

Solve the inequalities. Write your solution in interval notation.

1. (5pts) $-6 < 4x - 1 < 7$ +1

$$-5 < 4x < 8 \quad | \div 4$$

$$-\frac{5}{4} < x < 2$$



$$\left(-\frac{5}{4}, 2\right)$$

2. (7pts) $2x + 3 < 7$ or $3x + 4 > 21$

$$2x < 4$$

$$3x > 17$$

$$x < 2$$

$$x > \frac{17}{3}$$



$$(-\infty, 2) \cup \left(\frac{17}{3}, \infty\right)$$

3. (6pts) Find the domain of the function in interval notation: $f(x) = \frac{\sqrt{5-8x}}{x+4}$.

Must have $5-8x \geq 0$

$$-8x \geq -5$$

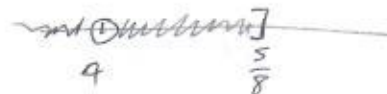
$$x \leq \frac{-5}{-8}$$

$$x \leq \frac{5}{8}$$

Can't have

$$x+4=0$$

$$x=-4$$



$$(-\infty, 4) \cup \left(4, \frac{5}{8}\right]$$

4. (14pts) Boat operators Buggy's and Daffy's charge the following rates for an excursion on a lake. Buggy's charges \$50 plus \$24 per person. Daffy's charges \$350, which includes 10 people, plus \$19 per person for every person over the first ten. Assuming your group has at least 10 people, for which number of people is Buggy's the better option? Solve as an inequality.

$x =$ no of people on excursion

Buggy's $50 + 24x$

Daffy's $350 + 19(x-10)$

Wish to have

$$50 + 24x \leq 350 + 19(x-10)$$

$$50 + 24x \leq 350 + 19x - 190 \quad | -19x$$

$$50 + 5x \leq 160 \quad | -50$$

For groups up to 22 people,

Buggy's is the better option

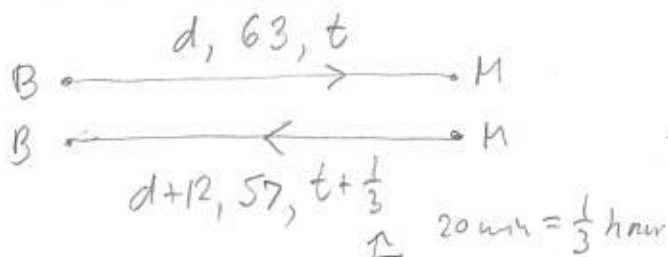
$$5x \leq 110$$

$$x \leq \frac{110}{5}$$

$$x \leq 22$$

5. (14pts) Kristi lives in Benton, and Laura in Madisonville. One day, leaving at the same time, Kristi drives on the highway toward Madisonville at 63 mph while Laura drives at 57 mph toward Benton on a scenic road that is 12 miles longer than the highway. Laura arrives in Benton 20 minutes after Kristi arrives in Madisonville.

- a) How long did it take for each of them to drive to their destinations?
 b) How far is Madisonville from Benton along the highway?



$$d = 63t$$

$$d + 12 = 57\left(t + \frac{1}{3}\right)$$

$$63t + 12 = 57\left(t + \frac{1}{3}\right)$$

$$63t + 12 = 57t + 19 \quad | -57t - 12$$

$$6t = 7$$

$$t = \frac{7}{6} \text{ hrs}$$

a) Kristi drove $\frac{7}{6}$ hrs (1 hr 10 min)

Laura drove $\frac{7}{6} + \frac{1}{3} = \frac{9}{6} = \frac{3}{2}$ hr (1 hr 30 min)

$$b) d = 63 \cdot \frac{7}{6} = \frac{147}{2} = 73.5 \text{ miles}$$

6. (14pts) You need 35 cans of soda for a party. A can of lemon soda costs 79 cents and a can of cola costs 91 cents. After you buy some lemon soda cans and some cola cans (35 altogether), you realize that, if you reversed the amounts of cans of each type you bought, it would have cost you 36 cents extra. How many cans of each soda type did you buy?

$x = \text{no of lemon soda cans}$

$35 - x = \text{no of cola cans}$

cost of reverse selection = cost of regular selection + 0.36

$$0.79(35 - x) + 0.91x = 0.79x + 0.91(35 - x) + 0.36$$

$$27.65 - 0.79x + 0.91x = 0.79x + 31.85 - 0.91x + 0.36$$

$$27.65 + 0.12x = -0.12x + 32.21 \quad | +0.12x - 27.65$$

$$0.24x = 4.56$$

$$x = \frac{4.56}{0.24} = 19$$

19 cans of lemon soda

16 cans of cola