Algebra/Trigonometry Section 3.3b Name:_____

Please do all your work on a separate piece of paper. Please show all setup and work!

Find the quadratic function that has the indicated vertex and whose graph passes through the given point.

1. Vertex: $(3, 4)$ Point: $(1, 2)$

Word problem

2. A textile manufacturer has daily productions costs of $C = 100,000 - 110x + 0.045x^2$ where C is the total cost (in dollars) and x is the number of units produced. How many units should be produced each day to yield a minimum cost?

Determine the right-hand and left-hand behavior of the graph of the polynomial function.

3. $f(x) = 6 - 2x + 4x^2 - 5x^3$

Find all the real zeros of the polynomial function.

4. $h(t) = t^2 - 6t + 9$
5. $f(x) = 2x^4 - 2x^2 - 40$

Find a polynomial function that has the given zeros.

6. 0, -3
7. -2 , - 1, 0, 1, 2

Find a polynomial of degree n that has the given zeros.

8. Zero: $x = -8, -4$ Degree: $n = 2$
9. Zero: $x = -5, 1, 2$ Degree: $n = 4$

Sketch the graph of the function by (a) applying the Leading Coefficient Test, (b) finding the zeros of the polynomial, (c) plotting sufficient solution points, and (d) drawing a continuous curve through the points.

10. $f(x) = 3x^3 - 15x^2 + 18x$

Use long division to divide.

11. $(2x^2 + 10x + 12) \div (x + 3)$

12. $(7x + 3) \div (x + 2)$

13. $\dfrac{x^4 + 3x^2 + 1}{x^2 - 2x + 3}$

Use synthetic division to divide.

14. $(3x^3 - 17x^2 + 15x - 25) \div (x - 5)$

15. $(9x^3 - 16x - 18x^2 + 32) \div (x - 2)$

16. $\dfrac{x^5 - 13x^4 - 120x + 80}{x + 3}$

17. $\dfrac{3x^3 - 4x^2 + 5}{x - 3}$