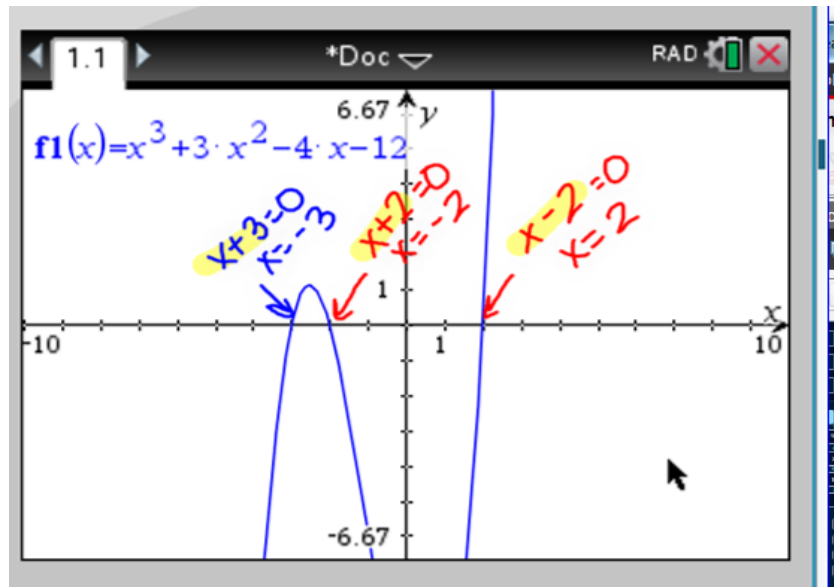


Questions on 3.7 HW?

Look over pgs.32-33 and finish
those questions up.



For each, one factor of a cubic function is given. Do your best to find the remaining factors and then use this information to determine all roots of the function and sketch a graph.

4. Function: $f(x) = x^3 + 3x^2 - 4x - 12$ Factor: $(x + 3)$ ● mult. to -12 Roots of function: $x = -3, 2, 2$

$$(x + 3)(x + 2)(x - 2)$$

$$(x + 3)(x^2 - 2x + 2x - 4)$$

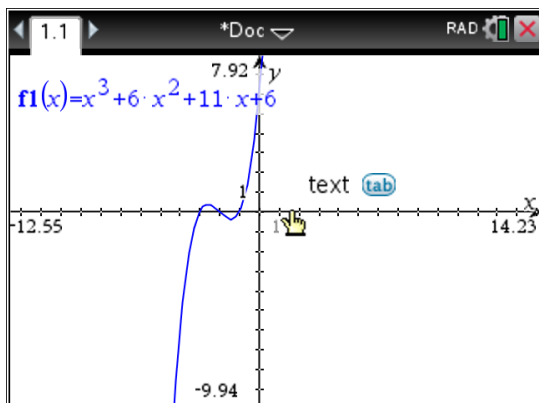
$$(x + 3)(x^2 - 4)$$

$$x^3 - 4x + 3x^2 - 12 = x^3 + 3x^2 - 4x - 12$$

● mult. to leading term w/ highest power of x .
 $-12 \div 3 = -4$

5. Function: $f(x) = x^3 + 6x^2 + 11x + 6$ Factor: $(x + 1)$ Roots of function:

$$0 = (x + 1)(x + 2)(x + 3) \quad x = -1, -2, -3$$



$6 \div 1 = 6$
 $2, 3$
 $-2, -3$
 $6, 1$
 $-6, -1$

$$i = \sqrt{-1} \quad i^2 = -1$$

7. Function: $f(x) = x^3 - x^2 + 4x - 4$ Factor: $(x - 2i)$

$$(x - 2i)(x + 2i)(x - 1)$$

Roots of function:
 $x = 2i, -2i,$

$$2i(-2i) = -4i^2 \\ = -4 \cdot -1 = 4$$

8. Function: $f(x) = x^3 - 3x^2 - 3x - 9$ Factor: $(x - 3)$

Roots of function:

9. Find all linear factors and graph: $f(x) = x^4 - 16$

Roots of function:

$$(x^2 + 4)(x^2 - 4)$$

$$x = -2i, 2i, -2, 2$$

$$(x + 2i)(x - 2i)(x + 2)(x - 2)$$

Part II: Given the roots, find the factors and write the polynomial equation in standard form.

10. Roots: 3, -4, and 0 $\rightarrow x(x - 3)(x + 4)$

$$(x^2 - 3x)(x + 4) = x^3 + 4x^2 - 3x^2 - 12x$$

$$= x^3 + x^2 - 12x$$

11. Roots: 5, 2i, -2i

$$(x - 5)(x - 2i)(x + 2i) =$$

$$(x - 5)(x^2 + 2ix - 2ix - 4i^2) =$$

$$(x - 5)(x^2 + 4) =$$

$$x^3 + 4x - 5x^2 - 20 =$$

$$x^3 - 5x^2 + 4x - 20$$

12. Roots: $\sqrt{3}, -\sqrt{3}, -2$

$$(x - \sqrt{3})(x + \sqrt{3})(x + 2)$$

$$(x^2 + x\sqrt{3} - x\sqrt{3} - 3)(x + 2)$$

$$(x^2 - 3)(x + 2) = x^3 + 2x^2 - 3x - 6$$

13. Find the factored form of the cubic function with roots 2, 3i and $-3i$

$$(x - 2)(x - 3i)(x + 3i)$$

$$(x - 2)(x^2 + 3xi - 3xi - 9i^2)$$

$$(x - 2)(x^2 + 9)$$

$$x^3 + 9x - 2x^2 - 18$$

$$x^3 - 2x^2 + 9x - 18$$

14. Conclusion: What have you learned about polynomial functions as a result of this task?

3.8 I Know, What do you know?

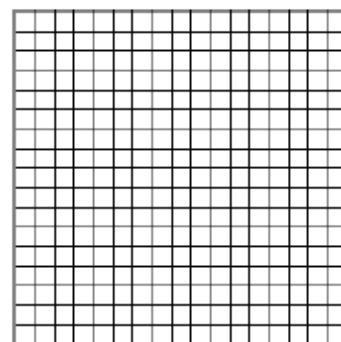
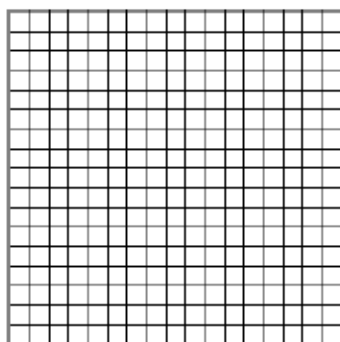
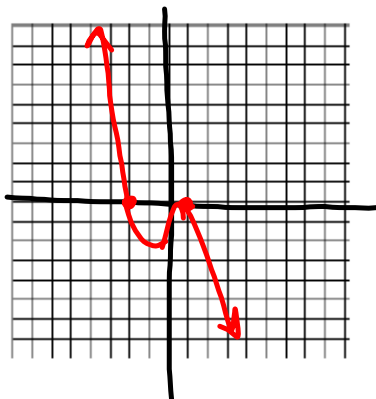
A Practice Understanding Task

Use the information provided to graph and write out the polynomial function in factored form.

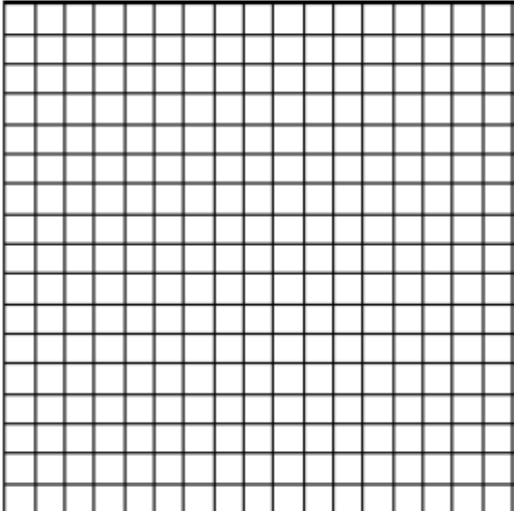


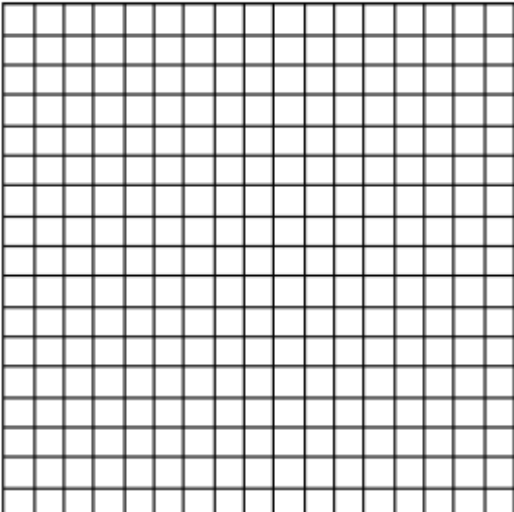
<http://www.flickr.com/photos/chrisbrenschm>

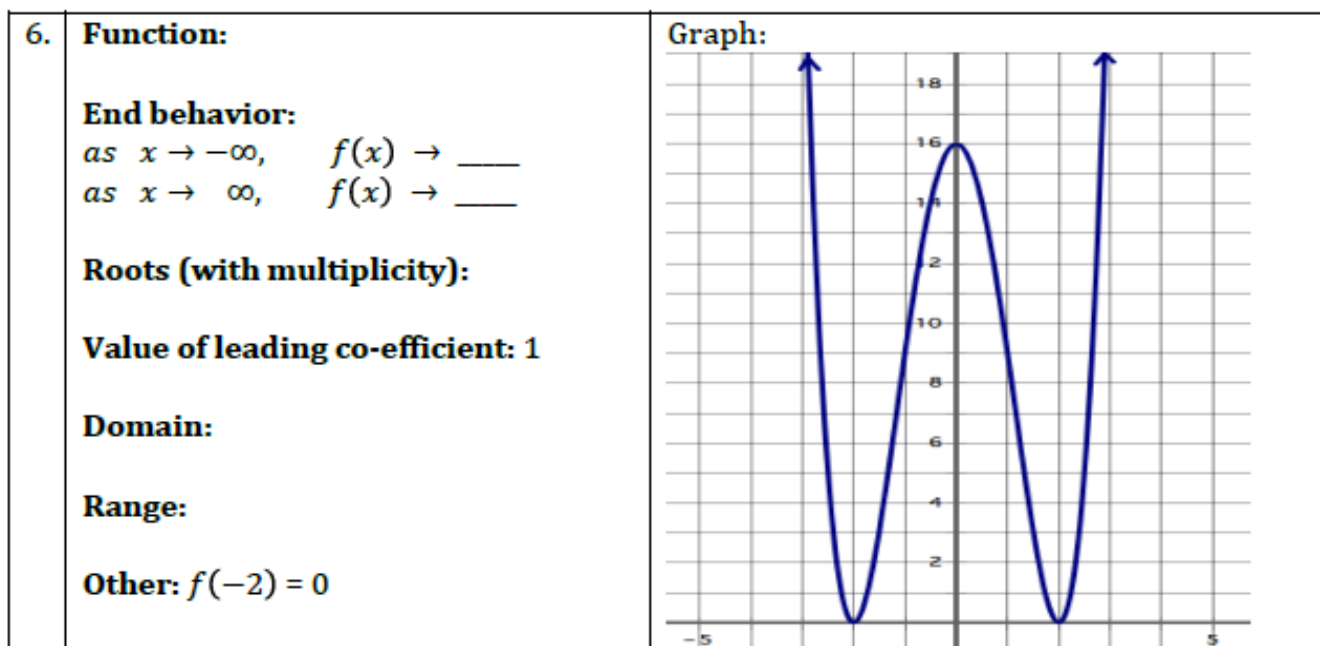
	Degree of poly	Given roots (you may have to determine others):	Leading coefficient	Equation (in factored and standard form):
1	3	-2, 1, and 1	-2	$-2(x+2)(x-1)^2 =$
2	4	$2+i, 4, 0$	1	$x(x-4)(x+2+i)(x+2-i) =$
3	2	$\sqrt{2}$	-1	$-1(x-\sqrt{2})(x+\sqrt{2}) =$



If I know... What do you know? For each problem, what I know about a function is given... your job is to complete the table of information with what you know.

<p>4. Function: $f(x) = 2(x - 1)(x + 3)^2$</p> <p>End behavior: as $x \rightarrow -\infty$, $f(x) \rightarrow \underline{\hspace{2cm}}$ as $x \rightarrow \infty$, $f(x) \rightarrow \underline{\hspace{2cm}}$</p> <p>Roots (with multiplicity):</p> <p>Value of leading co-efficient:</p> <p>Domain:</p> <p>Range: All Real numbers</p>	<p>Graph:</p> 
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<p>5. Function:</p> <p>End behavior: as $x \rightarrow -\infty$, $f(x) \rightarrow \infty$ as $x \rightarrow \infty$, $f(x) \rightarrow \underline{\hspace{2cm}}$</p> <p>Roots (with multiplicity): (3,0) m: 1; (-1,0) m: 2 (0,0) m: 2</p> <p>Value of leading co-efficient: -1</p> <p>Domain:</p> <p>Range:</p>	<p>Graph:</p> 
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Without using technology, sketch the graph of the polynomial function described. The term “imaginary roots” means complex zeros.

7. A cubic function with a leading coefficient of -2, with two negative zeros and one positive.

8. A quartic function with a leading coefficient of 1, with two negative zeros and one positive double zero.

9. A cubic function with a leading coefficient of -3, with an imaginary root and one positive double root.

10. A quartic function with a leading coefficient of -2, with two negative zeros and one positive double root.

Find all factors and sketch the graph of the polynomial functions.

11. $f(x) = x^3 - x^2$

12. $f(x) = x^4 - x^2$

13. $f(x) = x^3 - 2x$

14. $f(x) = x^3 - x^2 + 9x - 9$

Homework

3.7 "Ready, Set, Go"