

- **Review Quiz tomorrow!**

- Homework: bring in all review homework (review 3-6) completed tomorrow. Also, write a justification for every step on this sheet.

- Simplifying expressions: If  $x = -3$ , find  $\frac{-3x^2 - x^3 + |x|}{x^2 - 6}$ .

$$\begin{aligned} \frac{-3x^2 - x^3 + |x|}{x^2 - 6} &= \frac{-3(-3)^2 - (-3)^3 + |-3|}{(-3)^2 - 6} \\ &= \frac{-3(9) - (-27) + 3}{9 - 6} \\ \text{Solution:} &= \frac{-27 + 27 + 3}{3} \\ &= \frac{3}{3} \\ &= 1 \end{aligned}$$

- Simplify the following expression into a single fraction.

$$\begin{aligned} &4 - \frac{2}{3} \left( \frac{x^2}{2} - \frac{3}{5} \right) \\ &= 4 - \frac{2}{3} \left( \frac{x^2}{2} \right) - \left( -\frac{2}{3} \right) \left( \frac{3}{5} \right) \\ &= 4 - \frac{2x^2}{6} - \left( -\frac{6}{15} \right) \\ &= 4 - \frac{2x^2}{6} + \frac{6}{15} \\ &= \frac{4 \cdot 30}{30} - \frac{5 \cdot 2x^2}{5 \cdot 6} + \frac{2 \cdot 6}{2 \cdot 15} \\ &= \frac{120}{30} - \frac{10x^2}{30} + \frac{12}{30} \\ &= \frac{132 - 10x^2}{30} \end{aligned}$$

- Solve:  $-\frac{3}{5}x - \frac{2}{3} = 2 + \frac{5}{3}x$

$$\begin{aligned} -\frac{3}{5}x - \frac{2}{3} &= 2 + \frac{5}{3}x \\ -\frac{3}{5}x - \frac{5}{3}x &= 2 + \frac{2}{3} \\ -\frac{3 \cdot 3}{3 \cdot 5}x - \frac{5 \cdot 5}{5 \cdot 3}x &= \frac{3 \cdot 2}{3} + \frac{2}{3} \\ -\frac{9}{15}x - \frac{25}{15}x &= \frac{6}{3} + \frac{2}{3} \\ -\frac{34}{15}x &= \frac{8}{3} \\ -\frac{15}{34} \cdot \left( -\frac{34}{15} \right) x &= -\frac{15}{34} \cdot \frac{8}{3} \\ x &= -\frac{120}{102} \\ &= -\frac{20}{17} \end{aligned}$$

- How many mm in a yard? (Note: .0254 m = 1 in)

$$\text{Solution: } \frac{1000 \text{ mm}}{1 \text{ m}} \cdot \frac{.0254 \text{ m}}{1 \text{ in}} \cdot \frac{36 \text{ in}}{\text{yd}} = \frac{914.4 \text{ mm}}{\text{yd}}$$

- Solve the inequality and graph the solution (or write “no solution”):

$$4x + 5 > 3(x - 2) \text{ and } -2x \geq -6$$

$$4x + 5 > 3x - 6 \text{ and } x \leq 3$$

$$x > -11 \text{ and } x \leq 3$$

$$-11 < x \text{ and } x \leq 3$$

$$-11 < x \leq 3$$

- You are running a race. After  $6\frac{1}{2}$  minutes you are four miles from the finish line. After  $19\frac{1}{2}$  minutes you are two miles from the finish line. Assuming that you run at a constant speed, what is your speed? Write an equation that relates how far you are from the finish line,  $y$ , with the number of minutes after the race starts,  $x$ . How far were you when the race started? What time will you finish?

Solution:

- Speed is rate of change or slope of the graph:  $\frac{2-4}{19\frac{1}{2}-6\frac{1}{2}} = \frac{-2}{13}$
- Using point/slope form,  $y - 4 = \frac{-2}{13}(x - 6\frac{1}{2})$
- How far were we when the race started? Then  $x = 0$  so we solve  $y - 4 = \frac{-2}{13}(0 - 6\frac{1}{2})$ :

$$\begin{aligned} y - 4 &= \frac{-2}{13}(0 - 6\frac{1}{2}) \\ &= \frac{13}{13} \\ &= 1 \\ y &= 1 + 4 \\ &= 5 \end{aligned}$$

- What time will you finish? In this case  $y = 0$  so

$$\begin{aligned} 0 - 4 &= \frac{-2}{13}(x - 6\frac{1}{2}) \\ -4 &= -\frac{2}{13}x + \frac{13}{13} \\ &= -\frac{2}{13}x + 1 \\ -5 &= -\frac{2}{13}x \\ (-\frac{13}{2})(-5) &= (-\frac{13}{2})(-\frac{2}{13}x) \\ \frac{65}{2} &= x \\ 32\frac{1}{2} &= x \end{aligned}$$