C. Shore
ALGEBRA 2

Name _____

QUIZ #8
Polynomials

Concepts & Procedures 1 = ___ ___ = Construct Models 1
Concepts & Procedures 2 = ___ ___ = Construct Models 2
Communicate Reasoning = ___ ___ = Creativity
Critical Thinking = ___ ___ =Collaboration

Concepts & Procedures 1

1. Multiply: $(4x^2 + x - 6)(3x - 5)$.

2) What are the factors of: $x^3 + 2x^2 - 25x - 50$?

3. Solve the equation. $x^4 - 3x^2 - 10 = 0$

4. Find the zeros of $f(x) = (x - 4)^4(x + 2)^3$ and state the multiplicity.

5. Write a polynomial equation, ***h(x)***, in factored form, given the roots
$x = \sqrt{7}$, $x = 0$, $x = 6$, $x = -3$.

Concepts & Procedures 2

6. What is the remainder when dividing: $x^3 - 2x^2 + x - 10$ by $x - 5$?

7. Given that $(x + 2)$ is a factor of $x^3 + 8$, find the other quadratic factor.

Communicate Reasoning

8. The company, *Algebra 2 for Life*, makes Algebra 2 textbooks. The profit, in thousands of dollars, that *A24Life* makes can be modeled with the function $\mathbf{P(b) = -2b^3 + 8b^2 + 8b}$, where **b** represents the number, in thousands, of textbooks produced annually. The company currently produces 4 thousand and makes a profit of $32,000. The actuary, Monte Banks, needs to determine the least amount of textbooks the company can also produce and still make the same profit of 32 thousand dollars. Following is his work…

$$\mathbf{32 = -2b^3 + 8b^2 + 8b}$$

a) Explain why Monte substitued 32 for the profit instead of 32,000.

$$\mathbf{0 = -2b^3 + 8b^2 + 8b - 32}$$
$$\mathbf{0 = -2b^2(b - 4) + 8(b - 4)}$$
$$\mathbf{0 = (-2b^2 + 8)(b - 4)}$$

$\mathbf{-2b^2 + 8 = 0}$, $\mathbf{b - 4 = 0}$

$\mathbf{-2b^2 = -8}$, $\mathbf{b = 4}$

$\mathbf{b^2 = 4}$

$\mathbf{b = \pm 2}$

$$\mathbf{b = -2, 2, 4}$$

b) Explain why Monte should have expected the 4 as a solution.

c) Explain why Monte should ignore the solution of -2.

d) Explain what the 2 means in the context of the problem.

Bonus: What are the possible rational roots for: $\mathbf{f(x) = 3x^4 - 2x^3 + x^2 + 8x - 6}$?

Critical Thinking

9. Find the information listed below for the function $f(x) = x^5 + bx^4 + cx^2 + dx + k$

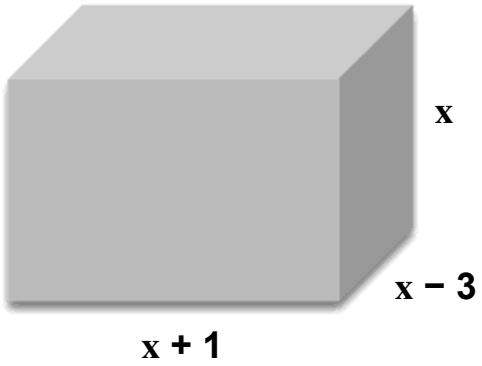
Degree: _____ Max Turns: _____ Max # x-int: _____ Min # x-int: _____

y-int: _____ Right Behavior as $x \to \infty$ _____

Left Behavior as $x \to -\infty$ _____

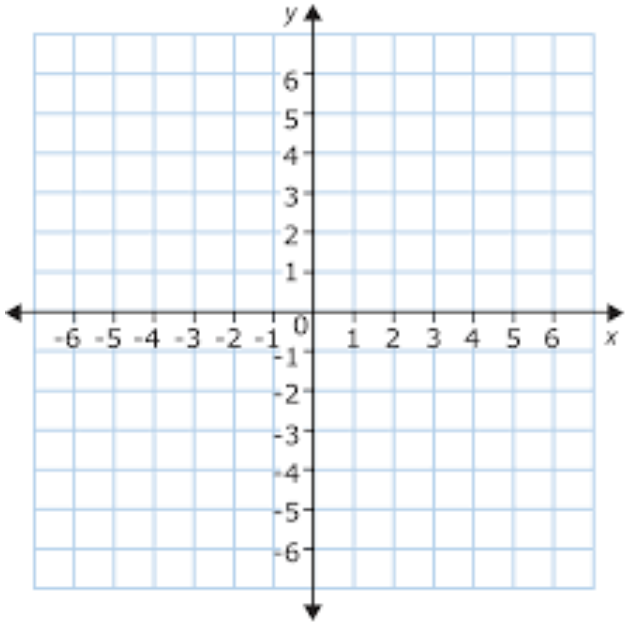
Constructing Models 1

10. The figure shows the size of a box written in terms of a length **x**.



a) Write a polynomial that represents the total volume of the box.

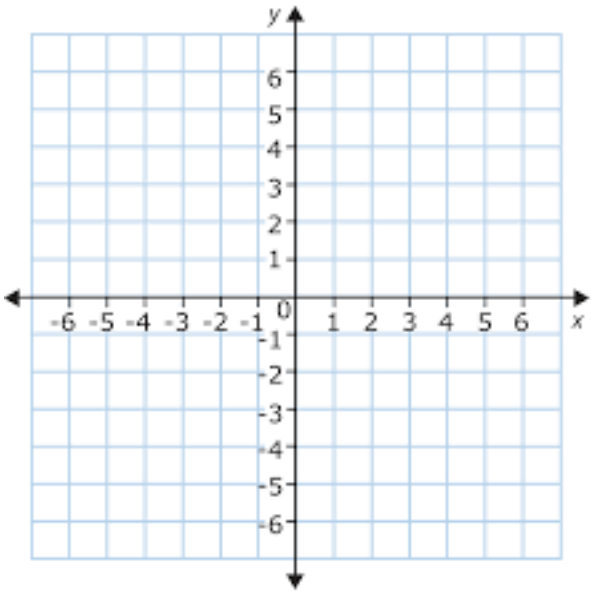
b) Graph your polynomial and estimate the maximum volume of the box.



Constructing Models 2

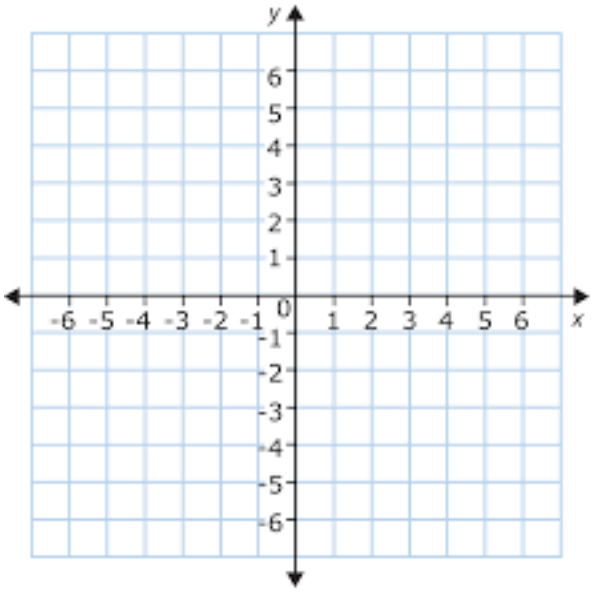
11-12) Graph each polynomial using the x- and y-intercepts. Use a T-table to find points other than the x- and y-intercepts and set your own y-axis scale. Use smooth curves to sketch.

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



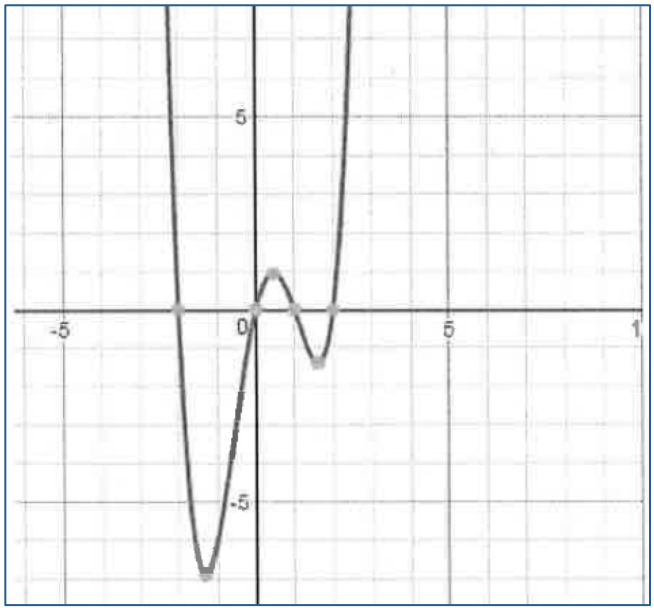
x |
y |

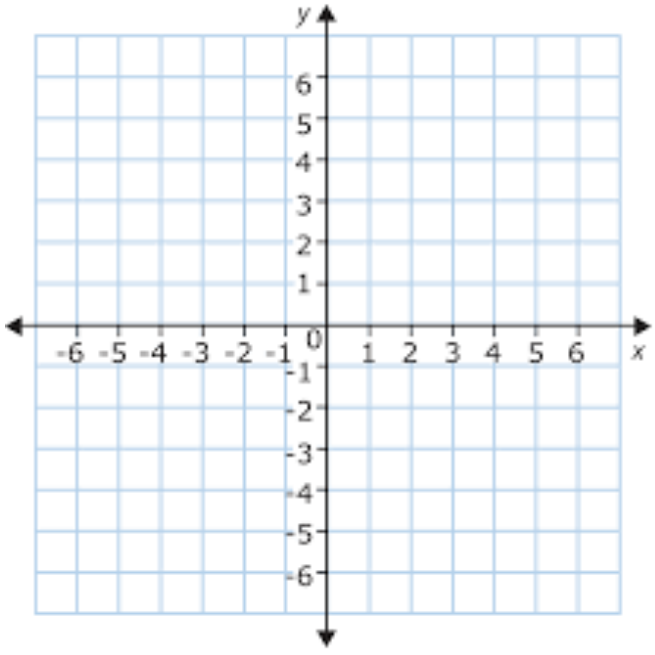
12. $g(x) = -(x + 2)(x - 3)^2$



x |
y |

13. What are the **factors** of the function graphed to the below right? _____





Creativity

14. Create a graph of a function that has a degree greater than three and at least one double root.