A spaceship moving with an initial velocity of 58.0 meters/second experiences a uniform acceleration and attains a final velocity of 153 meters/second. What distance has the spaceship covered after 12.0 seconds?

A.

6.96 × 102 meters

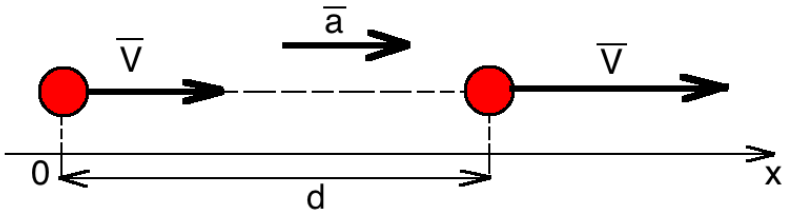
B.
1.27 × 103 meters

C.
5.70 × 102 meters

D.
1.26 × 102 meters

E.
6.28 × 102 meters

Solution:



$V_1 = 58\frac{m}{s} -$ the initial velocity of the spaceship;
$V_2 = 153\frac{m}{s} -$ final velocity of the spaceship;
$d -$ distance that spaceship covered after 12 s;
$t = 12s -$ time to cover the distance d;

Assuming constant acceleration we can use the rate equation and motion equation the to find the the distance that spacesip covered after 12 s. Rate equation alond the X axis:

$$V_2 = V_1 + at$$
$$a = \frac{V_2 - V_1}{t} \qquad (1)$$

Motion equation alond the Y axis:

$$d = V_1 t + \frac{at^2}{2} \qquad (2)$$

$(1)\text{in}(2)$:

$$d = V_1 t + \frac{\left(\frac{V_2 - V_1}{t}\right) t^2}{2} = V_1 t + \frac{(V_2 - V_1)t}{2} = \frac{(V_1 + V_2)t}{2} = \frac{\left(153\frac{m}{s} + 58\frac{m}{s}\right) \cdot 12s}{2} =$$
$$= 12.7 \times 10^3 m$$

Answer: distance that spaceship covered after 12s is B) $12.7 \times 10^3 m$