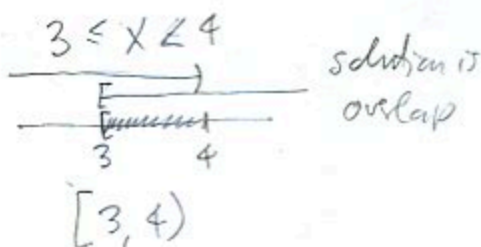


Solve the inequalities. Write your solution in interval notation.

1. (5pts)  $8 \leq 3x - 1 < 11$   $|+1$

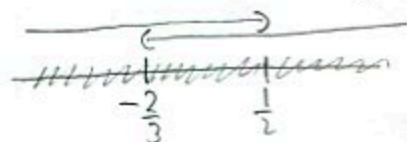
$$9 \leq 3x < 12 \quad | \div 3$$



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

$$2x < 1 \quad 3x > -2$$

$$x < \frac{1}{2} \quad \text{or} \quad x > -\frac{2}{3}$$



Solution is everything shaded, so  $(-\infty, \infty)$

3. (6pts) Find the domain of the function in interval notation:  $f(x) = \frac{\sqrt{7-2x}}{x+4}$

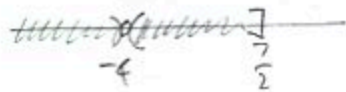
Must have:  $7-2x \geq 0$  Can't have

$$7 \geq 2x$$

$$x+4 \neq 0$$

$$x \leq \frac{7}{2}$$

$$x \neq -4$$



$$(-\infty, -4) \cup (-4, \frac{7}{2}]$$

4. (14pts) Jay plans to invest \$8,000: part at 3.5% simple interest, and the rest at 4.75% simple interest. What is the most he can invest at 3.5% to guarantee receiving \$330 in interest in a year? Solve as an inequality.

$x =$  amount invested at 3.5%  $(I = Prt)$

$8000 - x =$  \_\_\_\_\_ at 4.75%

Interest from 3.5% investment + Interest from 4.75% investment  $\geq 330$

$$0.035x \cdot 1 + 0.0475(8000 - x) \cdot 1 \geq 330$$

$$0.035x + 380 - 0.0475x \geq 330$$

$$-0.0125x \geq -50$$

$$x \leq \frac{50}{0.0125}$$

$$x \leq 4000$$

Jay can invest at most \$4000 at 3.5% in order to have at least \$330 in interest.

5. (14pts) Amy, who rows at speed 7mph in still water, takes 3 hours to row upstream to a point on the river. Her return trip downstream takes 2 hours.

a) How fast does the river flow?

b) How far did Amy travel upstream?

a) Let  $r =$  speed of river flow

	dist.	rat	time
← upstream	$d$	$7-r$	3
→ downstream	$d$	$7+r$	2

b) Amy traveled

$$d = (7 - 1.4) \cdot 3 = 5.6 \cdot 3 = 16.8 \text{ miles}$$

same  $\begin{cases} d = (7-r) \cdot 3 \\ d = (7+r) \cdot 2 \end{cases}$

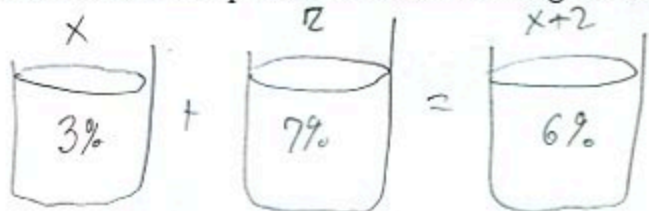
$$(7-r) \cdot 3 = (7+r) \cdot 2$$

$$21 - 3r = 14 + 2r$$

$$-5r = -7$$

$$r = \frac{7}{5} = 1.4 \text{ mph}$$

6. (14pts) How many liters of a 3% solution of sulphuric acid must be mixed with 2 liters of a 7% solution of sulphuric acid in order to get a 6% solution of sulphuric acid?



$x =$  amount of 3% solution, in liters

$$0.03x + 0.07 \cdot 2 = 0.06(x+2) \leftarrow \text{amt of acid in each vessel}$$

$$0.03x + 0.14 = 0.06x + 0.12 \quad | -0.03x - 0.12$$

$$0.02 = 0.03x$$

$$x = \frac{0.02}{0.03} = 0.666667 = \frac{2}{3}$$

Need  $\frac{2}{3}$  liter of the 3% solution,