

Part A: Solve the following using algebra.

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

$\frac{3x}{(x-1)(x+2)} + \frac{2}{(x+2)(x-1)} = \frac{(x-2)}{(x+2)(x-1)}$

$3x(x+2) + 2(x-1) = x-2$

$3x^2 + 6x + 2x - 2 = x - 2$

$3x^2 + 7x = 0$

$x(3x+7) = 0$

$\underline{x = 0, -\frac{7}{3}}$

2) $\frac{x^2-4x-5}{x-3} \geq 0; x \neq 3$

$(x-5)(x+1) \geq 0(x-3)$

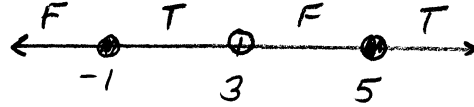
$(x-5)(x+1) \geq 0$

Test $x=0$

$x \geq 5, -1$

$\frac{-5}{-3} \geq 0$

TRUE



$\therefore \underline{-1 \leq x < 3, x \geq 5}$

3) $\frac{3}{x-5} + \frac{x}{x+3} < \frac{12}{x^2-2x-15}; x \neq 5, -3$

$3(x+3) + x(x-5) < 12$ Test $x=0$

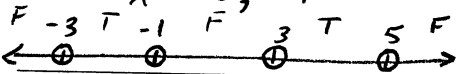
$3x+9+x^2-5x < 12$ $\frac{3}{-5} + 0 < \frac{12}{-15}$

$x^2-2x-3 < 0$ FALSE

$(x-3)(x+1) < 0 \therefore -3 < x < -1$

$x < 3, -1$

$3 < x < 5$



4) $\sqrt{x+3} + x = 3$

$(\sqrt{x+3})^2 = (3-x)^2$

check $x=1$

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

$2+1 = 3$

(T)

$0 = x^2 - 7x + 6$

check $x=6$

$0 = (x-6)(x-1)$

$3+6 = 3$

$x = 6, 1$

(F)

extraneous roots.

5) $\sqrt{2x+3} = \sqrt{4-x}$ $2x+3 \geq 0$

$2x+3 = 4-x$ $x \geq -\frac{3}{2}$

$3x = 1$ $4-x \geq 0$

$x = \frac{1}{3}$ $4 \geq x$ or $x \leq 4$

*checks ok $\rightarrow \sqrt{3\frac{2}{3}} = \sqrt{3\frac{2}{3}}$

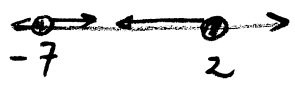
6) $\sqrt{2-x} < 3$ $2-x \geq 0$

$2-x < 9$ $-x \geq -2$

$-x < 7$ $x \leq 2$

$x > -7$

$\therefore \underline{-7 < x \leq 2}$



7) $x \geq \sqrt{x-5+7}$ $x \geq 5$

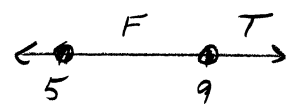
$x-7 \geq \sqrt{x-5}$

$x^2-14x+49 \geq x-5$

$x^2-15x+54 \geq 0$

$(x-9)(x-6) \geq 0 \therefore \underline{x \geq 9}$

$x \geq 9$, extraneous



8) $|2x-5|=11$

a) $2x-5=11$

$2x=16$

$x=8$

b) $-2x+5=11$

$-2x=6$

$x=-3$

a) $|16-5|=11$ (T)

b) $|-6-5|=11$ (T)

9) $|x+1| = 3x-5$

a) $x+1 = 3x-5$
 $6 = 2x$
 $3 = x$

b) $-x-1 = 3x-5$

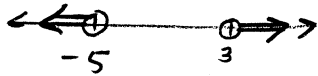
$4 = 4x$
 $1 = x$
 a) $|4| = |2-5$ b) $|2| = -2$

10) $|3x-1| = |x+7|$ - Graphing calculator

$x = -1.5$ & 4

11) $|x+1| < -4$

a) $x+1 < -4$
 $x < -5$

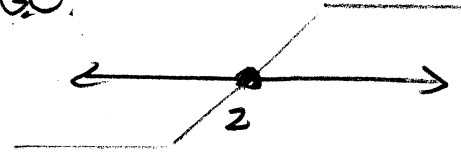


b) $-x-1 < -4$
 $x > 3$

\therefore No Solution

12) $|x+1| \leq |x-5|$ GC.

$\therefore x = 2$



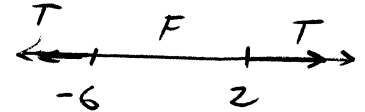
$\therefore x \leq 2$

Part B: Graphing Calculator questions.

1) $\sqrt{4x+1} - \sqrt{2x-3} < 1$ No Sol'n

2) $|x+5| + |x-1| > 8$

$x = 2$ & -6



$\therefore x < -6$ or $x > 2$

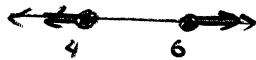
3) $\sqrt{x-3} < \frac{2x}{x+4}$ $x \geq 3$; $x = 4$



Part C: AND, NOT, OR and Venn.

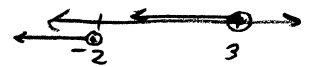
1) Show the solution for each of the following on a number line.

a) $x \leq 4$ or $x \geq 6$



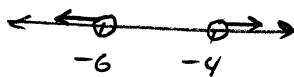
$\therefore x \leq 4$ or $x \geq 6$

b) $x \leq 3$ or not $x > -2$



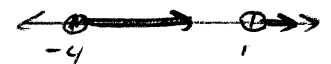
$\therefore x \leq 3$

c) $x < -6$ and $x > -4$



go \therefore no sol'n

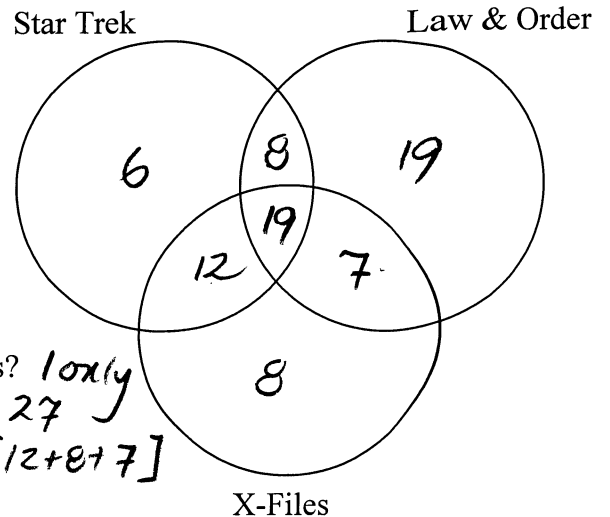
d) $x \geq -4$ and $x > 1$



$\therefore x > 1$

2. Seventy students were surveyed about which TV show(s) they watched on a particular night.

- 7 • 45 watched Star Trek
- 6 • 53 watched Law & Order
- 5 • 46 watched X-Files
- 4 • 31 watched X-files and Star Trek
- 3 • 27 watched Star Trek and Law & Order
- 2 • 26 watched Law & Order and X-files
- 1 • 19 watched all three



a) Display the information on a Venn diagram

b) How many students watched none of these TV shows? 10xly

c) How many watched exactly two of these TV shows? 27

$[12+8+7]$