

## SOLVING EQUATIONS: APPLICATION QUESTIONS

### Examples

1. The formula for aircraft speed is  $s = \frac{d}{t}$ , where  $s$  is the speed in km/h,  $d$  is the distance travelled in km, and  $t$  is the time in hours. Find the distance travelled by an aircraft cruising at a speed of 428 km/h for 1.5 h.

$$s = 428$$

$$t = 1.5$$

$$d = ?$$

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

$$428 = \frac{d}{1.5}$$

$$642 = d$$

∴ the aircraft travelled 642 km

2. The cost,  $C$  dollars, to produce a school yearbook is given by the equation  $C = 8000 + 9n$ , where  $n$  is the number of yearbooks printed.

- a. What will it cost to produce 1 500 yearbooks?  
 b. How many yearbooks can be produced for \$20 000?

a)  $C = 8000 + 9n$   
 $C = 8000 + 9(1500)$   
 $= 8000 + 13500$   
 $= \$21\,500$

∴ It would cost \$21 500

b)  $C = 8000 + 9n$   
 $20\,000 = 8000 + 9n$   
 $20\,000 - 8000 = 9n$   
 $\frac{12000}{9} = \frac{9n}{9}$

$$1333 = n$$

∴ They can produce 1333 yearbooks

3. The formula below shows how the amount of simple interest,  $I$ , earned on an investment is related to the amount invested (also called the principal) in dollars,  $P$ , the interest rate,  $r$ , and the time,  $t$ , of the investment in years.

$$I = Prt$$

If Coby deposits \$400 into a savings account that pays simple interest at a rate 2% per year. How long will it take Coby to earn \$70 in interest?

$$I = 70$$

$$P = 400$$

$$r = 2\%$$

$$= 0.02$$

$$t = ?$$

$$I = Prt$$

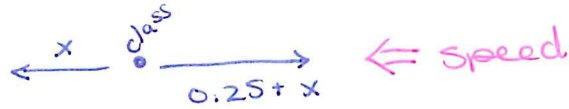
$$70 = (400)(0.02)t$$

$$\frac{70}{8} = \frac{8t}{8}$$

$$8.75 = t$$

∴ It would take 8.75 years to make \$70

4. Liam and Hayden leave class at the same time and walk in opposite directions. Liam walks 0.25m/s faster than Hayden does. After 10 seconds they are 29.3 meters apart. How fast is each person walking?



Distance = speed • time.

$$29.3 = (x + 0.25 + x)(10)$$

$$29.3 = (2x + 0.25)(10)$$

$$29.3 = 20x + 2.5$$

$$29.3 - 2.5 = 20x$$

$$\frac{26.8}{20} = \frac{20x}{20}$$

$$x = 1.34$$

$$\begin{aligned} \text{Liam} &= 0.25 + x \\ &= 0.25 + 1.34 \\ &= 1.59 \text{ m/s} \end{aligned}$$

$$\begin{aligned} \text{Hayden} &= x \\ &= 1.34 \text{ m/s} \end{aligned}$$

5. The equation  $s = \frac{w - 10e}{t}$  models the speed in words per minute,  $s$ , at which someone types. The speed,  $s$ , is related to the number of words typed,  $w$ , the number of errors,  $e$ , and the time spent typing in minutes,  $t$ .

- a) If Morgan types 400 words in 5 min, with 8 errors. What is her typing speed.  
 b) Austin's typing speed is 125 word/minute, and he types 900 words in 8 min. How many errors did Austin make?

a)  $s = ?$

$w = 400$

$e = 8$

$t = 5$

$$s = \frac{w - 10e}{t}$$

$$s = \frac{400 - 10(8)}{5}$$

$$s = \frac{400 - 80}{5}$$

$$s = \frac{320}{5}$$

$$s = 64 \text{ word/min}$$

b)  $s = 125$

$w = 900$

$e = ?$

$t = 8$

$$s = \frac{w - 10e}{t}$$

$$125 = \frac{900 - 10e}{8}$$

$$1000 = 900 - 10e$$

$$1000 - 900 = -10e$$

$$\frac{-100}{-10} = \frac{-10e}{-10}$$

$$10 = e$$

errors