

Adv. Algebra 2 – Concept Quiz

Form A

Name: *Key
 Date: _____ Period: _____

21. Graphs of Rational Functions

a) Find the characteristics listed below of the function $f(x) = \frac{x+8}{x^2-5x-14} \cdot \frac{x+8}{(x-7)(x+2)}$

a. Vertical Asymptote $x = 7, -2$

b. End Behavior $y = 0$

c. x-intercept(s) $(-8, 0)$

d. y-intercept $(0, -\frac{4}{7})$

$$\frac{8}{-14} = -\frac{4}{7}$$

b) As x gets larger and larger in the positive and negative direction, the graph of $g(x) = \frac{2x^2-5x-19}{x-4}$ approaches the line $y = 2x + 3$. Explain why this is end behavior of $g(x)$.

As x gets larger & larger, the remainder, $-\frac{7}{x-4}$, starts to approach zero because the denominator gets much larger than the numerator. Thus $y = 2x + 3$ is what the graph starts to approach.

$$\begin{array}{r} 4 \overline{) 2 \ -5 \ -19} \\ \underline{8 \ 12} \\ 2 \ 3 \ \underline{7} \\ 2x + 3 - \frac{7}{x-4} \end{array}$$

22. Solving Rational Equations

a) Find all values of x that make the equation true.

$$\frac{-2}{x-1} = \frac{x-8}{x+1}$$

$$(x+1)(x-1) \cdot \frac{-2}{x-1} = \frac{x-8}{x+1} \cdot (x+1)(x-1)$$

$$-2(x+1) = (x-8)(x-1)$$

$$-2x - 2 = x^2 - 9x + 8$$

$$0 = x^2 - 7x + 10$$

$$\rightarrow (x-5)(x-2) = 0$$

$$\boxed{x = 5, 2}$$

b) How can extraneous solutions arise in the process of solving an equation?

When the solution to a rational equation makes the equation undefined when the solution is substituted back in when you substitute a solution back into an equation and it makes the equation undefined, then a solution is extraneous. This occurs in rational equation when denominator is zero.

23. Multiply and Divide Rational Expressions

$$\frac{x^2-9}{15x^2-45x} \div \frac{x^2+8x+15}{6x^3+30x^2} = \frac{(x+3)(x-3)}{3 \cdot 5x(x-3)} \cdot \frac{3 \cdot 2x \cdot x(x+5)}{(x+5)(x+3)}$$

$$\frac{3}{3} \cdot \frac{x}{x} \cdot \frac{(x+3)}{(x+3)} \cdot \frac{(x-3)}{(x-3)} \cdot \frac{(x+5)}{(x+5)} \cdot \frac{2x}{5}$$

$$\boxed{\frac{2x}{5}}$$

24. Adding and Subtracting Rational Expressions

$$\frac{5x-1}{x^2+2x-8} - \frac{6}{x+4} \rightarrow \frac{5x-1}{(x+4)(x-2)} + \frac{-6}{x+4} \cdot \frac{(x-2)}{(x-2)}$$

$$\frac{5x-1}{(x+4)(x-2)} + \frac{-6x+12}{(x+4)(x-2)}$$

$$\boxed{\frac{-x+11}{(x+4)(x-2)}}$$

Adv. Algebra 2 – Concept Quiz

Form B

Name: *key

Date: _____ Period: _____

21. Graphs of Rational Functions

a) Find the characteristics listed below of the function $f(x) = \frac{x+4}{x^2-7x-18} = \frac{x+4}{(x-9)(x+2)}$

a. Vertical Asymptote $x=9, x=-2$

b. End Behavior $y=0$

c. x-intercept(s) $(-4, 0)$

$$\frac{4}{-18} = \frac{2}{-9}$$

d. y-intercept $(0, -\frac{2}{9})$

b) As x gets larger and larger in the positive and negative direction, the graph of $g(x) = \frac{3x^2-2x-11}{x-4}$ approaches the line $y = 3x + 10$. Explain why this is end behavior of $g(x)$.

22. Solving Rational Equations

a) Find all values of x that make the equation true.

$$\frac{x}{2x+7} = \frac{x-5}{x-1}$$

$$(x-1)(2x+7) \cdot \frac{x}{2x+7} = \frac{x-5}{x-1} \cdot (x-1)(2x+7)$$

$$(x-1) \cdot x = (x-5)(2x+7)$$

$$x^2 - x = 2x^2 + 7x - 10x - 35$$

$$x^2 - 2x - 35 = 0$$

$$(x-7)(x+5) = 0$$

$x = 7, -5$

b) How can extraneous solutions arise in the process of solving an equation?

23. Multiply and Divide Rational Expressions

$$\frac{x^2-25}{6x^2-30x} \div \frac{x^2+7x+10}{9x^3+18x^2} = \frac{(x+5)(x-5)}{3 \cdot 2 \cdot x(x-5)} \cdot \frac{3 \cdot x \cdot x(x+2)}{(x+5)(x+2)}$$

$$\frac{3}{3} \cdot \frac{x}{x} \cdot \frac{(x+5)}{(x+5)} \cdot \frac{(x-5)}{(x-5)} \cdot \frac{(x+2)}{(x+2)} \cdot \frac{3x}{2}$$

$\frac{3x}{2}$

24. Adding and Subtracting Rational Expressions

$$\frac{10}{x^2-5x-14} - \frac{2}{x-7} = \frac{10}{(x-7)(x+2)} + \frac{-2}{(x-7)} \cdot \frac{(x+2)}{(x+2)}$$

$$\frac{10}{(x-7)(x+2)} + \frac{-2x-4}{(x-7)(x+2)} = \frac{-2x+6}{(x-7)(x+2)}$$