1. Rewrite in set-builder notation:
   $[-3, 5)$ $= \{x \mid -3 \le x < 5\}$

2. Rewrite in interval notation:
   $\{x | x \le 2\}$ $= (-\infty, 2]$

Solve for x (leave any fractional answers as improper fractions, not mixed numb

3. $\left(\frac{1}{3}(x-7)+5\right) = (6x+4)\cdot 3$

$x - 7 + 15 = 18x + 12$

$x + 8 = 18x + 12$

$-4 = 17x$

$\boxed{\frac{-4}{17}} = x$

4. **Set up a table and write an equation, but do not solve:**
   How much water must be evaporated from 10 gallons of a 12% sugar solution in order to obtain a 15% sugar solution?

liquid	volume of sol'n (gal)	% conc. sugar	volume of sugar
12%	10	0.12	1.2
water	x	0	0
15%	10-x	0.15	0.15(10-x)

$1.2 = 0.15(10-x)$

2.5 Inequalities in One Variable

10. $5x + 2 \ge 4x - 1$

$\{x \mid x \ge -3\} = [-3, \infty)$

$(-1)\cdot 3 \ge -x \cdot (-1)$

$-3 \le x \leftrightarrow x \ge -3$

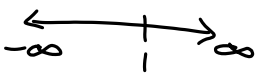
26. $2 - 5(x+1) \ge 3(x-1) - 8$

$2 - 5x - 5 \ge 3x - 3 - 8$

$-5x - 3 \ge 3x - 11$

$\frac{-8x}{-8} \ge \frac{-8}{-8}$

$\{x \mid x \le 1\} = (-\infty, 1]$



Compound Inequalities

and	$\cap$	intersection	$A \cap B$
			x is in both A *and* B
or	$\cup$	union	$A \cup B$
			x is in either A *or* B

$A = \{x \mid x \geq 0\}$

$B = [-5, 4)$

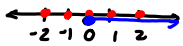
$C = \{1, 2, 3, 4, 5\}$

$D = \{-4, -3, \frac{1}{2}, \frac{2}{3}\}$

$E = \{-\sqrt{2}, \pi\}$

$\mathbb{R}, \mathbb{Q}, \mathbb{Z}, \mathbb{N}, \emptyset$

$\mathbb{Z} \cap A =$ whole #s $\{0, 1, 2, 3, \ldots\}$



$C / B = C - B = \{4, 5\}$

$D \cup \mathbb{Q} = \mathbb{Q}$

$E \cap A = \{\pi\}$

$A = \{x \mid x \geq 0\}$

$B = [-5, 4)$

$C = \{1, 2, 3, 4, 5\}$

$D = \{-4, -3, \frac{1}{2}, \frac{2}{3}\}$

$E = \{-\sqrt{2}, \pi\}$

$\mathbb{R}, \mathbb{Q}, \mathbb{Z}, \mathbb{N}, \emptyset$

$B \cap \mathbb{N} =$

$D / A =$

$B \cup E =$

$A \cup C =$

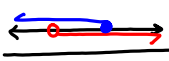
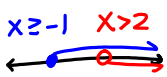
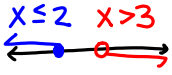
$E / \mathbb{Q} =$

$C \cap \mathbb{Z} =$

$B \cap A =$

$-2 < x < 3$

$-2 < x$ and $x < 3$

	or $\cup$	and $\cap$
$x \leq 3$ $x > 0$ 	$(-\infty, \infty) = \mathbb{R}$ $\{x \mid x \in \mathbb{R}\}$	$(0, 3] = \{x \mid 0 < x \leq 3\}$
$x \geq -1$ $x > 2$ 	$[-1, \infty) =$ $\{x \mid x \geq -1\}$	$(2, \infty) =$ $\{x \mid x > 2\}$
$x \leq 2$ $x > 3$ 	$(-\infty, 2] \cup (3, \infty)$ $\{x \mid x \leq 2 \text{ or } x > 3\}$ $\{x \mid x \leq 2\} \cup \{x \mid x > 3\}$	$\emptyset$

Intermediate Algebra | Quiz #6 | Name: Key
2nd Period | 22 August 2018

1. Forty liters of pure maple syrup that cost \$9.00 per liter were mixed with imitation maple syrup that cost \$4.25 per liter. How much imitation maple syrup is needed to make a mixture to sell for \$5.50 per liter?

Syrup type	volume of syrup (L)	× cost per Liter	= total cost
pure	40	\$9	40(9)
imitation	x	\$4.25	x(4.25)
mixture	40+x	\$5.50	(40+x)(5.5)

$$40(9) + 4.25x = 5.5(40+x)$$
$$360 + 4.25x = 220 + 5.5x$$
$$140 = 1.25x$$
$$\frac{14000}{125} = \frac{100}{100} \cdot \frac{140}{1.25} = x$$

$$\begin{array}{r} 112 \\ 125\overline{)14000} \\ 125 \\ \hline 1500 \\ 1250 \\ \hline 250 \end{array}$$

112 Liters of imitation maple syrup

2. How many milliliters of pure acid must be added to 60 ml of a 30% acid solution to make a 50% acid solution?

solution type	volume of solution (mL)	× concentration	= volume of dissolved substance
30% sol'n	60	0.30	60(0.3)
pure acid	x	1.00	x(1)
50% sol'n	60+x	0.50	(60+x)(0.5)

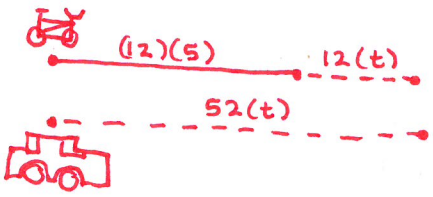
$$60(0.3) + x = 0.5(60+x)$$
$$18 + x = 30 + 0.5x$$
$$0.5x = 12$$
$$x = \frac{12}{0.5} = \frac{120}{5} = 24$$

$$\cancel{2} \cdot \frac{1}{\cancel{2}} x = 12 \cdot 2$$
$$x = 24$$

24 mL of pure acid

3. A car traveling 52 miles per hour overtakes a cyclist who, riding at 12 miles per hour, has a 5-hour head start. How far from the starting point does the car overtake the cyclist?

vehicle	rate (mph)	x	time (h)	=	distance (mi)
car	52		t		$52(t)$
cyclist	12		$t+5$		$12(t+5)$

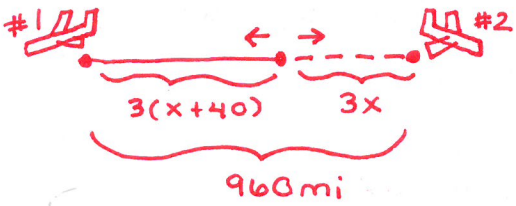


$$52(t) = 12(t+5)$$
$$52t = 12t + 60$$
$$40t = 60$$
$$t = \frac{60}{40} = \frac{3}{2}$$

distance $= 52\left(\frac{3}{2}\right) =$ **78 miles**

4. Two planes start from the same point and fly in opposite directions. The first plane is flying 40 miles per hour faster than the second plane. In 3 hours, the planes are 960 miles apart. Find the speed of each plane.

plane	rate (mph)	x	time (h)	=	distance (mi)
1	$x+40$		3		$3(x+40)$
2	x		3		$3x$



$$3(x+40) + 3x = 960$$
$$3x + 120 + 3x = 960$$
$$6x = 840$$
$$x = \frac{840}{6} = 140$$

plane #1 travels at 180 miles per hour
plane #2 travels at 140 miles per hour