

Name _____

Math 3 Honors Unit 4: Rational Expressions

EVERY TIME YOU DO THIS:



$$f(x) = \frac{\cancel{x^2} + 2x + 1}{\cancel{x^2} + 3}$$

$$= \frac{2x+1}{3}$$

A KITTEN DIES.

Monday	Tuesday	Wednesday	Thursday	Friday
March 4 <ul style="list-style-type: none"> Simplify rational expressions HW: worksheet 4.1	March 5 <ul style="list-style-type: none"> Multiply and divide rational expressions HW: worksheet 4.2	March 6 <ul style="list-style-type: none"> Add and subtract rational expressions HW: worksheet 4.3	March 7 <ul style="list-style-type: none"> Add and subtract rational expressions HW: worksheet 4.4	March 8 <ul style="list-style-type: none"> QUIZ!! Solve rational equations HW: worksheet 4.5
March 11 <ul style="list-style-type: none"> Solve rational equations HW: worksheet 4.6	March 12 <ul style="list-style-type: none"> Graph rational functions HW: worksheet 4.7	March 13 <ul style="list-style-type: none"> Graph rational functions HW: worksheet 4.8	March 14 <ul style="list-style-type: none"> Review for test HW: finish review	March 15 <ul style="list-style-type: none"> 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. $\frac{y^2-2y}{y^2+7y-18} \div \frac{y^2-11y+18}{y^2-81}$

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

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

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

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

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

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

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

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

6.3 - Add and Subtract Rational Expressions

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

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

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

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

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

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

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

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

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

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

6.4 - Simplify Rational Expressions

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

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

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

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

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

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

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

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

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

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

6.5 - Solve Rational Expressions

Solve for the variable.

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

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

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

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

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

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

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

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

6.6 - More Solve Rational Expressions

Solve for the variable.

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

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

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

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

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

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

6.7 - Graphs of Rational Functions

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

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

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

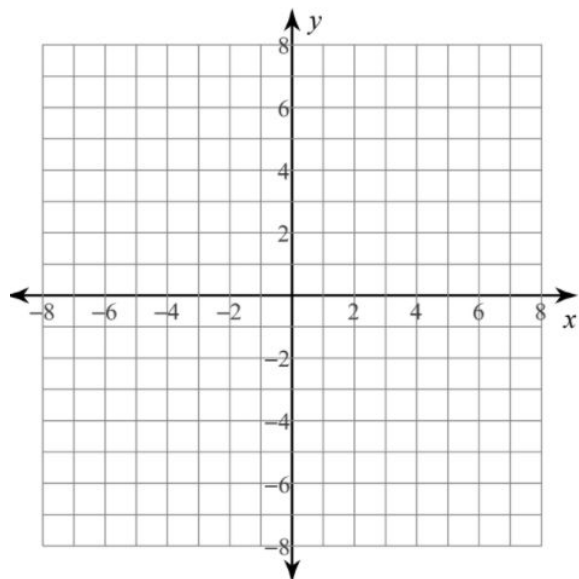
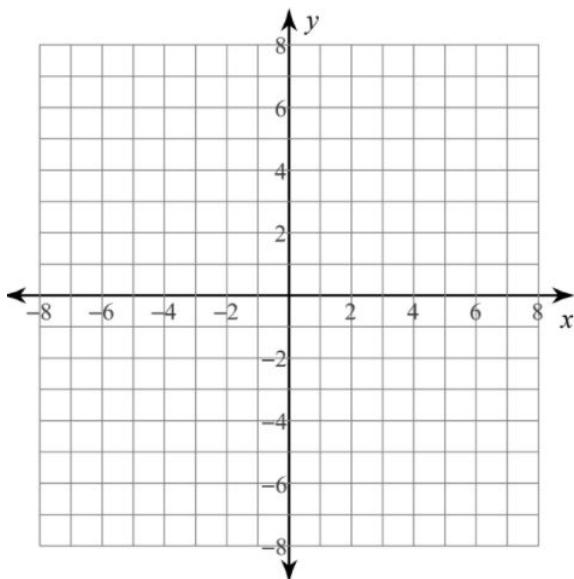
3. $f(x) = \frac{x^3-x^2-6x}{-3x^2-3x+18}$

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

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

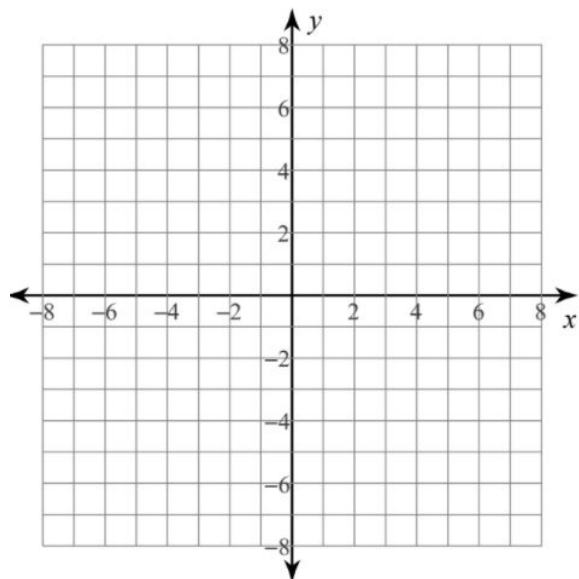
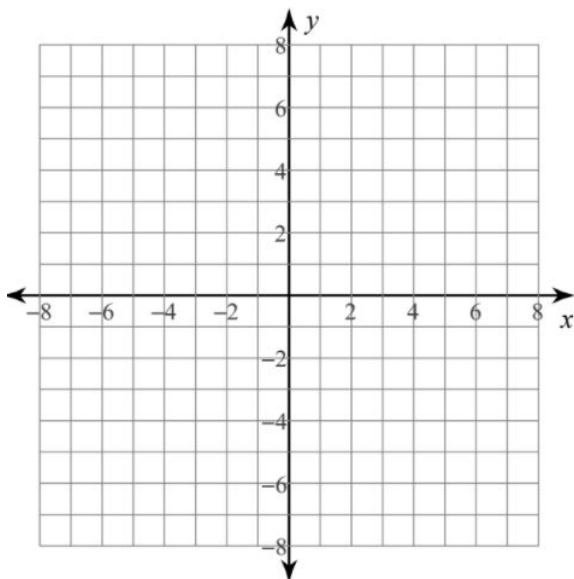
5. $f(x) = -\frac{4}{x^2-3x}$

6. $f(x) = \frac{x-4}{-4x-16}$



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

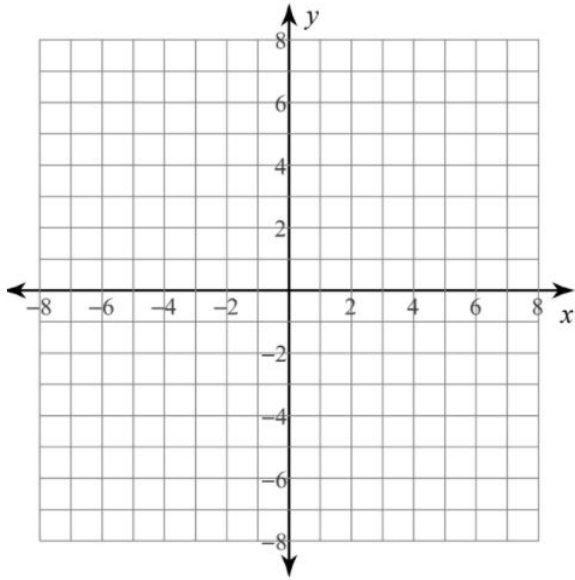
8. $f(x) = \frac{x^3-9x}{3x^2-6x-9}$



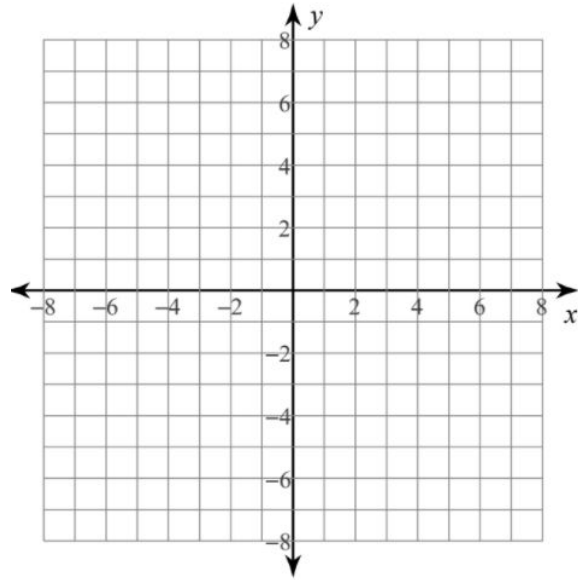
6.8 - More Graphs of Rational Functions

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

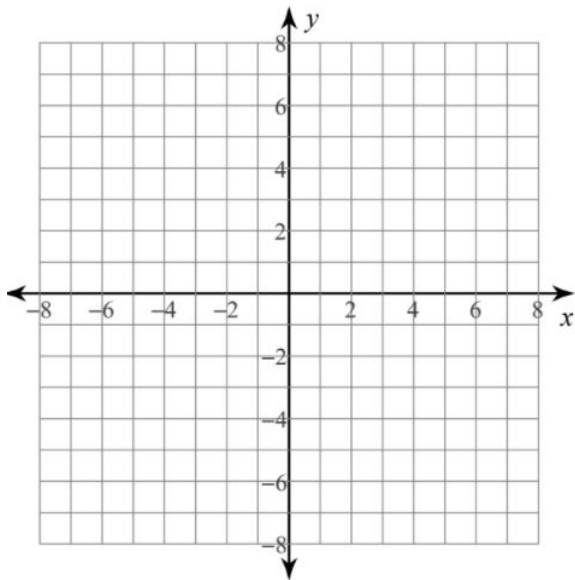
1. $f(x) = \frac{3x^2-12x}{x^2-2x-3}$



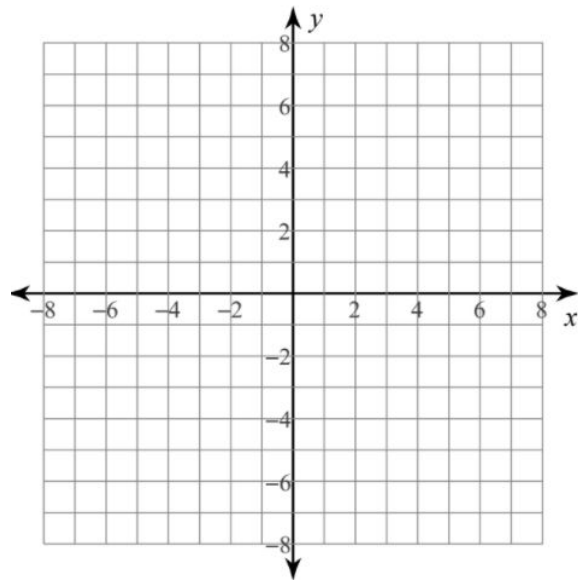
2. $f(x) = \frac{x+2}{2x+6}$



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

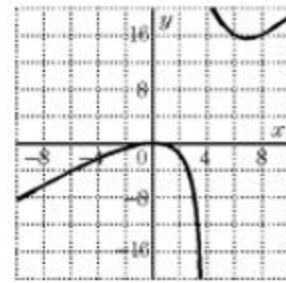
B -6

C 3

D -3

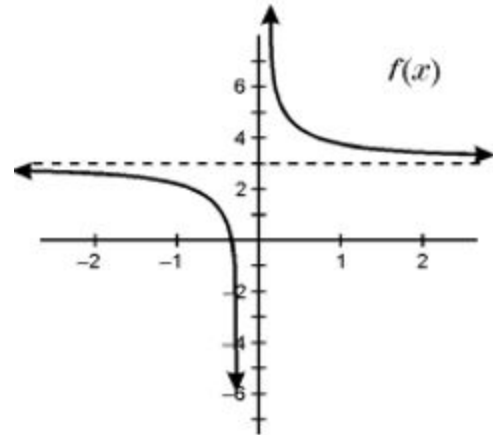
6. Which of the following is the equation of an asymptote for the function graphed?

- 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