

Solve the inequalities. Write your solution in interval notation.

1. (5pts)  $0 \leq 8 - 5x < 13$   $|-8$

$$-8 \leq -5x < 5 \quad | \div (-5)$$

$$\frac{-8}{-5} \geq x > -1$$

$$\frac{8}{5} \geq x > -1$$

~~$$(-\infty, \frac{8}{5}]$$~~

$$(-1, \frac{8}{5}]$$

2. (7pts)  $2x + 3 < 7$  or  $3x - 11 > 7$

$$2x < 4 \quad 3x > 18 \quad | +3$$

$$x < 2 \quad \text{or} \quad x > 6$$

~~$$(-\infty, 2) \cup (6, \infty)$$~~

$$(-\infty, 2) \cup (6, \infty)$$

3. (6pts) Find the domain of the function in interval notation:  $f(x) = \frac{\sqrt{6-3x}}{x+6}$

Must have:  $6-3x \geq 0$   
 $6 \geq 3x \quad | \div 3$

$$2 \geq x$$

Can't have  $x+6=0$   
 $x=-6$

~~$$(-\infty, 2]$$~~

$$(-\infty, -6) \cup (-6, 2]$$

4. (14pts) Mall masseurs Guido and Jaco offer their services at these costs: Guido charges 80 cents per minute, and Jaco charges \$14 for the first fifteen minutes and then 75 cents per minute for the minutes after fifteen. Assuming you want to get at least a fifteen minute massage, for which number of minutes does Jaco have the better deal? Solve as an inequality.

$x =$  minutes of masseur time

Guido cost:  $0.8x$

Jaco cost:  $14 + 0.75(x-15)$

Jaco is better deal when

$$0.8x \geq 14 + 0.75(x-15)$$

$$0.8x \geq 14 + 0.75x - 11.25 \quad | -0.75x$$

$$0.05x \geq 2.75$$

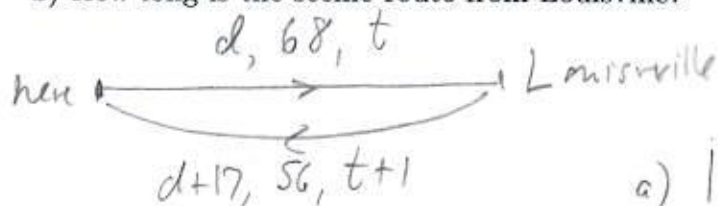
$$x \geq \frac{3.75}{0.05} = 55$$

For massages longer than 55 min, Jaco is the better deal.

5. (14pts) Jenny traveled to Louisville at 68 miles per hour. On the way back, she took the scenic route and drove 56 miles per hour. The way back was 17 miles longer and took one hour longer to drive than the way to Louisville.

a) How many hours did it take to drive to Louisville?

b) How long is the scenic route from Louisville?



a) It took 3.25 hours to drive to Louisville

b) Scenic route's length is

$$56 \cdot (3.25 + 1)$$

$$= 56 \cdot 4.25$$

$$= 238$$

put in

$$d = 68t$$

$$d + 17 = 56(t + 1)$$

$$68t + 17 = 56(t + 1)$$

$$68t + 17 = 56t + 56 \quad | -17$$

$$68t = 56t + 39 \quad | -56t$$

$$12t = 39$$

$$t = \frac{39}{12} = 3.25$$

6. (14pts) Larry, Moe and Curly share the cost of their lunch, for which the bill was \$23.20. Moe pays half of what Larry pays, and Curly pays \$5 less than Larry and Moe together. How much did each of them contribute to the bill?

$l$  = how much Larry pays

$\frac{l}{2}$  = how much Moe pays

$l + \frac{l}{2} - 5$  = how much Curly pays

total = 23.20 so

$$l + \frac{l}{2} + l + \frac{l}{2} - 5 = 23.2$$

$$3l - 5 = 23.2 \quad | +5$$

$$3l = 28.2$$

$$l = 9.4$$

Larry pays \$9.40

Moe pays \$4.70

Curly pays: \$9.10 = 9.40 + 4.70 - 5