

Solve the equations:

1. (6pts) $\sqrt{x^2 - x + 3} = x - 2$ |²

$$\cancel{x^2} - x + 3 = \cancel{x^2} - 4x + 4$$

$$3x = 1$$

$$x = \frac{1}{3} \times \text{doesn't work in original equation.}$$

$$\sqrt{\frac{1}{9} - \frac{1}{3} + 3} \stackrel{?}{=} \frac{1}{3} - 2$$

$$\sqrt{\frac{1 - 3 + 27}{9}} = -\frac{5}{3}$$

$$\sqrt{\frac{25}{9}} \neq -\frac{5}{3}$$

2. (4pts) $|3x - 4| = 6$

$$3x - 4 = 6 \quad \text{or} \quad 3x - 4 = -6$$

$$3x = 10$$

$$3x = -2$$

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

$$x = -\frac{2}{3}$$

3. (6pts) Two cars travel the same stretch of highway. Both enter at 12 noon and the faster car finishes the trip at 3PM. The car that is going 10mph slower finishes half an hour later.

a) How fast is each car going?

b) How long is the section of the highway they traveled?

a) Let $v =$ speed of faster car

$$1) 70.3 = 210 \text{ miles long}$$

$$\underbrace{3v}_{\text{distance covered by faster car}} = \underbrace{3.5(v-10)}_{\text{distance covered by slower car}}$$

distance covered by faster car = distance covered by slower car

$$3v = 3.5v - 35$$

$$35 = 0.5v$$

$$v = \frac{35}{0.5} = 70 \text{ mph}$$

slower car going 60 mph.

4. (5pts) Two pumps can be used to fill a pool. If each of them works by itself, the larger pump fills it in 5 hours, while the smaller one fills it in 8 hours. How fast can they fill the pool if they are both turned on?

Total time it takes both, in hours

$$\frac{1}{T} = \frac{1}{5} + \frac{1}{8}$$

$$\frac{1}{T} = \frac{8+5}{40} = \frac{13}{40}$$

$$T = \frac{40}{13} = 3.08 \text{ hrs}$$

Solve the inequalities. Write your solution in interval form and draw the interval on a number line.

5. (4pts) $4x - 7 \leq 5 - 3x$ $x \in (-\infty, \frac{12}{7}]$

$$7x \leq 12$$

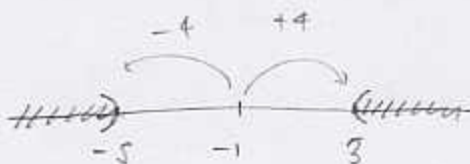
$$x \leq \frac{12}{7}$$



6. (5pts) $|x + 1| > 4$

$$|x - (-1)| > 4$$

*distance from
x to -1 > 4*



$x \in (-\infty, -5) \cup (3, \infty)$

