

1.1 Conrd

Tuesday, September 1, 2015 10:22 AM

You and your friend are taking a trip to Maine on a

bus. The weather is

cold and the temperature is

75°. How far have you travelled if you

are moving at 52 mph for

2 hours ?

$$52 \frac{\text{mi}}{\text{h}} \cdot 2\text{h} = 104\text{mi}$$

secret formula :)

$$\text{Distance} = \text{Rate} \cdot \text{time}$$

How long does it take to drive 123.5 miles at 47 mph?

$$123.5 = 47 \cdot t \quad t = 2.63 \text{ hours}$$

Travelling in a river.

What are some variables for travelling in water?

You are on a boat that goes 91 miles downstream in 7 hours but requires 12 hours to go 84 miles upstream. What is the speed of the boat in still water and what is the speed of the current?

x = speed of the boat in still water
 c = speed of current

| | rate | time | distance |
|------------|---------|----------|----------|
| upstream | $x - c$ | 12 hours | 84 mi |
| downstream | $x + c$ | 7 hours | 91 mi |

$$\begin{cases} (x - c) \cdot 12 = 84 \\ (x + c) \cdot 7 = 91 \end{cases}$$

$$\begin{cases} 12x - 12c = 84 \\ 7x + 7c = 91 \end{cases}$$

$$\begin{aligned} x &= 10 \text{ mph} \\ c &= 3 \text{ mph} \end{aligned}$$

You are on a boat that travels 6 miles per hour upstream and 10 miles per hour downstream. You are on the boat five hours, but cannot remember when the boat went halfway and turned around. Find the time it took the boat to go upstream and how far you traveled upstream.

| | rate | time | distance |
|------------|--------|----------------------|-----------------|
| upstream | 6 mph | y 3.125 hrs | x 18.75 mi |
| downstream | 10 mph | $5 - y$ 1.875 hrs | x |

$$\begin{cases} 6 \cdot y = x \end{cases}$$

$$6y = 10(5 - y)$$

$$\begin{cases} 6 \cdot y = x \\ 10(5-y) = x \end{cases}$$

$$6y = 10(5-y)$$

$$6y = 50 - 10y$$

$$16y = 50$$

$$y = \frac{50}{16} = \frac{25}{8} = 3.125 \text{ hours}$$

Mark and his brother David are fighting over a paper airplane while playing in their yard. Mark grabs the plane and takes off running at a rate of 7.5 miles per hour. One minute later, David realizes what happened and he starts to chase him at a rate of 9mph. In minutes, how long will it take David to reach Mark and how far will they have run?

| | rate | time | distance |
|-------|-----------------------------------|--------------------|----------|
| Mark | $7.5 \frac{\text{mi}}{\text{hr}}$ | x | y |
| David | $9 \frac{\text{mi}}{\text{hr}}$ | $x - \frac{1}{60}$ | y |

$$7.5x = 9 \cdot \left(x - \frac{1}{60}\right)$$

$$7.5x = 9x - \frac{9}{60}$$

$$\frac{3}{20} = \frac{3x}{2}$$

$$x = \frac{3}{20} \cdot \frac{2}{3} = \frac{1}{10} \text{ hr.} = 6 \text{ min.}$$

$$y = 0.75 \text{ mi}$$

Sue alone can paint a house in 12 days. If Clyde helps, it takes only 4 days. How long will it take for Clyde to work alone?

| | rate | time | |
|-------|---|--------|-------------|
| Sue | $\frac{1 \text{ house}}{12 \text{ days}}$ | 4 days | } 1 project |
| Clyde | $\frac{1 \text{ house}}{x \text{ days}}$ | 4 days | |

$$\frac{4}{12} + \frac{4}{x} = 1$$

$$\frac{1}{3} + \frac{4}{x} = 1$$

$$\frac{4}{x} = \frac{2}{3}$$

$$12 = 2x$$

$$6 = x$$

Two painters working together can paint a house in 3 hours.
 One painter can paint the same house by himself in 8 hours.
 How long would it take the 2nd painter to paint the house,
 working alone?

| | rate | time |
|------------|---|-------|
| painter #1 | $\frac{1 \text{ house}}{8 \text{ hrs}}$ | 3 hrs |
| painter #2 | $\frac{1 \text{ house}}{x \text{ hrs}}$ | 3 hrs |

} 1 project

$$\frac{3}{8} + \frac{3}{x} = 1$$

$$\frac{3}{x} = \frac{5}{8}$$

$$24 = 5x$$

$$4.8 = \frac{24}{5} = x$$

hours

If the sum of two consecutive **even** numbers is 194, find the numbers.

$$2x, 2x + 2$$

$$2x - 1, 2x + 1$$

$$2x + 2x + 2 = 194$$

$$4x = 192$$

$$x = 48$$

$$(96, 98)$$

{ 96, 98 }

Three consecutive odd numbers are added together. Their sum is five more than twice the middle odd number. What are the three numbers?

$$2x+1, 2x+3, 2x+5$$

$$6x+9 = 2(2x+3) + 5$$

$$6x+9 = 4x+6+5$$

$$2x = 2$$

$$x = 1$$

{ 3, 5, 7 }

Four consecutive numbers are added together. Their sum is seven less than three times the sum of the smallest and largest numbers. What are the four numbers?

$$x, x+1, x+2, x+3$$

$$4x+6 = 3(x+x+3) - 7$$

$$4x+6 = 6x+9-7$$

$$4 = 2x$$

$$2 = x$$

{ 2, 3, 4, 5 }