

Pre-Calculus Worksheet

Name: Key

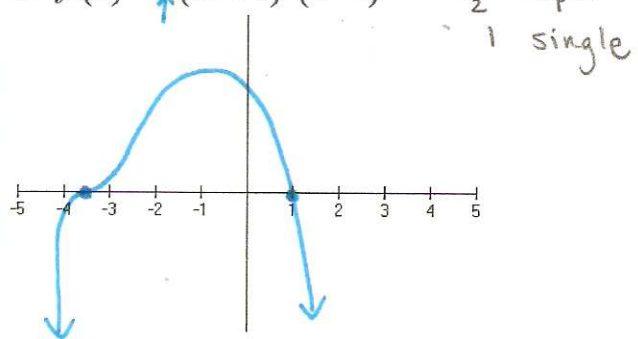
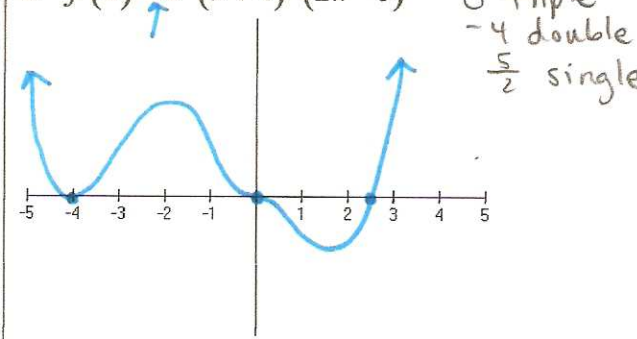
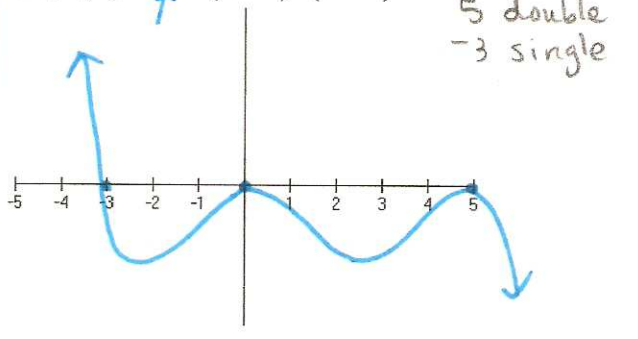
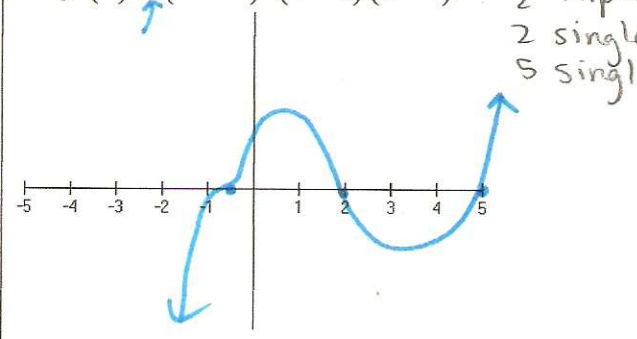
Section 2.2 - Polynomial Functions DAY TWO

Period: \_\_\_\_\_

I. Use a graphing utility to graph the function. Then find the requested information.

<p>1. <math>f(x) = x^4 + x^3 - 3x^2 - 5x - 2</math></p> <p># Relative Extrema: <u>1</u></p> <p>Real Zeroes (and their multiplicity): <math>\uparrow \uparrow</math></p> <p>-1 triple root</p> <p>2 single root</p> <p>Factored Form of Function:</p> <p><math>f(x) = + (x+1)^3 (x-2)</math></p>	<p>2. <math>f(x) = -2x^5 + x^4 + 20x^3 + 29x^2 + 12x</math></p> <p># Relative Extrema: <u>4</u> <math>\uparrow \downarrow</math></p> <p>Real Zeroes (and their multiplicity):</p> <p>-1 double root <math>-\frac{3}{2}</math> single root</p> <p>0 single root</p> <p>4 single root</p> <p>Factored Form of Function:</p> <p><math>f(x) = -x(x+1)^2(x-4)(2x+3)</math></p>
<p>3. <math>f(x) = x^5 + 4x^4 - 18x^3 - 108x^2 - 135x</math></p> <p># Relative Extrema: <u>2</u></p> <p>Real Zeroes (and their multiplicity): <math>\downarrow \uparrow</math></p> <p>0 single root</p> <p>-3 triple root</p> <p>5 single root</p> <p>Factored Form of Function:</p> <p><math>f(x) = + x(x+3)^3(x-5)</math></p>	<p>4. <math>f(x) = -2x^4 + 7x^3 + 5x^2 - 19x - 15</math></p> <p># Relative Extrema: <u>3</u> <math>\downarrow \downarrow</math></p> <p>Real Zeroes (and their multiplicity):</p> <p>-1 double</p> <p>3 single</p> <p><math>\frac{5}{2}</math> single</p> <p>Factored Form of Function:</p> <p><math>f(x) = - (x+1)^2(x-3)(2x-5)</math></p>

II. Sketch a graph of the function WITHOUT using the calculator.

<p>5. <math>f(x) = -\frac{1}{2}(2x+7)^3(x-1)</math> <math>-\frac{7}{2}</math> triple</p> <p>1 single</p> 	<p>6. <math>f(x) = \frac{1}{2}x^3(x+4)^2(2x-5)</math> 0 triple</p> <p>-4 double</p> <p><math>\frac{5}{2}</math> single</p> 
<p>7. <math>f(x) = -x^2(x-5)^2(x+3)</math> 0 double</p> <p>5 double</p> <p>-3 single</p> 	<p>8. <math>f(x) = \frac{1}{2}(2x+1)^3(x-2)(x-5)</math> <math>-\frac{1}{2}</math> triple</p> <p>2 single</p> <p>5 single</p> 

III. Determine a possible equation for the polynomial (in factored form) given the graph.

9.

single, 0 single, 3 single, 5 single

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

10.

-3 double, 1/2 double, 3 double

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

11.

-3/2 single, 0 triple, 2 single

$f(x) = -x^3 (2x+3)(x-2)$

12.

0 single, 2 triple, 5 double

$f(x) = -x(x-2)^3(x-5)^2$

IV. Miscellaneous Problems. My favorite. ☺

13. Find all the zeros for...

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

0 single, -3 triple, 8 single

14. Find all the zeros for...

$f(x) = x^5 - 37x^3 + 36x$  by factoring.

$0 = x(x^4 - 37x^2 + 36)$   
 $0 = x(x^2 - 36)(x^2 - 1)$   
 $0 = x(x-6)(x+6)(x+1)(x-1)$

$x = 0, \pm 1, \pm 6$

15. Write a possible equation for a polynomial with a degree of 6 and having 5 as a triple root, -2 as a double root, and 3 as a single root (in factored form).

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

16. Write a possible equation for a polynomial with a negative leading coefficient and an even degree (in factored form).

for example...

$f(x) = -(x+4)^2(x-6)^2$