A2 UNIT 5 REVIEW #1 Name_____

Polynomial Expressions/Functions Date_____ Pd___

1) FACTOR completely, if possible.

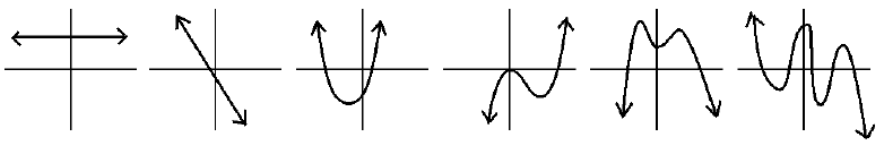
a) $4x^3 - 25x^2 + 25x$ Max # of turning Pts. __	b) $x^2 + 9$ Max # of turning Pts. __	c) $2x^3 - 3x^2 + 10x - 15$	d) $8x^3 - 1$
e) $2x^2 - 32$	f) $-5x^2 + 18x - 9$	g) $2x^4 + 7x^2 + 6$ Max # of turning Pts. __	h) $x^5 - x^3 + 64x^2 - 64$ Max # of turning Pts. __

2) Find the indicated characteristics

a. State the end behavior. In terms of infinity $f(x) = x^3(3x+1)(x-6)$ Sign (a) _____ Degree _____ _____ _____ (arrows) • End Behavior (arrows) $x \to$ _____, $y \to$ _____ $x \to$ _____, $y \to$ _____ • y-intercept: _____ $f(0) =$ ____	b. State the end behavior. In terms of infinity $f(x) = x^2 - 3x^4 - 5x^6$ Sign (a) _____ Degree _____ _____ _____ (arrows) • End Behavior (arrows) $x \to$ _____, $y \to$ _____ $x \to$ _____, $y \to$ _____ • y-intercept: _____ $f(0) =$ ____	c. Find the zeros & state the multiplicity of each zero & if each Bounces or Crosses at the x-axis $f(x) = (x+2)^2(x-2)$	d. Find the zeros & state the multiplicity of each zero & if each Bounces or Crosses at the x-axis $y = 18x - 9x^2 - 2x^3$

- A graph "crosses" the x-axis at a zero if the multiplicity of that zero is _____.
- A graph "bounces" off the x-axis at a zero if the multiplicity of that zero is _____.

- A polynomial's graph can have AT MOST 1 fewer turning points than its degree.

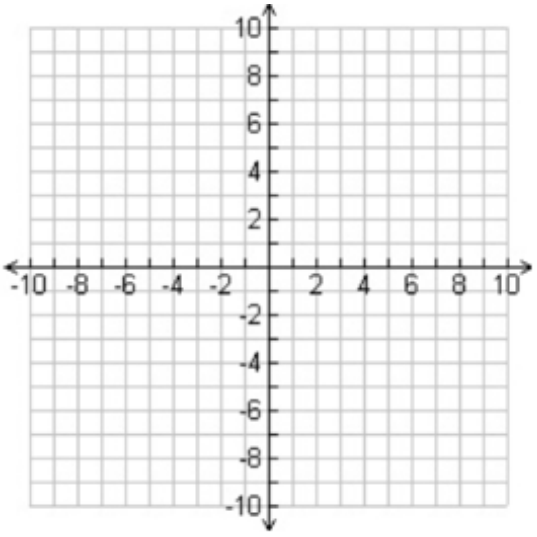


degree = 0 'constant' | degree = 1 'linear' | degree = 2 'quadratic' | degree = 3 'cubic' | degree = 4 'quartic' | degree = 5 'quintic'

3) Sketch the following polynomial functions

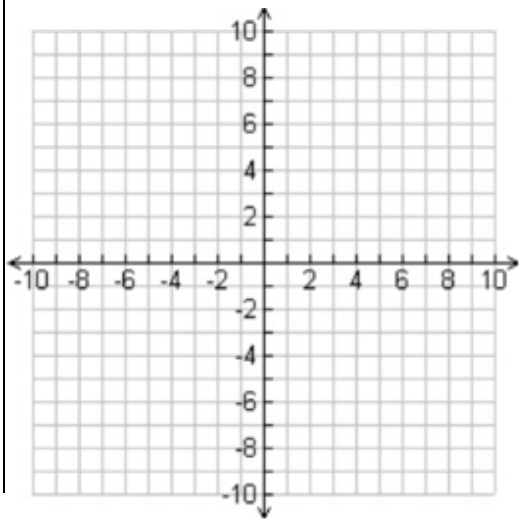
A) $f(x) = -x^3 - 2x^2 + 4x + 8$

x-int	
multiplicities	
y-int	
Domain	
Range	
Sign on a (leading Coeff)	
Degree (even or odd)	
Max # of Turning Pts.	
End Behavior	



B) $g(x) = x(x-3)(x+4)^2$

x-int	
multiplicities	
y-int	
Domain	
Range	Skip here
Sign on a (leading Coeff)	
Degree (even or odd)	
Max # of Turning Pts.	
End Behavior	



Rational Functions/Expressions

4) (a & b) Simplify and state the excluded values. (c & d) Perform the indicated operation and simplify.

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

b. $\frac{x^2-9}{x^3+3x^2}$

c. $\frac{4x}{x+1} \cdot \frac{x^2-6x-7}{x^2-7x}$

d. $\dfrac{\frac{x^2-x-12}{4x+12}}{\frac{x^2+x-20}{3x+15}}$

5) Simplify *(remember to factor when necessary)*. State Restrictions.

a. $\dfrac{120x^3y}{25xy^5}$ b. $\dfrac{x^2+9x+20}{2x+8}$ c. $\dfrac{x^2-x-12}{x^2-2x-8}$

6) Multiply or divide *(remember to factor when necessary). State Restrictions.*

A. $\dfrac{5n+15}{4n+8}\cdot\dfrac{2n+4}{3n+9}$ B. $\dfrac{x^2-x-12}{x-4}\div\dfrac{2x+6}{x-5}$ C. $\dfrac{x+3}{10x+20}\cdot\dfrac{x+2}{x^2+4x+3}$

RECALL

To Add or Subtract Two Fractions	
$\dfrac{a}{c}+\dfrac{b}{c}=\dfrac{a+b}{c},\ c\neq 0$	$\dfrac{a}{c}-\dfrac{b}{c}=\dfrac{a-b}{c},\ c\neq 0$

To Find the Least Common Denominator of Rational Expressions
1. Factor each denominator completely. Any factors that occur more than once should be expressed as powers. For example, $(x-3)(x-3)$ should be expressed as $(x-3)^2$
2. List all different factors (other than 1) that appear in any of the denominators. When the same factor appears in more than one denominator, write that factor with the highest power that appears.
3. The least common denominator is the product of all the factors listed in step 2.

Adding or Subtracting Rational Expressions
Step 1 Identify a common denominator.
Step 2 Multiply each expression by an appropriate form of 1 so that each term has the common denominator as its denominator.
Step 3 Write each expression using the common denominator.
Step 4 Add or subtract the numerators, combining like terms as needed.
Step 5 Factor as needed.
Step 6 Simplify as needed.

7) Add or subtract these rational expressions. State restrictions.

A. $\dfrac{5}{12x}-\dfrac{3}{4}$ B. $\dfrac{5}{x+1}-\dfrac{3}{x-4}$ C. $\dfrac{4}{7x-35}+\dfrac{5}{x-5}$

8) Solve each equation for x. SHOW WORK!

A. $\dfrac{3x}{x+7}-\dfrac{8}{2(x+7)}=\dfrac{-22}{x+7}$ B. $\dfrac{2}{x-6}+\dfrac{7}{x+2}=\dfrac{4x+2}{x^2-4x-12}$ C. $\dfrac{1}{x}+\dfrac{3}{x-1}=0$

9) Find the x-intercepts

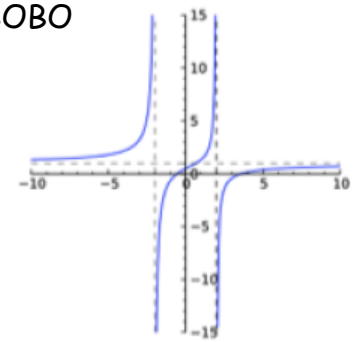
a)	b)	c)	d)
$y=\frac{7x}{x+5}$	$g(x)=\frac{5}{x}$	$y=\frac{x^2+3x}{x^2-16}$	$f(x)=\frac{x^2-x-12}{x^2-2x-8}$

10) Find The Domain

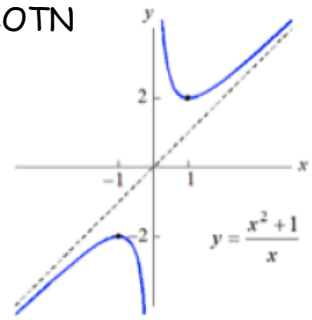
a)	b)	c)	d)
$f(x)=\frac{x^2+x-12}{6x^2+x-12}$	$g(x)=\frac{x^2-9}{x^3-4x}$	$y=\frac{(x-1)(4x+4)}{(x-3)(x-4)}$	$h(x)=\frac{x-2}{x}$

Three examples of BOBO, BOTN, EATS DC

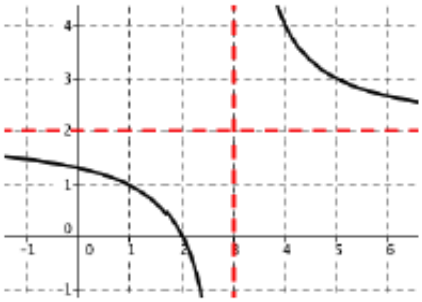
BOBO



BOTN



EATS DC



11) Find the Horizontal Asymptote

a)	b)	c)
$y=\frac{16x+1}{4x^2-2}$	$y=\frac{16x^2+1}{4x^2-2}$	$y=\frac{16x^2+1}{4x-2}$

12) Find the vertical asymptotes, if any.

a)	b)	c)	d)
$y=\frac{x}{3x^2-2x-8}$	$y=\frac{x+1}{x^2+16x+15}$	$y=\frac{x^2}{x^2+9}$	$y=\frac{6x}{x-7}$

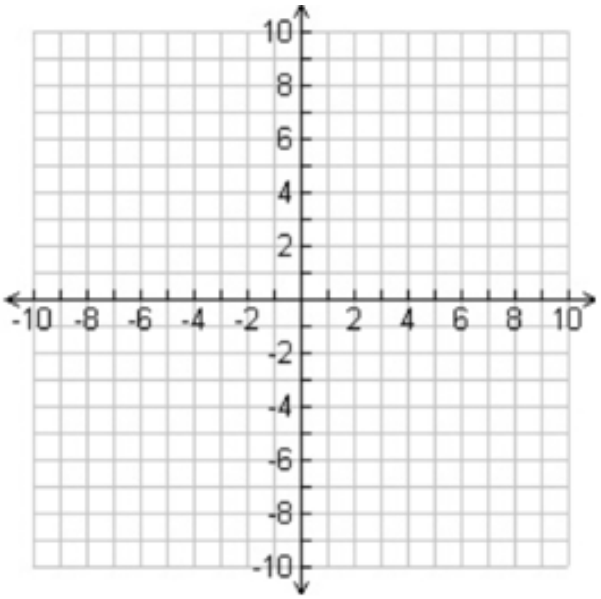
13) Find all holes, if any.

a) $f(x)=\frac{9-x^2}{x+3}$	b) $y=\frac{x+5}{5x^2-3x-2}$	c) $y=\frac{5x^2-9x-18}{x^2-3x}$	d) $y=\frac{x^3+x^2+3x+3}{x^2-1}$

14) Sketch the following rational equations

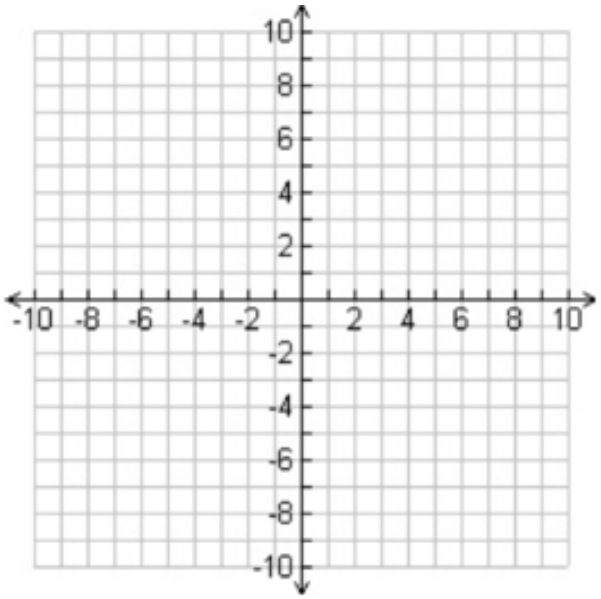
A) $y=\frac{x-4}{2x^2-8x}$

x-int	
y-int	
VA	
HA	
Holes	
Domain	
Range	
End Behavior	



B) $y=\frac{2x^2-6x-8}{-x^2+25}$

x-int	
y-int	
VA	
HA	
Holes	
Domain	
Range	
End Behavior	



15) Find the Least Common Multiple for each of the following pairs of expressions:

a) $4x^2 - 16 \ AND \ 6x^2 - 24x + 24$

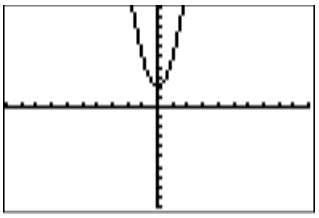
LCM _____

b) $x^2 + 5x + 6 \ AND \ x^2 + 6x + 8$

LCM _____

16) For each POLYNOMIAL sketch below, state the following:
the number of real zeros, whether the sign of the leading coefficient (a) is positive or negative, the least possible degree and if that value is even or odd.

A)



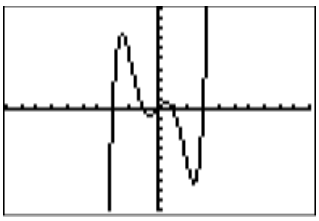
Number of Real Zeros _____

Sign of L.C. (a) _____

Least Possible Degree _____

Even or Odd _____

B)



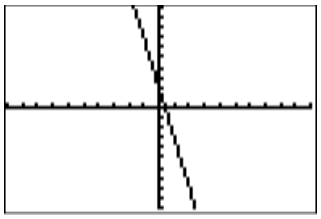
Number of Real Zeros _____

Sign of L.C. (a) _____

Least Possible Degree _____

Even or Odd _____

C)



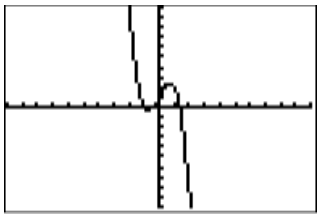
Number of Real Zeros _____

Sign of L.C. (a) _____

Least Possible Degree _____

Even or Odd _____

D)



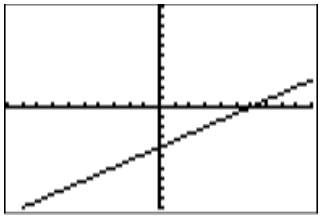
Number of Real Zeros _____

Sign of L.C. (a) _____

Least Possible Degree _____

Even or Odd _____

E)



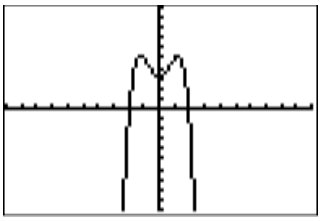
Number of Real Zeros _____

Sign of L.C. (a) _____

Least Possible Degree _____

Even or Odd _____

F)



Number of Real Zeros _____

Sign of L.C. (a) _____

Least Possible Degree _____

Even or Odd _____