

Algebra 3-4  
Unit 6 Polynomial REVIEW

Name: Key Per: \_\_\_\_\_  
Date: 8-19

1. Sketch a graph of each polynomial.

a)  $f(x) = 3x(x + 4)^4(x - 3)^3$

b)  $f(x) = (x + 4)^2(x + 1)^3$

c)  $f(x) = -2(x + 6)^3(x + 1)^2$

End Behavior: positive/up

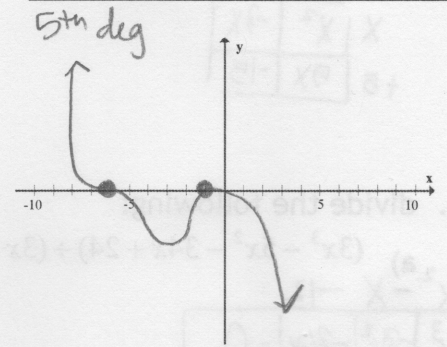
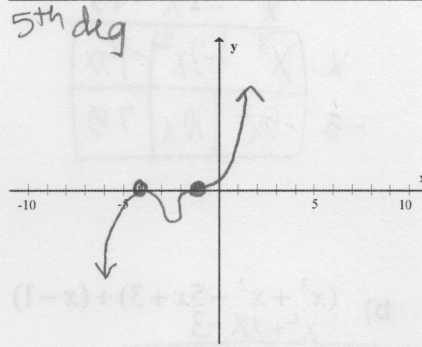
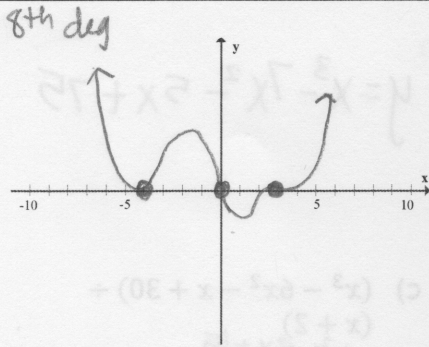
End Behavior: positive/up

End Behavior: negative/down

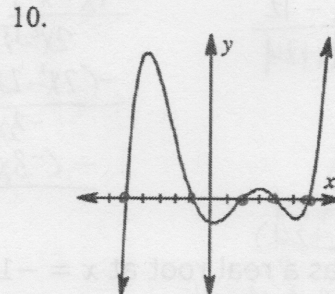
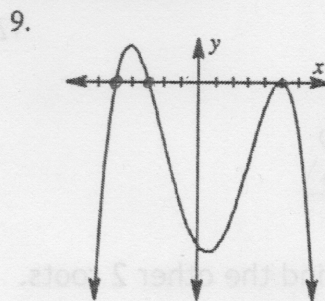
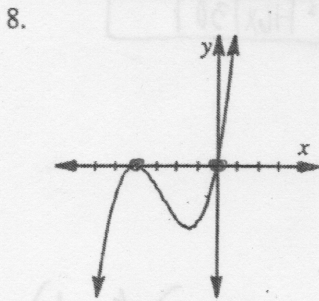
Zeroes	0	-4	3
Mult.	1	4	3

Zeroes	-4	-1	
Mult.	2	3	3

Zeroes	-6	-1	
Mult.	3	2	



2. Write an equation for each polynomial.

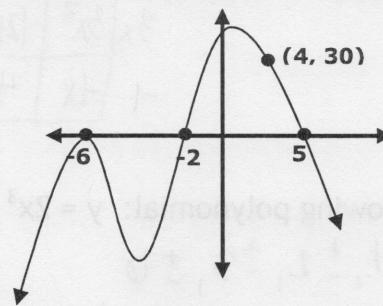
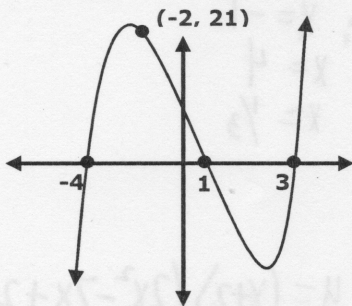


$y = (x + 4)^2(x)$

$y = -(x + 5)(x + 3)(x - 5)^2$

$y = (x + 5)(x + 1)(x - 2)(x - 4)(x - 6)$

3. Write the exact equation of each of the following polynomials.



$y = a(x + 4)(x - 1)(x - 3)$

$21 = a(-2 + 4)(-2 - 1)(-2 - 3)$

$21 = a(2)(-3)(-9)$

$21 = a(30)$

$\frac{21}{30} = a = \frac{7}{10}$

$y = \frac{7}{10}(x + 4)(x - 1)(x - 3)$

$y = a(x + 6)^2(x + 2)(x - 5)$

$30 = a(4 + 6)^2(4 + 2)(4 - 5)$

$30 = a(10)^2(6)(-1)$

$30 = a(-600)$

$\frac{-30}{600} = a = \frac{-3}{60} = \frac{-1}{20}$

$y = \frac{-1}{20}(x + 6)^2(x + 2)(x - 5)$

4. Find the exact equation of a polynomial with roots at 3, 4, and -2, passing through the point (-1, 28).

$$y = a(x-3)(x-4)(x+2) \quad 28 = a(20)$$

$$28 = a(-1-3)(-1-4)(-1+2) \quad \frac{28}{20} = a = \frac{7}{5}$$

$$28 = a(-4)(-5)(1) \quad y = \frac{7}{5}(x-3)(x-4)(x+2)$$

5. Find the cubic equation in standard form with zeros at  $x=3$ ,  $x=-5$ , and  $x=5$ .

$$y = (x-3)(x+5)(x-5)$$

	$x-3$	
$x$	$x^2$	$-3x$
$+5$	$5x$	$-15$

$$y = (x^2+2x-15)(x-5)$$

	$x^2$	$-2x$	$-15$
$x$	$x^3$	$-2x^2$	$-15x$
$-5$	$-5x^2$	$10x$	$75$

$$y = x^3 - 7x^2 - 5x + 75$$

6. divide the following:

a)  $(3x^3 - 5x^2 - 34x + 24) \div (3x - 2)$

$x^2$	$-x$	$-12$		
$3x$	$3x^3$	$-3x^2$	$-36x$	$0$
$-2$	$-2x^2$	$2x$	$24$	

$$\begin{array}{r} x^2 - x - 12 \\ 3x-2 \overline{) 3x^3 - 5x^2 - 34x + 24} \\ \underline{-(3x^3 - 2x^2)} \phantom{+ 24} \\ -3x^2 - 34x \phantom{+ 24} \\ \underline{-(-9x^2 + 2x)} \phantom{+ 24} \\ -36x + 24 \\ \underline{-(-36x + 24)} \\ 0 \end{array}$$

b)  $(x^3 + x^2 - 5x + 3) \div (x - 1)$

	$x^2$	$+2x$	$-3$	
$x-1$	$x^3$	$+x^2$	$-5x$	$+3$
	$-(x^3 - x^2)$			
	$2x^2 - 5x$			
	$-(2x^2 - 2x)$			
	$-3x + 3$			
	$-(-3x + 3)$			
	$0$			

c)  $(x^3 - 6x^2 - x + 30) \div (x + 2)$

	$x^2$	$-8x$	$+15$	
$x$	$x^3$	$-8x^2$	$+9x$	$0$
$+2$	$2x^2$	$+16x$	$30$	

7.  $3x^3 - 10x^2 - 9x + 4$  has a real root at  $x = -1$ . Find the other 2 roots.

	$3x^2$	$-13x$	$+4$	
$x+1$	$3x^3$	$-10x^2$	$-9x$	$+4$
	$-(3x^3 + 3x^2)$			
	$-13x^2 - 9x$			
	$-(-13x^2 - 13x)$			
	$4x + 4$			
	$-(4x + 4)$			
	$0$			

$$y = (x+1)(3x^2 - 13x + 4) = (x+1)(x-4)(3x-1)$$

	$x$	$-4$
$3x$	$3x^2$	$-12x$
$-1$	$-1x$	$4$

roots:  $x = -1$   
 $x = 4$   
 $x = \frac{1}{3}$

8. Find all roots for the following polynomial:  $y = 2x^3 - 3x^2 - 11x + 6$

ends in 6  $\rightarrow$  try:  $\pm 1, \pm 2, \pm 3, \pm 6$

$x=1 \rightarrow (x-1)$	$2x^2$	$-1x$	$-12$	
$x$	$2x^3$	$-1x^2$	$-12x$	$-6$
$-1$	$-2x^2$	$1x$	$12$	

$x=-1 \rightarrow (x+1)$	$2x^2$	$-5x$	$-6$	
$x$	$2x^3$	$-5x^2$	$-6x$	$12$
$+1$	$2x^2$	$-5x$	$-6$	

$x=2 \rightarrow (x-2)$	$2x^2$	$-9x$	$-9$	
$x$	$2x^3$	$-9x^2$	$-9x$	
$-2$	$-4x^2$	$-2x$	$18$	

$x=-2 \rightarrow (x+2)$	$2x^2$	$-7x$	$3$	
$x$	$2x^3$	$-7x^2$	$3x$	
$+2$	$4x^2$	$-14x$	$6$	

$$y = (x+2)(2x^2 - 7x + 3)$$

	$2x$	$-1$	
$x$	$2x^2$	$-1x$	$m: 6$
$-3$	$-6x$	$3$	$a: -7$

$$y = (x+2)(2x-1)(x-3)$$

roots:  $x = -2$   $x = \frac{1}{2}$   $x = 3$