

P. Math 11 Rationals, Radicals, and Absolute-Value Review 3

Work shown must be neat. You may indicate answers for inequalities either algebraically or on a number line.

Part A: Solve the following using algebra:

1)  $\frac{x-3}{x-2} - \frac{3}{x-3} = 2 - \frac{x}{x^2-5x+6}$   $x \neq 3, 2$

$$(x-3)(x-3) - 3(x-2) = 2(x-3)(x-2) - x$$

$$x^2 - 6x + 9 - 3x + 6 = 2x^2 - 10x + 12 - x$$

$$0 = x^2 - 2x - 3$$

$$0 = (x-3)(x+1)$$

$$\therefore x = \cancel{3} - 1$$

exclude

2)  $\frac{x+7}{x-3} \leq x+1$   $x \neq 3$

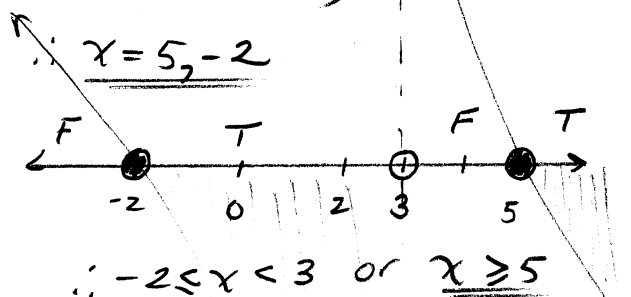
$$x+7 \leq (x+1)(x-3)$$

$$x+7 \leq x^2 - 2x - 3$$

$$0 \leq x^2 - 3x - 10$$

$$0 \leq (x-5)(x+2)$$

Test  $x=0$   
 $\frac{7}{3} \leq 1$  TRUE



3)  $(\sqrt{8-2x})^2 = (x-4)^2$  ①  $8-2x \geq 0$   
 $8-2x = x^2 - 8x + 16$   $-2x \geq -8$   
 $x \leq 4$

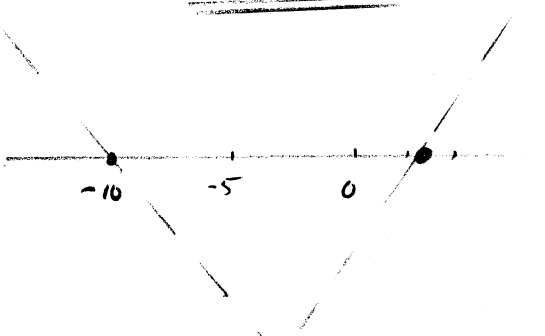
$\therefore 0 = x^2 - 6x + 8$  ②  $x-4 \geq 0$  } Same  
 $0 = (x-4)(x-2)$   $x \geq 4$   
 $\therefore x = \cancel{2}, 4$   
extraneous

A number line with points 0 and 4. There is a solid dot at 4 and an arrow pointing to the right from 4.

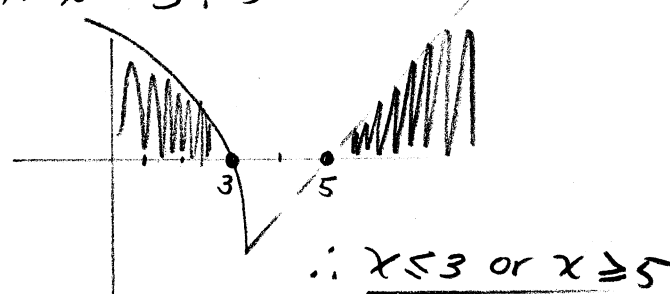
4)  $\sqrt{3x-12} > -1$  ①  $3x-12 \geq 0$   
 $3x-12 > 1$   $3x \geq 12$   
 $3x > 13$   $x \geq 4$   
 $x > \frac{13}{3}$   $x \geq 4$

$\therefore x > \frac{13}{3}$

5)  $|2x+7| = |x-3|$  GC  
 $\therefore x = -10$  &  $-1.33$



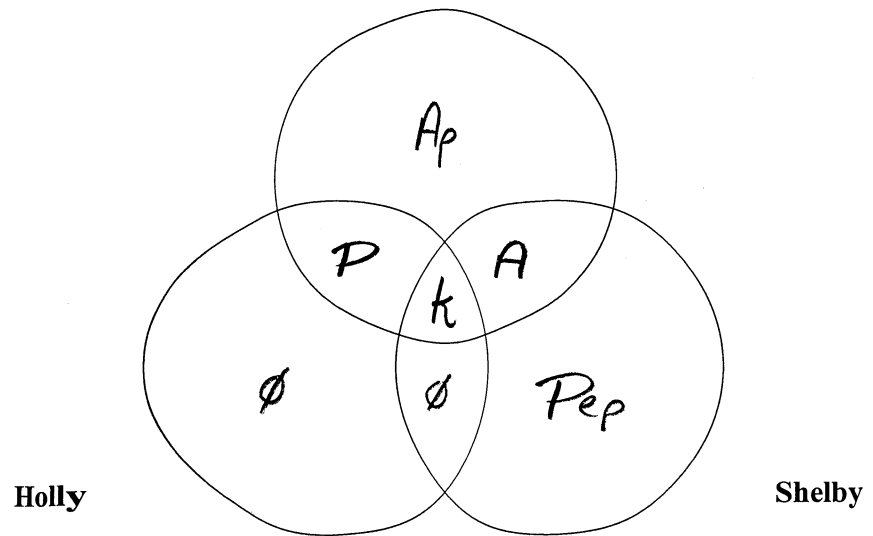
6)  $|10-3x| \geq |2x-5|$  GC  
 $\therefore x = 3$  &  $5$



**Part B:**

1. Given the following information, please fill in the following Venn diagram.

- Three people went out for groceries.
- All 3 of them bought kiwi. ( $k$ )
- Karen and Shelby bought kiwi and apples. ( $A + k$ )
- Holly and Karen bought pears and kiwi. ( $P + k$ )
- Karen bought kiwi, pears, and apricots. ( $k + P + Ap$ )
- Shelby is the only one that bought any peppers. ( $Pep$ )

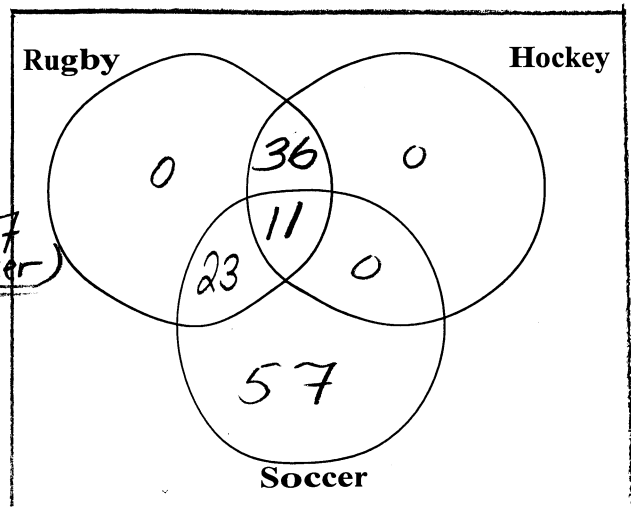


2. 150 students at a sports camp were categorized as follows:

- ② 23 students played only soccer and rugby.
- ① 11 students played soccer, rugby, and hockey.
- ④ 47 students played hockey and rugby.
- ③ 57 students played soccer only.
- ⑤ 47 played hockey.

127 students

- a) Display the information in a Venn Diagram.
- b) How many students are in a single category? 57
- c) How many students did not play any of these three sports? 23  
(150 - 127)



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2)  $\frac{x+7}{x-3} \leq x+1$

3)  $\sqrt{8-2x} = x-4$

4)  $\sqrt{3x-12} > -1$

$3x-12 > -1$

$3x > 11$

$x > \frac{11}{3} (3.6)$

Rest:

$3x-12 \geq 0$

$3x \geq 12$

$x \geq 4$

$\therefore$  The solution would have the answer starting at 3.6 but the restriction sets the start value @ 4  $\therefore x \geq 4$

5)  $|2x+7| = |x-3|$

6)  $|10-3x| \geq |2x-5|$