UNIT 4 - LESSON 6

READY, SET, GO! Name Period Date

READY

Topic: Identifying extraneous solutions

1. Below is the work done to solve a rational equation. The problem has been worked correctly. Explain why the equation has only **one** solution.	
Solve: $\frac{2}{x^2-2x} - \frac{1}{x-2} = 1$	
$\frac{2}{x(x-2)} - \frac{(x)1}{(x)(x-2)} = 1$	⟵ *Write using a common denominator.*
$\frac{2-x}{(x)(x-2)} = 1$	⟵ *Subtract.*
$(x)(x-2)\frac{2-x}{(x)(x-2)} = 1(x)(x-2)$	⟵ *Multiply both sides by the common denominator.*
$2-x = x^2-2x$	⟵ *Simplify.*
$x^2-x-2=0$	⟵ *Write a quadratic equation in standard form.*
$(x-2)(x+1)=0$	⟵ *Factor*
$x = 2$ *or* $x = -1$	⟵ *Apply the Zero-Product Property and solve for z.*
	⟵ *Substitute 2 and -1 into the original equation to see if the numbers are solutions.*

Substitute the given numbers into the given equation. Identify which are actual solutions and which, if any, are extraneous. • Solutions • Extraneous

2. *a:* -1 *and* $\frac{5}{2}$ $a - \frac{3}{2a+1} = 2$ $-1 - \frac{3}{2(-1)+1} = 2$ $-1+3=2$ $2=2$ $\frac{5}{2} - \frac{3}{2(\frac{5}{2})+1} = 2$ $\frac{5}{2} - \frac{3}{6} = 2$ $2=2$ ✓	3. *d: 0 and 3* $\frac{3d}{d^2-d} - \frac{1}{d-1} = 1$ 0 makes 1st denom = 0 $\frac{3(3)}{3^2-3} - \frac{1}{3-1} = 1$ $\frac{9}{6} - \frac{1}{2} = 1$ $1=1$ ✓	4. *m:* 1 $\frac{1}{m^2-m} - \frac{1}{m-1} = 0$ 1 makes both denom. = 1
Solve 5 and 6. Watch for extraneous solutions.	5. $\frac{1}{x^2-x} - \frac{1}{x-1} = \frac{1}{2}$	6. $2x + \frac{3}{x+2} = 1$

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

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

$2-2x = x^2-x$

$0 = x^2+x-2$

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

$x=-2$ $x=1$ Extraneous

$\therefore x=-2$

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

$\frac{2x^2+4x+3}{x+2} = 1\cdot x+2$

$2x^2+4x+3 = x+2$

$2x^2+3x+1=0$

$(2x+1)(x+1)=0$

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

SET

Topic: Predicting and sketching rational functions

Find the asymptote(s) and intercepts. Then sketch the graph. (Do not use technology to get the graph. The max and mins do not need to be accurate.)

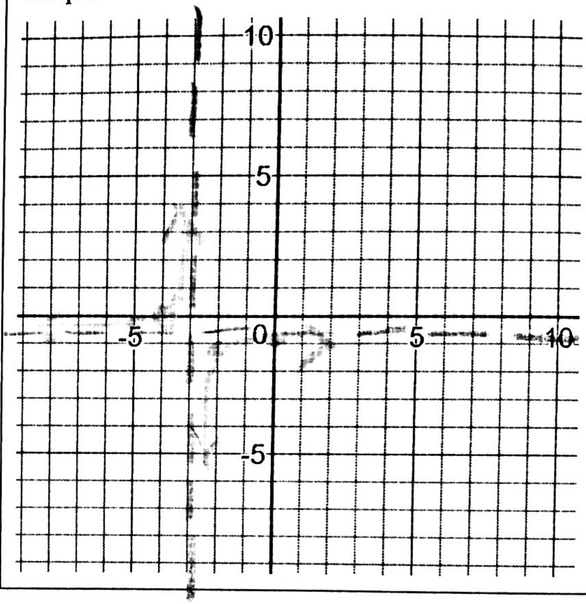
5.

$$y = \frac{(x+4)}{(-2x-6)} = \frac{x+4}{-2(x+3)}$$

Asymptote(s): Vertical $x=-3$
Horizontal $y=-1/2$

Intercepts: x-int $(-4,0)$
y-int $(0,-2/3)$

Graph:



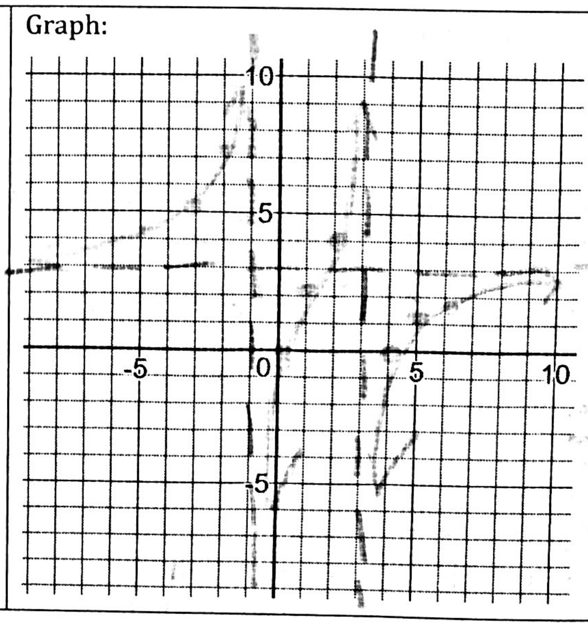
6.

$$y = \frac{3x}{(x-3)} \cdot \frac{(x-4)}{(x+1)}$$

Asymptote(s): Vertical $x=3$, $x=-1$
Horizontal $y=3$

Intercepts: x-int $(0,0)$ $(4,0)$
y-int $(0,0)$

Graph:



$4x^2 - 16 \overline{) x^3 + 0x^2 - 16x + 0}$ quotient $\frac{1}{4}x$

$-(x^3 \quad + 4x)$

$-12x + 0$

$\frac{1}{4}x - \frac{12x}{4x^2 - 16}$

7H.

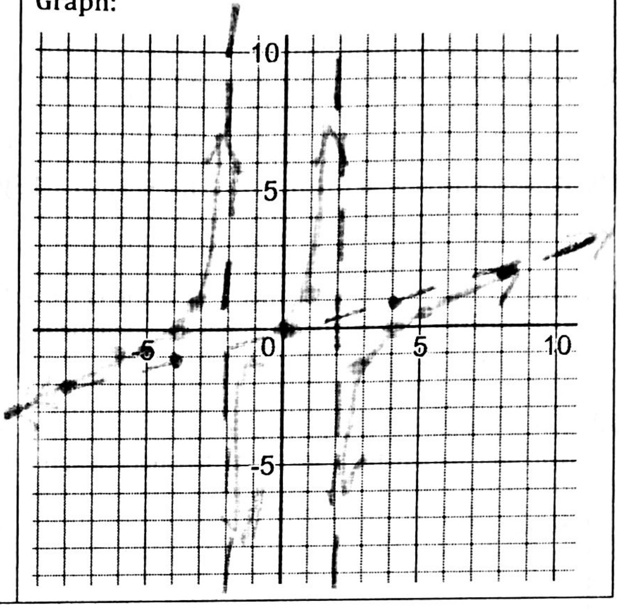
$$y = \frac{(x^2 - 4x)}{(4x - 8)} \div \frac{(x + 2)}{x + 4}$$

$y = \frac{x(x-4)}{4(x-2)} \cdot \frac{x+4}{x+2}$

Asymptote(s):
Vertical $x = 2, x = -2$
Slant $y = \frac{1}{4}x$

Intercepts:
x-int $(0,0)(4,0)(-4,0)$
y-int $(0,0)$

Graph:



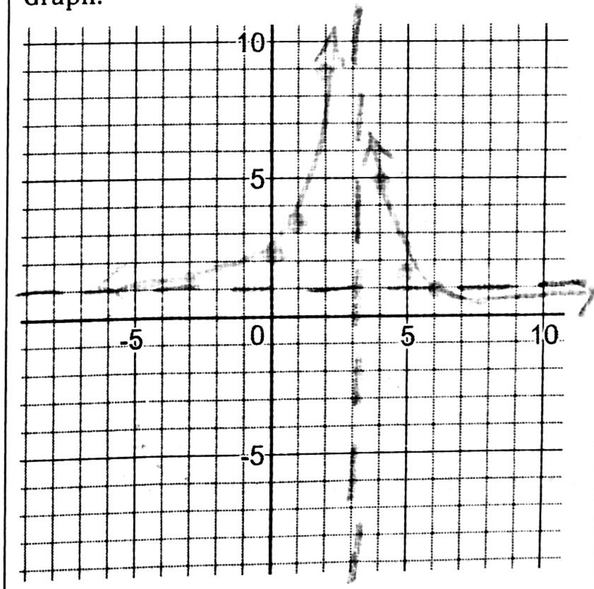
* **8H.**

$$y = \frac{(x - 6)}{(x - 3)} + \frac{(x + 3)}{x^2 - 6x + 9}$$

Asymptote(s): Vertical $x = 3$
Horizontal $y = 1$

Intercepts: x-int: None
y-int: $(0, 7/3)$

Graph:



$y = \frac{(x-6)(x-3)}{(x-3)(x-3)} + \frac{x+3}{(x-3)(x-3)}$

$= \frac{x^2 - 9x + 18 + x + 3}{(x-3)(x-3)} = \frac{x^2 - 8x + 21}{(x-3)(x-3)}$

$x = \frac{8 \pm \sqrt{64 - 84}}{2}$ Imag.

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GO

Topic: Exploring linear equations

9. What value of k in the equation $kx + 10 = 6y$ would give a line with slope -3?

$\frac{kx+10}{6} = y$ Slope: $\frac{k}{6} = -3 \cdot 6$ $k = -18$

10. What value of k in the equation $kx - 12 = -15y$ would give a line with slope $\frac{2}{5}$?

$\frac{kx}{-15} - \frac{12}{-15} = y$ Slope: $-15 \cdot \frac{k}{-15} = \frac{2}{5} \cdot -15$ $k = -6$

11. The standard form of a linear equation is $Ax + By = C$. Rewrite this equation in slope – intercept form. What is the slope? What is the y – intercept?

$By = -Ax + C$

$y = -\frac{A}{B}x + \frac{C}{B}$

$y = -\frac{A}{B}x + \frac{C}{B}$ $m = -\frac{A}{B}$ $b = \frac{C}{B}$

12. If b is the y – intercept of a linear function whose graph has slope m, then $y = mx + b$ describes the line. Below is an incomplete justification of this statement. Fill in the missing information.

Statements	Reasons
1. $m = \frac{y_2 - y_1}{x_2 - x_1}$	1. slope formula
2. $m = \frac{y-b}{x-0}$	2. By definition, if b is the y – intercept, then (0, b) is a point on the line. (x, y) is any other point on the line.
3. $m = \frac{y-b}{x}$	3. ? Substitution Property of Equality $(x-0=x)$
4. $m \cdot x = y - b$	4. Multiplication Property of Equality (Multiply both sides of the equation by x.)
5. $mx + b = y, or\ y = mx + b$	5. ? Addition Property of Equality (Add b to both sides)