Name _____

Math 3 Honors Unit 4: Rational Expressions

Monday	Tuesday	Wednesday	Thursday	Friday
March 4 ● Simplify rational expressions HW: worksheet 4.1	**March 5** ● Multiply and divide rational expressions HW: worksheet 4.2	**March 6** ● Add and subtract rational expressions HW: worksheet 4.3	**March 7** ● Add and subtract rational expressions HW: worksheet 4.4	**March 8 (ER)** ● QUIZ!! ● Solve rational equations HW: worksheet 4.5
March 11 ● Solve rational equations HW: worksheet 4.6	**March 12** ● Graph rational functions HW: worksheet 4.7	**March 13** ● Graph rational functions HW: worksheet 4.8	**March 14** ● Review for test HW: finish review	**March 15** ● TEST!!

6.1 - Simplify Rational Expressions

Factor completely.

1. $75x^4 - 48y^4$

2. $3x^2 + 10x + 8$

3. $x^2 + 4xy - 12y^2$

4. $12x^3 - 12x^2 - 9x$

Simplify the following rational expressions. State any restrictions on the variables.

5. $\frac{4x+6}{2x+3}$

6. $\frac{2y}{y^2+6y}$

7. $\frac{20+40x}{20x}$

8. $\frac{7x-28}{x^2-16}$

9. $\frac{3y^2-3}{y^2-1}$

10. $\frac{3x^2-12}{x^2-x-6}$

11. $\frac{x^2+3x-18}{x^2-36}$

12. $\frac{x^2+13x+40}{x^2-2x-35}$

6.2 - Multiply and Divide Rational Expressions

Simplify the following rational expressions. State any restrictions on the variables.

1. $\dfrac{y^2-2y}{y^2+7y-18} \div \dfrac{y^2-11y+18}{y^2-81}$

2. $\dfrac{y^2-25}{y^2-16} \div \dfrac{2y+10}{y^2-4y}$

3. $\dfrac{14x+7}{4x-6} \cdot \dfrac{8x-12}{42x+21}$

4. $\dfrac{x^2}{x^2+2x+1} \div \dfrac{3x}{x^2-1}$

5. $\dfrac{2x+4}{3x-3} \cdot \dfrac{12x-12}{x+5}$

6. $\dfrac{\frac{1}{3x}}{\frac{5}{6y}}$

7. $\dfrac{x-2}{(x+2)^2} \cdot \dfrac{x+2}{2x-4}$

8. $\dfrac{5a}{5a+5} \cdot \dfrac{10a+10}{a}$

9. $\dfrac{x+6}{x^2-36}$

6.3 - Add and Subtract Rational Expressions

Simplify the following rational expressions. State any restrictions on the variables.

1. $\dfrac{8}{3x^3y} + \dfrac{4}{9xy^3}$

2. $3x - \dfrac{x^2-5x}{x^2-2}$

3. $\dfrac{5x}{2y+4} - \dfrac{6}{y^2+2y}$

4. $\dfrac{7}{5y+25} - \dfrac{4}{3y+15}$

5. $\dfrac{7}{2xy^2} + \dfrac{3}{8x^2y}$

6. $\dfrac{6y-4}{y^2-5} + \dfrac{3y+1}{y^2-5}$

7. $\dfrac{x+2}{x^2+4x+4} + \dfrac{2}{x+2}$

8. $\dfrac{x^2}{5} + \dfrac{x^2}{5}$

9. $\dfrac{y}{4y+8} - \dfrac{1}{y^2+2y}$

6.4 - Simplify Rational Expressions

Simplify the following rational expressions. State any restrictions on the variables.

1. $\dfrac{1+\frac{2}{x}}{4-\frac{6}{x}}$

2. $\dfrac{x^2-6x}{x^2-36} \cdot \dfrac{x+6}{x^2}$

3. $-\dfrac{2}{n+4} - \dfrac{n^2}{n^2-16}$

4. $\dfrac{4}{x^2-25} + \dfrac{6}{x^2+6x+5}$

5. $\dfrac{d^2+2d-35}{d^2-10d+25} \div \dfrac{d^2-49}{d^2+d-30}$

6. $\dfrac{\frac{2}{y}-1}{\frac{3}{x}+1}$

7. $\dfrac{4}{x^2-16} + \dfrac{5}{x-5} - \dfrac{4}{x+4}$

8. $\dfrac{x+1}{2x^2} - \dfrac{2x-2}{9x} + \dfrac{5x}{12}$

9. $3 + \dfrac{r}{3+\frac{3}{3+r}}$

6.5 - Solve Rational Expressions

Solve for the variable.

1. $\dfrac{3-x}{6} = \dfrac{6-x}{12}$

2. $\dfrac{2}{6x+2} = \dfrac{x}{3x^2+11}$

3. $\dfrac{3}{2x-4} = \dfrac{5}{3x+7}$

4. $\dfrac{2}{x+2} + \dfrac{5}{x-2} = \dfrac{6}{x^2-4}$

5. $\dfrac{7}{x^2-5x} + \dfrac{2}{x} = \dfrac{3}{2x-10}$

6. $\dfrac{1}{4-5x} = \dfrac{3}{x+9}$

7. $\dfrac{7}{2} = \dfrac{7x}{8} - 4$

8. $4 + \dfrac{2y}{y-5} = \dfrac{8}{y-5}$

6.6 - More Solve Rational Expressions

Solve for the variable.

1. $\dfrac{9}{3x} = \dfrac{4}{x+2}$

2. $\dfrac{8}{3x-2} = \dfrac{2}{x-1}$

3. $\dfrac{x-3}{x+5} = \dfrac{x}{x+2}$

4. $\dfrac{4(x-4)}{x^2+2x-8} = \dfrac{4}{x+4}$

5. $\dfrac{2}{3x} + \dfrac{1}{6} = \dfrac{4}{3x}$

6. $\dfrac{2}{x-3} + \dfrac{1}{x} = \dfrac{x-1}{x-3}$

6.7 - Graphs of Rational Functions

Identify points of discontinuity, holes, vertical asymptotes, x-intercepts, and horizontal asymptote of each.

1. $f(x) = \dfrac{1}{3x^2+3x-18}$

2. $f(x) = \dfrac{x-2}{x-4}$

3. $f(x) = \dfrac{x^3-x^2-6x}{-3x^2-3x+18}$

4. $f(x) = \dfrac{x^2+x-6}{-4x^2-16x-12}$

Identify points of discontinuity, holes, vertical asymptotes, x-intercepts, and horizontal asymptote of each. Then sketch the graph.
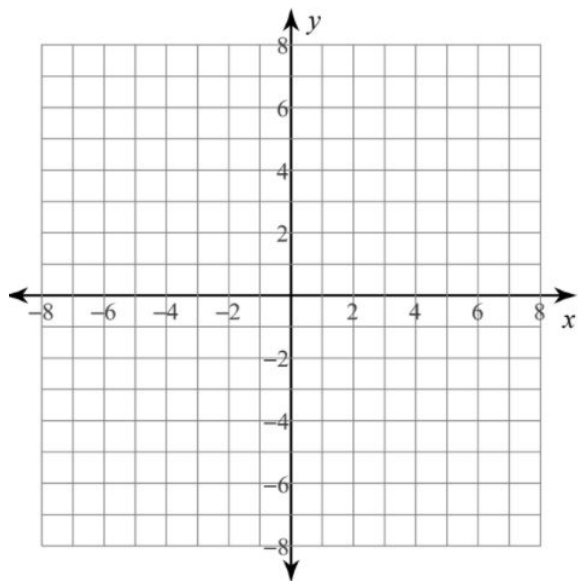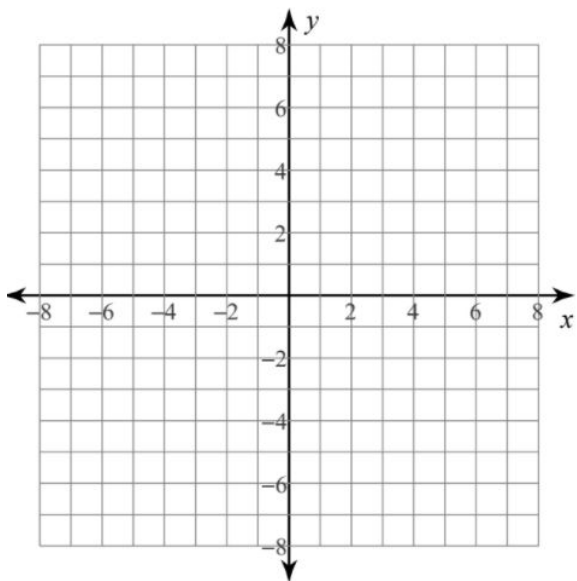
5. $f(x) = -\dfrac{4}{x^2-3x}$

6. $f(x) = \dfrac{x-4}{-4x-16}$
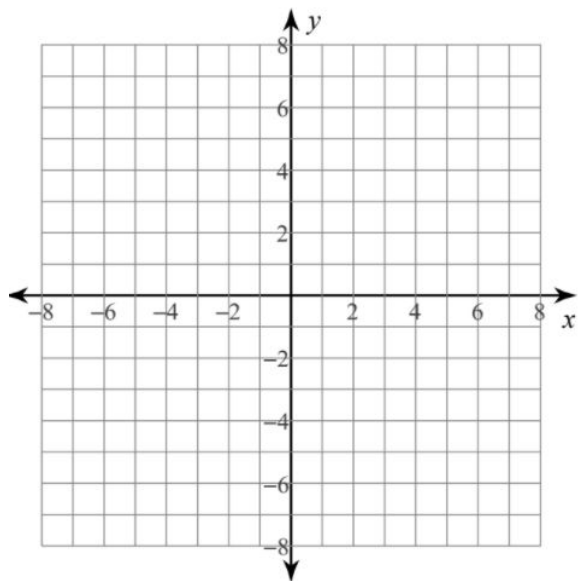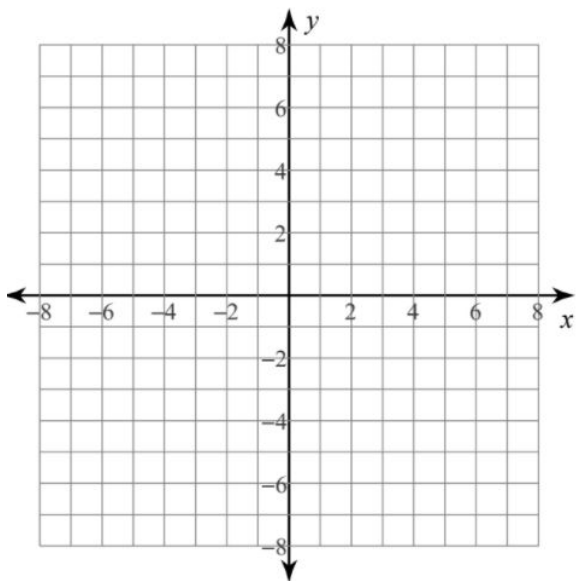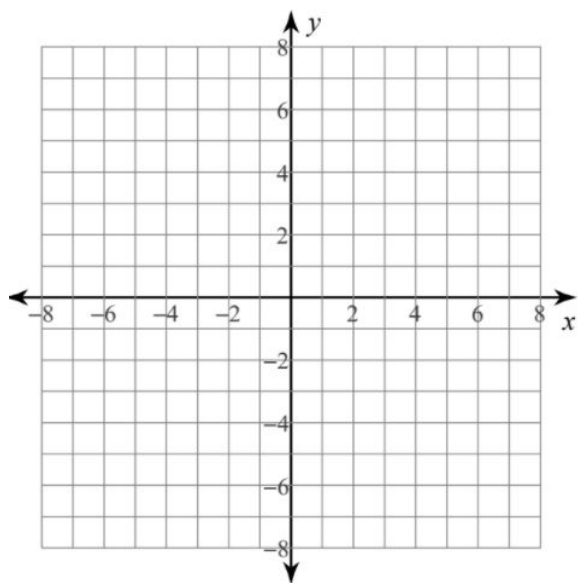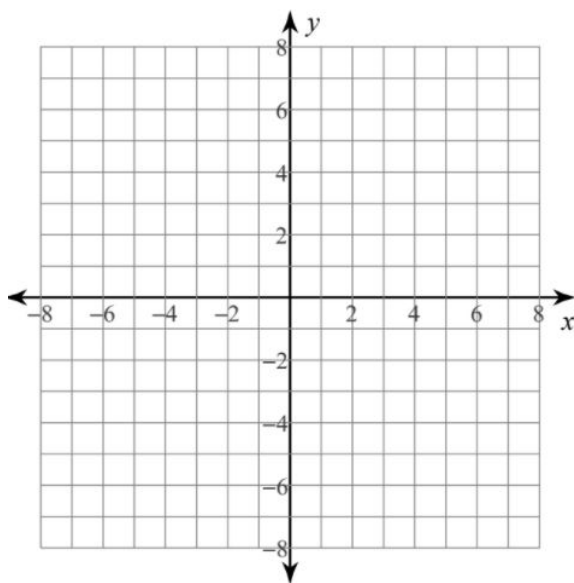
7. $f(x) = \dfrac{x+4}{-2x-6}$

8. $f(x) = \dfrac{x^3-9x}{3x^2-6x-9}$

6.8 - More Graphs of Rational Functions

Identify points of discontinuity, holes, vertical asymptotes, x-intercepts, and horizontal asymptote of each. Then sketch the graph.
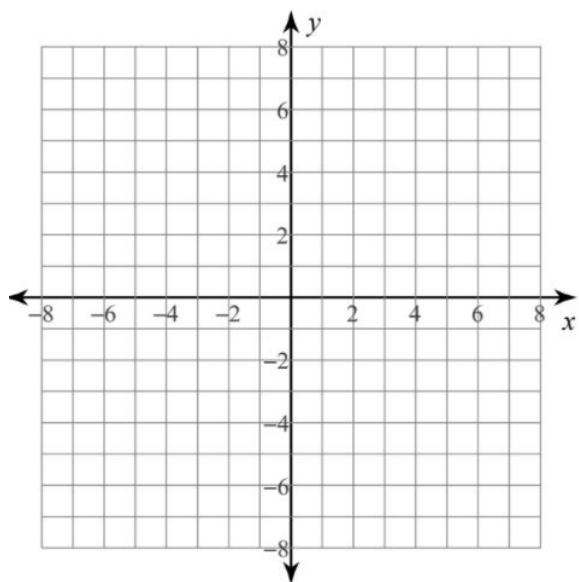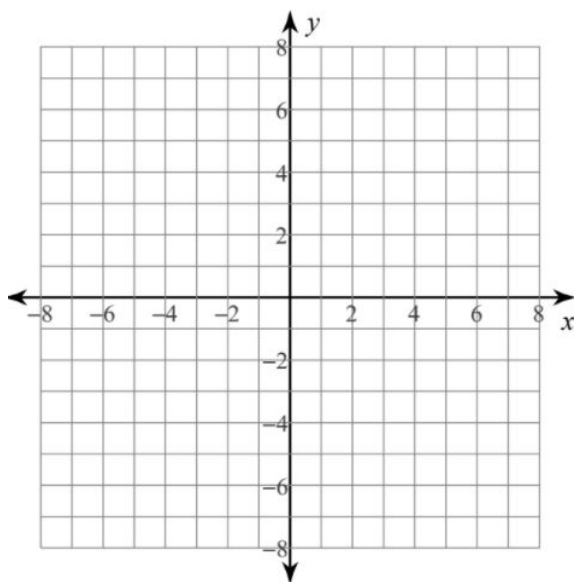
1. $f(x) = \frac{3x^2-12x}{x^2-2x-3}$

2. $f(x) = \frac{x+2}{2x+6}$

3. $f(x) = \frac{2}{x^2+3x-10}$

4. $f(x) = \frac{x^2-4x+3}{x^2-x-6}$

Answer the following multiple choice questions.

5. Which value of x will make the fraction $\frac{x-3}{x+6}$ undefined?
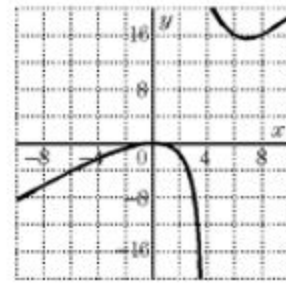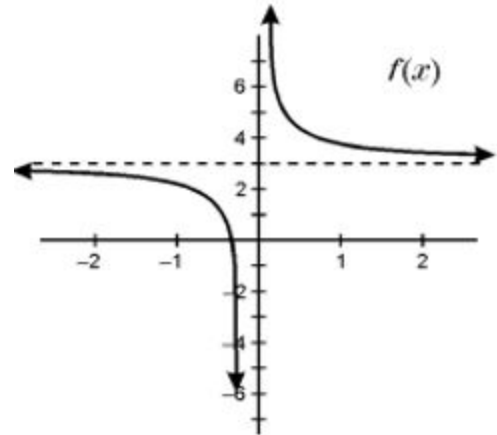
| A 6 | B -6 | C 3 | D -3 |

6. Which of the following is the equation of an asymptote for the function graphed?

A $x = -4$

B $y = 0$

C $x = 4$

D $y = 4$

7. What value(s) are restricted from the range of $f(x)$?

A 1

B 0

C 3

D no restricted values

8. A value of x that makes the expression $\frac{x^2+4x-12}{x^2-2x-15}$ undefined is

A -6 B -2 C 3   D 5

9. The graph of the function $y = \frac{8}{x}$ lies in what quadrant(s)?

A QI and QIII   B QII and QIV   C QII   D QIII