gebra II
Unit 5 Review
"Procrastination is the natural assassination of opportunity." Anonymous

Name _____

1. Simplify using the laws of exponents.

a) $\frac{35x^2y^3}{15x^5y} \Rightarrow \frac{7y^2}{3x^3}$

b) $\frac{(2x^2y)^2}{(3xy^2)^3} \Rightarrow \frac{4x^4y^2}{27x^3y^6} = \frac{4x}{27y^4}$

2. Write in simplest form without negative or zero exponents.

a) $\frac{18x^2y^{-3}}{12x^{-2}y} \Rightarrow \frac{18x^2 \cdot x^2}{12y \cdot y^3} = \frac{3x^4}{2y^4}$

b) $\frac{(3x^2y)^{-3}}{9x^{-2}y} \Rightarrow \frac{3^{-3}x^{-6}y^{-3}}{9x^{-2}y} = \frac{x^2}{9(3^3)x^6y^3y} = \frac{1}{243x^4y^4}$

c) $\left(\frac{u^3}{v^{-1}}\right)^0 \left(\frac{-2u^1}{v^{-2}}\right)^2 (uv^2)^{-1} = 1 \cdot \frac{(2)^2u^2}{v^{-4}} \cdot \frac{u^{-1}v^{-2}}{1}$

$= \frac{4u^2v^4}{1} \cdot \frac{1}{uv^2}$

$= \frac{4u^2v^4}{uv^2} \rightarrow 4uv^2$

3. Write **without** using fractions.

$\frac{12x^0y^5}{y^3z^2} \Rightarrow \frac{12y^2}{z^2} \Rightarrow 12y^2z^{-2}$

4. Rewrite in scientific notation.

a) $70200 \Rightarrow 7.02 \times 10^4$

b) $0.085 \Rightarrow 8.5 \times 10^{-2}$

5. Rewrite in decimal (normal) form.

a) 6.7×10^{-3} .0067 $\Rightarrow$ 0.0067

b) 4.2×10^{2} 4.20 $\Rightarrow$ 420

6. Calculate each answer and **write the answer in scientific notation with the correct number of significant digits.**

a) $(3.98 \times 10^{-14})(6.818 \times 10^{19})$ (3) (4)

$27.13564 \times 10^{5+1}$

2.71×10^{6}

b) $\dfrac{5.22 \times 10^{-1}}{1.5 \times 10^{8}}$ (3) (2)

3.48×10^{-9} (2)

3.5×10^{-9}

7. Simplify the rational algebraic expression.

a) $\dfrac{x^2 - 5x + 6}{x^2 - 7x + 12} \Rightarrow \dfrac{(x-2)(x-3)}{(x-3)(x-4)}$

$= \dfrac{x-2}{x-4}$

b) $\dfrac{6 + x - x^2}{x^2 - 9} = \dfrac{-1(x^2 - x - 6)}{(x-3)(x+3)}$

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

$= -\dfrac{x+2}{x+3}$

8. Simplify each product or quotient.

a) $\dfrac{x^2+3x}{x^2+2x-3} \cdot \dfrac{x+1}{x} \Rightarrow \dfrac{*(x+3)}{(x+3)(x-1)} \cdot \dfrac{(x+1)}{*} = \dfrac{x+1}{x-1}$

b) $\dfrac{x^2-2x-8}{x^2+3x+2} \div \dfrac{(x^2-3x-4)}{1}$ Flip $\Rightarrow \dfrac{(x-4)(x+2)}{(x+1)(x+2)} \cdot \dfrac{1}{(x-4)(x+1)} = \dfrac{1}{(x+1)^2}$

9. Consider the following rational function: $f(x) = \dfrac{x^2+4x-12}{x^2+7x+6}$ $\Rightarrow$ $f(x) = \dfrac{(x+6)(x-2)}{(x+1)(x+6)}$

a) What are the excluded values for x?

$x+1=0$ $\quad x+6=0$

$x \neq -1$ $\quad x \neq -6$

$x \neq -1,\ x \neq -6$

Reduce!

$f(x) = \dfrac{x-2}{x+1}$

b) Identify the locations of all vertical asymptotes and/or holes.

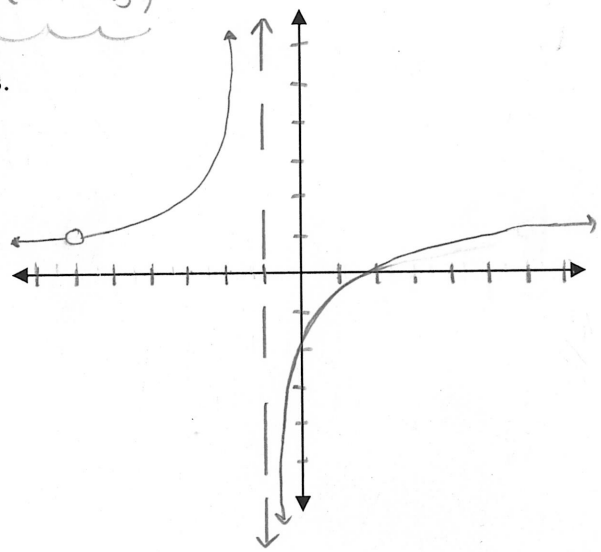
$f(-1) = \dfrac{-1-2}{-1+1} = \dfrac{-3}{0}$ $\qquad f(-6) = \dfrac{-6-2}{-6+1} = \dfrac{-8}{-5} \rightarrow \dfrac{8}{5}$

Vertical Asymptote @ $x=-1$ $\qquad$ Hole @ $(-6\ 8/5)$

c) Graph the function. Show all asymptotes and/or holes.

y= $(x^2+4x-12) \div (x^2+7x+6)$

Graph



10. Simplify each sum or difference.

a) $\dfrac{x}{x-1}+\dfrac{4}{x+1}$ $\Rightarrow$ $\dfrac{x(x+1)}{(x-1)(x+1)} + \dfrac{4(x-1)}{(x-1)(x+1)}$

LCM: $(x-1)(x+1)$

$= \dfrac{x^2+x+4x-4}{(x-1)(x+1)}$

$= \dfrac{x^2+5x-4}{(x-1)(x+1)}$

b) $\dfrac{5}{x-2}-\dfrac{2}{x+3}$ $\Rightarrow$ $\dfrac{5(x+3)}{(x-2)(x+3)} - \dfrac{2(x-2)}{(x-2)(x+3)}$

LCM: $(x-2)(x+3)$

$= \dfrac{5x+15-2x+4}{(x-2)(x+3)}$

$= \dfrac{3x+19}{(x-2)(x+3)}$

11. Solve the equation.

$$\frac{2x-1}{6}=\frac{x+2}{4}+\frac{1}{3}$$

LCM: 12

$12\left(\frac{2x-1}{6}\right)=12\left(\frac{x+2}{4}\right)+12\left(\frac{1}{3}\right)$

$2(2x-1)=3(x+2)+4(1)$

$4x-2=3x+6+4$

$-3x \quad -3x$

$x-2=10$

$+2 \quad +2$

$x=12$

✓: $\frac{24-1}{6}=\frac{14}{4}+\frac{1}{3}$

$\frac{23}{6}=\frac{14}{4}+\frac{1}{3}$

$3.8\overline{3}=3.8\overline{3}$ ✓

12. Solve the equation.

$$\frac{6}{x+1}-\frac{3}{x-2}=0$$

$(x+1)(x-2)\left(\frac{6}{(x+1)}\right)-(x+1)(x-2)\left(\frac{3}{(x-2)}\right)=(x+1)(x-2)(0)$

LCM: $(x+1)(x-2)$

Restrictions: $x+1=0 \quad x-2=0$

$x\neq -1 \quad x\neq 2$

$6(x-2)-3(x+1)=0$

$6x-12-3x-3=0$

$3x-15=0$

$+15 \quad +15$

$\frac{3x}{3}=\frac{15}{3}$

$x=5$

✓: $\frac{6}{6}-\frac{3}{3}=0$

$1-1=0$

13. How much of an 8% saline solution should be added to 600 ml of a 3% solution to produce a 5% saline solution?

$(600\text{mL})(0.03)=18$

$(x)(0.08)=0.08x$

$(600+x)(0.05)=0.05(600+x)$

$18+0.08x=0.05(600+x)$

$18+0.08x=30+0.05x$

$-18 \quad -0.05x \quad -18 \quad -0.05x$

$\frac{0.03x}{0.03}=\frac{12}{0.03}$

$x=400\text{ mL}$