Name _____

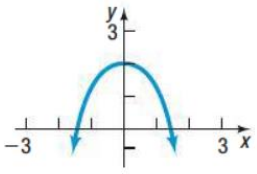
MATH 124
TEST 3
Sec. 3.5, 4.1 – 4.4, 5.1 - 5.2

Directions: Show work whenever possible. Points may be given for partially correct answers. Points may be deducted for insufficient or nonsensical steps even if the answer is correct. DO NOT USE MATH APPS!

In Problems 1-12, match each graph to one of the following functions:

A. $y = x^2 + 2$	D. $y = -\|x\| + 2$	G. $y = \|x - 2\|$	J. $y = -2x^2$
B. $y = -x^2 + 2$	E. $y = (x - 2)^2$	H. $y = -\|x + 2\|$	K. $y = 2\|x\|$
C. $y = \|x\| + 2$	F. $y = -(x + 2)^2$	I. $y = 2x^2$	L. $y = -2\|x\|$

Write the letters below.

1.


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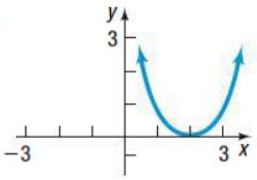

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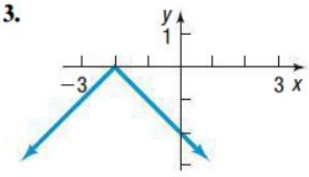

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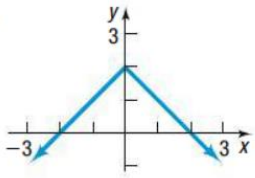

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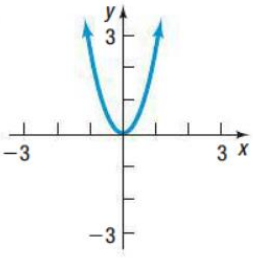

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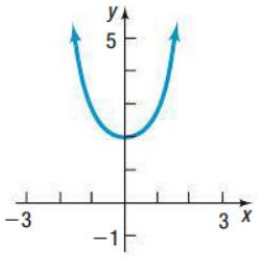

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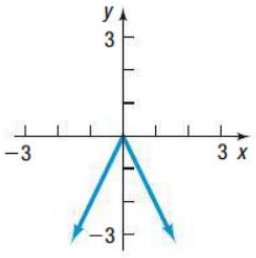

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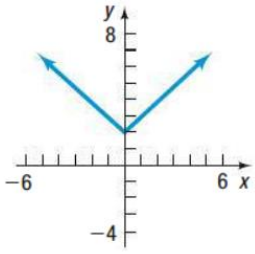

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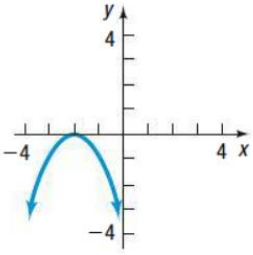

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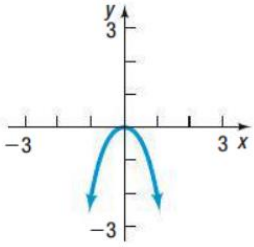

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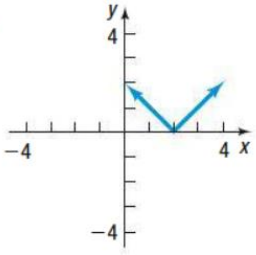

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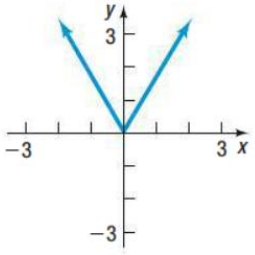
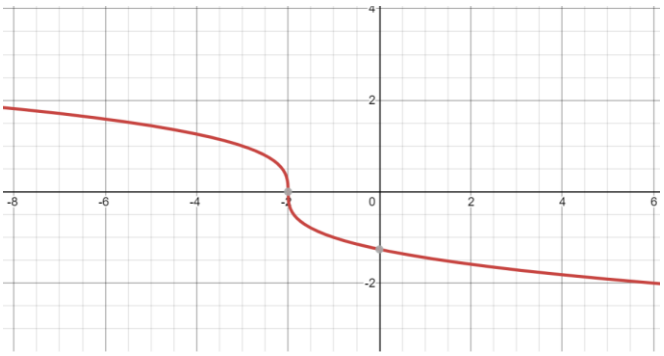


13. Write the function that matches this graph.



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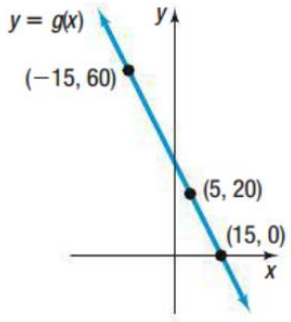
14. In parts (a)–(f), use the figure below.



(a) Solve $g(x) = 20$.

(b) Solve $g(x) = 60$.

(c) Solve $g(x) = 0$.

(d) Solve $g(x) > 20$.

(e) Solve $20 < g(x) < 60$

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15. **Supply and Demand** Suppose that the quantity supplied S and the quantity demanded D of hot dogs at a baseball game are given by the following functions:

$$S(p) = -2000 + 3000p$$

$$D(p) = 10{,}000 - 1000p$$

where p is the price of a hot dog.

Find the equilibrium price for hot dogs at the baseball game. What is the equilibrium quantity?

16. **Candy** The following data represent the weight (in grams) of various candy bars and the corresponding number of calories.

Candy Bar	Weight, x	Calories, y
Hershey's Milk Chocolate®	44.28	230
Nestle's Crunch®	44.84	230
Butterfinger®	61.30	270
Baby Ruth®	66.45	280
Almond Joy®	47.33	220

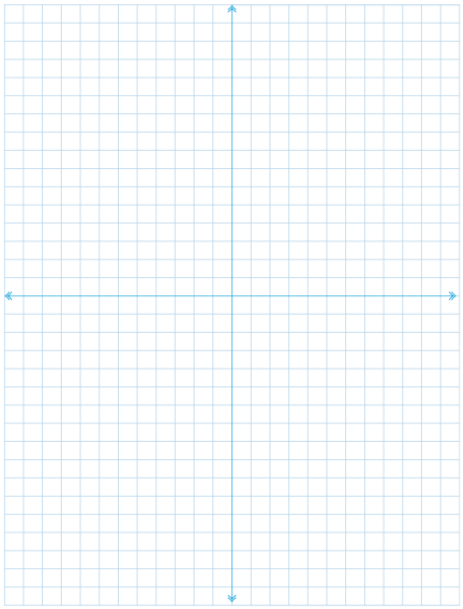
A. Use the lightest (least weight) and heaviest (greatest weight) candy bars to write the equation of a line that goes through them. Round to 2 decimal places.

B. Use your equation in A to estimate the number of calories in a candy bar that weighs 68.3 g.

C. Use technology to calculate the line of best fit using the least squares method. Round to 2 decimal places.

D. Interpret the slope in part C in words.

17. Given $f(x) = -2(x - 1)^2 + 32$, graph and identify the following.



Vertex

Axis of Symmetry

y-intercept

Convert to standard form $ax^2 + bx + c$

x-intercept(s)

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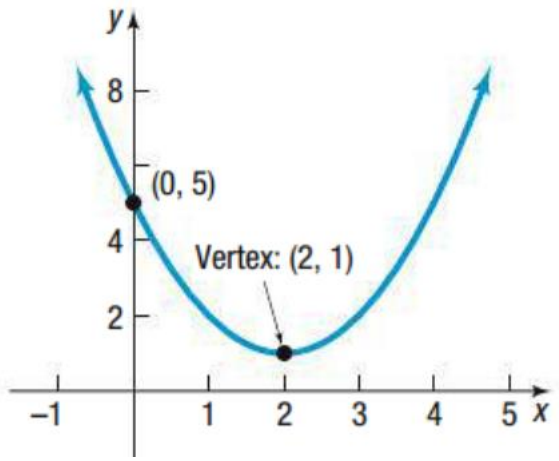
18. Given the following graph of a quadratic function:



On what interval is the function increasing?

On what interval is the function decreasing?

Identify the function in either vertex or standard form.

19. The price p (in dollars) and the quantity x sold of a certain product satisfy the demand equation

$x = -20p + 500$

(a) Find a model that expresses the revenue R as a function of p.

(b) Draw the graph of R(p).

(c) What price p maximizes the revenue?

(d) What is the maximum revenue?

(e) How many units are sold at this price?

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20. Factor and find the real zeros.

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

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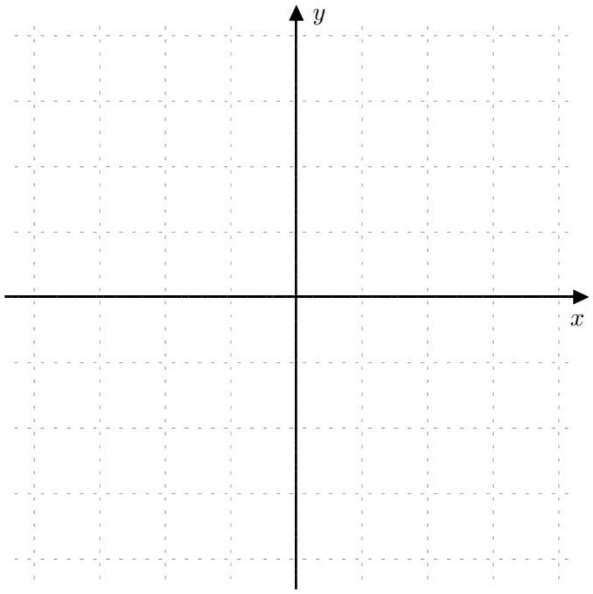
21. Find a polynomial function of degree 3 with zeros -4, -2, and 3. Expand the polynomial so that it is in standard form.

22. Find the multiplicity of each zero and identify whether it touches or crosses the x-axis at that zero.

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

zero	multiplicity	touches or crosses

Sketch the graph. Label the intercepts.



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

(a) What is the first term?

(b) What is the degree of the polynomial?

(c) What is the last term?

(d) How many turning points does the graph have?

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24. Given $f(x) = x^2(x - 6)$.

(a) Find the x and y-intercepts.

(b) Use technology to identify the local max and local min. (Use ordered pairs)