Algebra 2

Ch. 1 Story Problems (section 1.3)

Jackson will use part of a barn wall as one of the long sides of a rectangular pen to keep his miniature pony in. He wants the length of the pen to be one more than twice the width of the pen. He plans to use 81 feet if fencing. Find the lengths of the sides.

Barn

x [rectangle] x

$2x + 1$

$\text{length} = 2x + 1 = 41 \text{ ft}$
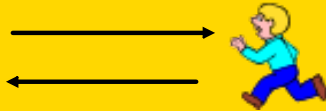
$\text{width} = x \quad = 20 \text{ ft}$

$x + 2x + 1 + x = 81$
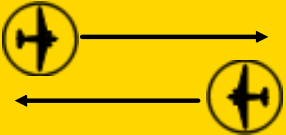
$4x + 1 = 81$

$4x = 80$

$x = 20$

20 ft by 41 ft

Rate $\times$ Time = Distance

Opposite Direction	Same Direction	Round Trip
$D_1 + D_2 =$ Total Distance	$D_1 = D_2$	$D_1 = D_2$

Radar detected an unidentified plane (1) 5,000 miles away, approaching at 700 mi/h. Fifteen minutes later an interceptor plane (2) was dispatched, traveling at 800 mi/h. How long did the interceptor take to reach the approaching plane.

Plane 1 Distance

Plane 2 Distance

5000

$$R \times T = D$$

	R	T	D
Plane 1	700	$x + \frac{1}{4}$	$700(x+\frac{1}{4})$
Plane 2	800	x	$800x$

$$700(x + \tfrac{1}{4}) + 800x = 5000$$

$$700x + 175 + 800x = 5000$$

$$1500x + 175 = 5000$$

$$1500x = 4825$$

$$x \approx 3.22 \text{ hours.}$$

Pete and Joe run around a 450-meter track in opposite directions. They start at the same point and at the same time. Pete's speed is 2.0 m/s and Joe's speed is 2.5 m/s. How far will Joe have run when they meet again?

$R \times T = D$			
Pete	2	x	2x
Joe	2.5	x	2.5x

$$2.5x + 2x = 450$$
$$4.5x = 450$$
$$x = 100$$

Pete's distance = 2(100) = 200 m

Joe's distance = 2.5(100) = 250 m

Tate drives into the city to buy a software program at a computer store. Because of traffic conditions, he only average 15 mi/h. On his drive home he averages 35 mi/h. If the total travel time is 2 hours, how long does it take him to drive to the store?

Tate's home ⟶ Store

Home ⟵ Store

	R	x T	= D
H ⟶ S	15	x	15x
S ⟶ H	35	2−x	35(2−x)

$$15x = 35(2-x)$$

$$15x = 70 - 35x$$

$$+35x \qquad +35x$$

$$50x = 70$$

$$x = \frac{70}{50} = \frac{7}{5} = 1.4 \text{ hours}$$