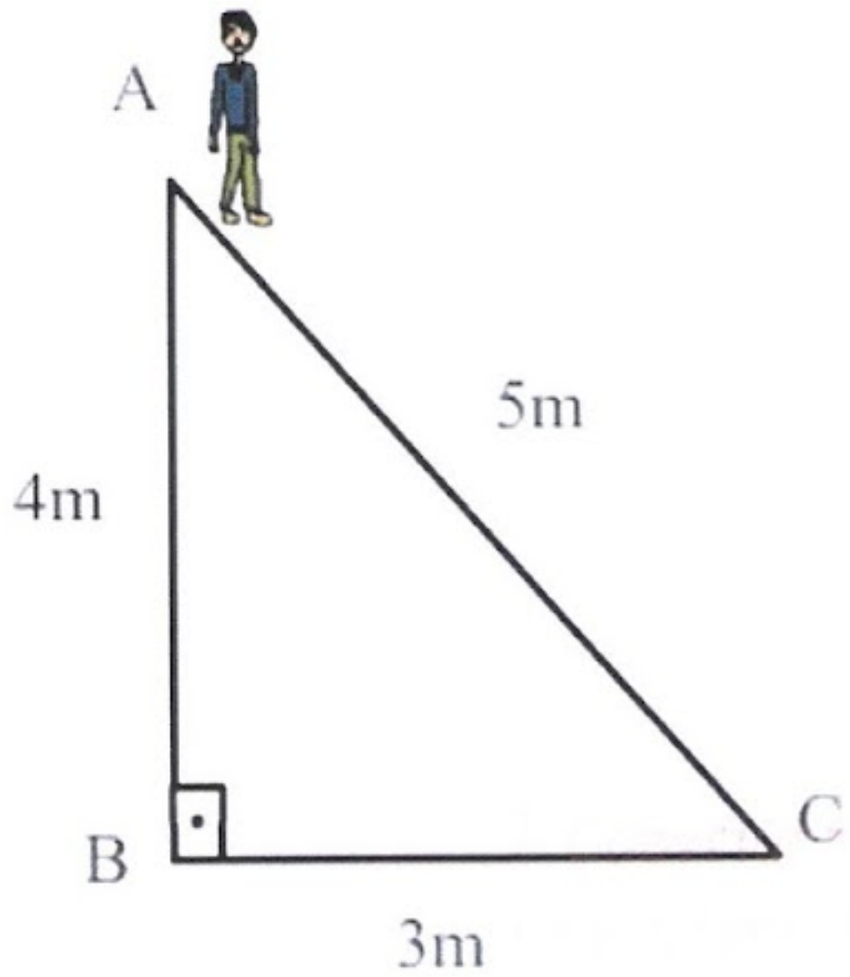
MOTION EXAM
NAME AND SURNAME_____

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.

$s = 4 + 3 = 7$ 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).

Displacement = 5 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)

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

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

b)

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

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

SOLUTION:

$$s = v \cdot t$$

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

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:

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

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

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:

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

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

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

THE ACCELERATION OF THE CAR IS HIGHER.