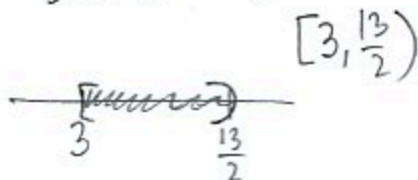


Solve the inequalities. Write your solution in interval notation.

1. (5pts)  $-1 \leq 2x - 7 < 6$   $| +7$

$$6 \leq 2x < 13$$

$$3 \leq x < \frac{13}{2}$$



2. (7pts)  $2x + 3 < 5$  or  $3x - 7 > 11$

$$2x < 2 \quad 3x > 18$$

$$x < 1 \quad \text{or} \quad x > 6$$



$$(-\infty, 1) \cup (6, \infty)$$

3. (6pts) Find the domain of the function in interval notation:  $f(x) = \frac{\sqrt{10-3x}}{2x-5}$

Must have

$$10 - 3x \geq 0$$

$$10 \geq 3x \quad | :3$$

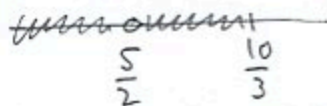
$$x \leq \frac{10}{3}$$

Can't have

$$2x - 5 = 0$$

$$2x = 5$$

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



$$(-\infty, \frac{5}{2}) \cup (\frac{5}{2}, \frac{10}{3}]$$

4. (14pts) Luciana has \$8,000 to invest and can split this money between an investment bringing 4% interest, and one bringing 3% interest. What is the least she needs to invest at 4% interest in order to meet a goal of annual interest of at least \$290?

$$x = \text{amt. invested at } 4\%, \quad 8000 - x = \text{amt. invested at } 3\%$$

$$(\text{interest from } 4\%) + (\text{interest from } 3\%) \geq 290$$

$$x \cdot 0.04 \cdot 1 + (8000 - x) \cdot 0.03 \cdot 1 \geq 290$$

$$0.04x + 240 - 0.03x \geq 290 \quad | -240$$

$$0.01x \geq 50 \quad | \cdot 100$$

$$x \geq 5000$$

At least \$5000 needs to be invested at the 4% int. rate.

5. (14pts) Paul traveled to Lexington at 70 miles per hour. On the way back, he took the scenic route and averaged 55 miles per hour. The way back was 86 miles longer and took 2.6 hours longer to drive than the way to Lexington.

a) How long did it take to drive to Lexington?

b) How long is the scenic route from Lexington?

here  $\xrightarrow{d, 70\text{mph}, t}$  Lex.  $d = \text{distance to Lexington}$   
 $\xleftarrow{d+86, 55, t+2.6}$   $t = \text{time to Lexington}$

$$d = 70t$$

$$d + 86 = 55(t + 2.6)$$

$$70t + 86 = 55t + 143 \quad | -55t - 86$$

$$15t = 57$$

$$t = \frac{57}{15} = 3.8 \text{ hrs}$$

a) It took 3.8 hours

b)  $d = 70 \cdot 3.8 = 266$  miles

$d + 86 = 352$  miles  
from Lexington

6. (14pts) How many liters of water must be mixed with 4 liters of a 22% solution of muriatic acid in order to get a 12% solution of muriatic acid?

$$\begin{array}{|c|} \hline 22\% \text{ sol} \\ \hline 4\text{l} \\ \hline \end{array} + \begin{array}{|c|} \hline 0\% \text{ sol} \\ \hline x \\ \hline \end{array} = \begin{array}{|c|} \hline 12\% \text{ sol} \\ \hline x+4 \\ \hline \end{array}$$

$x = \text{amt of water added}$

Need  $3\frac{1}{3}$  liter of water.

$$0.22 \cdot 4 + 0 \cdot x = 0.12(x + 4)$$

$$0.88 = 0.12(x + 4)$$

$$0.88 = 0.12x + 0.48 \quad | -0.48$$

$$0.4 = 0.12x$$

$$x = \frac{0.4}{0.12} = 3.3\bar{3} = 3\frac{1}{3} \text{ ltr}$$