

Review: A cashier has \$730 in twenty-dollar bills and five-dollar bills. In all, the cashier has 68 bills. How many twenty-dollar bills does the cashier have?

	#	value	total value
\$5	$68-x$	5	$5(68-x)$
\$20	x	20	$20x$

$$20x + 5(68 - x) = 730$$

$$20x + 340 - 5x = 730$$

$$15x = 730 - 340$$


$$15x = 390$$

$$x = 26 \text{ \$20 bills}$$

$$\mathbb{Q} = \left\{ \frac{p}{q} \mid p, q \in \mathbb{Z}, q \neq 0 \right\}$$

$$|x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

2.5 Inequalities in One Variable

$$2x - 5 \geq x + 7$$


$$2x - x \geq 7 + 5$$

$$x \geq 12$$

$$\{x \mid x \geq 12\}$$

← set-builder

$$[12, \infty)$$

← interval

* inequality changes directions if mult/divide by a negative

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

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

$$2 - 5 + 3 + 8 \geq 3x + 5x$$

$$8 \geq 8x$$

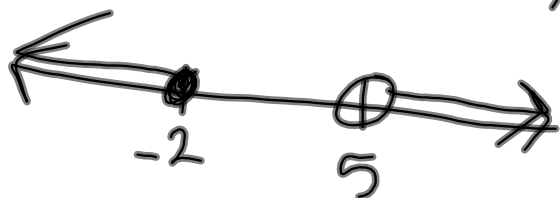
$$\left\{ x \mid \begin{array}{l} 1 \geq x \\ x \leq 1 \end{array} \right\} \quad (-\infty, 1]$$

Compound Inequalities

or \cup union $A \cup B$
 x is in A or B

and \cap intersection
 $A \cap B$
 x is in both A and B

$$x > 5 \quad \text{or} \quad x \leq -2$$



$$\{x \mid x > 5 \text{ or } x \leq -2\}$$

$$(5, \infty) \cup (-\infty, -2]$$

combine conditions w/ "or"

combine sets w/ \cup

$$3x - 2 \geq -11 \quad \text{and} \quad 2x - 7 < 1 - 2x$$

$$3x \geq -9$$

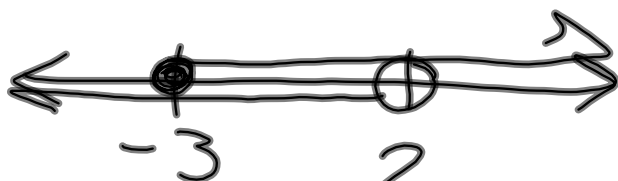
$$x \geq -3$$

$$2x + 2x < 1 + 7$$

$$4x < 8$$

$$x < 2$$

\cap
and



$$[-3, 2)$$

$$\{x \mid -3 \leq x < 2\}$$

$$2x + 5 < 7x + 3 \leq 5 - 3x$$

equivalent to:

$$2x + 5 < 7x + 3 \quad \text{and} \quad 7x + 3 \leq 5 - 3x$$

$$2 < 5x$$

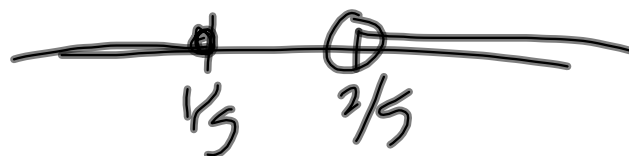
$$\frac{2}{5} < x$$

$$x > \frac{2}{5}$$

and

$$10x \leq 2$$

$$x \leq \frac{1}{5}$$



$$3x - 4 \geq -5 \quad \text{or} \quad 7x + 25 < 30$$

$$3x \geq -1$$

$$7x < 5$$

$$x \geq -\frac{1}{3}$$

or

$$x < \frac{5}{7}$$



$$\{x \mid x \in \mathbb{R}\}$$

$$(-\infty, \infty)$$

$$5(1-x) < 2x-4 \leq 3-4x$$

$$5-5x < 2x-4 \quad \underline{\text{and}} \quad 2x-4 \leq 3-4x$$

$$9 < 7x$$

$$6x \leq 7$$

$$\frac{9}{7} < x$$

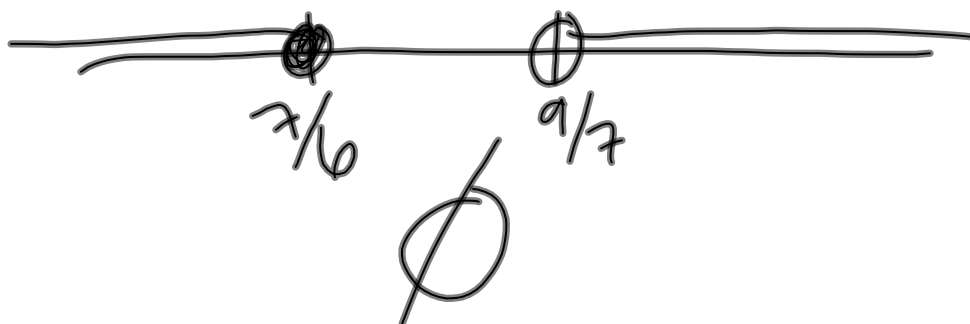
$$x \leq \frac{7}{6}$$

$$x > \frac{9}{7}$$

and

$$\frac{7}{6} \cdot \frac{7}{7} = \frac{49}{42}$$

$$\frac{9}{7} \cdot \frac{6}{6} = \frac{54}{42}$$



2.5

#35-72

word problems from
old test #1