MAT 1033C -- Martin–Gay
Intermediate Algebra
Chapter 8 (8.1, 8.2, 8.5, 8.6)
Practice for the Exam

Name_____
Date _____
Day/Time: _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Fill in the blank with one of the words or phrases listed below.

quadratic formula	**quadratic**	**discriminant**	**$\pm\sqrt{b}$**
completing the square	**quadratic inequality**	**(h, k)**	**(0, k)**
(h, 0)	**$\frac{-b}{2a}$**		

1) The _____ helps us find the number and type of solutions of a quadratic equation. 1) _____

2) If $a^2 = b$, then a = _____. 2) _____

3) The graph of $f(x) = ax^2 + bx + c$ where a is not 0 is a parabola whose vertex has x–value of _____. 3) _____

4) A(n) _____ is an inequality that can be written so that one side is a quadratic expression and the other side is 0. 4) _____

5) The process of writing a quadratic equation so that one side is a perfect square trinomial is called _____. 5) _____

6) The graph of $x^2 + k$ has vertex _____. 6) _____

7) The graph of $(x - h)^2$ has vertex _____. 7) _____

8) The graph of $(x - h)^2 + k$ has vertex _____. 8) _____

9) The formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ is called the _____. 9) _____

10) A _____ equation is one that can be written in the form $ax^2 + bx + c = 0$ where a, b, and c are real numbers and a is not 0. 10) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the square root property to solve the equation.

11) $x^2 = 121$ 11) _____

A) –11, 11 B) 60.5 C) 11 D) –12, 12

12) $x^2 = 15$ 12) _____

A) $\frac{15}{2}$ B) $\sqrt{15}$ C) 225 D) $-\sqrt{15}, \sqrt{15}$

13) $x^2 = 96$ 13) _____

A) $-4\sqrt{6}, 4\sqrt{6}$ B) 48 C) $4\sqrt{6}$ D) 16

14) $(x + 8)^2 = 20$ 14) _____

A) $-8 - 2\sqrt{10}, -8 + 2\sqrt{10}$ B) $2\sqrt{5} - 8, 2\sqrt{5} + 8$

C) $-2\sqrt{5}, 2\sqrt{5}$ D) $-8 - 2\sqrt{5}, -8 + 2\sqrt{5}$

15) $4x^2 + 60 = 0$ 15) _____

A) $-\sqrt{15}, \sqrt{15}$ B) $-i\sqrt{15}, i\sqrt{15}$ C) $-15i, 15i$ D) $-15, 15$

16) $(5x + 3)^2 = 5$ 16) _____

A) $\frac{\sqrt{5} - 3}{5}, \frac{\sqrt{5} + 3}{5}$ B) $-\frac{8}{5}, \frac{2}{5}$

C) $\frac{-3 - \sqrt{5}}{5}, \frac{-3 + \sqrt{5}}{5}$ D) $\frac{3 - \sqrt{5}}{5}, \frac{3 + \sqrt{5}}{5}$

Add the proper constant to each binomial so that the resulting trinomial is a perfect square trinomial. Then factor the trinomial.

17) $x^2 + 6x +$ _____ 17) _____

A) $x^2 + 6x + \underline{3} = (x + 9)^2$ B) $x^2 + 6x + \underline{9} = (x + 3)^2$

C) $x^2 + 6x + \underline{6} = (x + 36)^2$ D) $x^2 + 6x + \underline{36} = (x + 6)^2$

18) $x^2 - 16x +$ _____ 18) _____

A) $x^2 - 16x + \underline{(-64)} = (x - 8)^2$ B) $x^2 - 16x + \underline{64} = (x - 8)^2$

C) $x^2 - 16x + \underline{(-256)} = (x - 16)^2$ D) $x^2 - 16x + \underline{256} = (x - 16)^2$

19) $x^2 - \frac{2}{11}x +$ _____ 19) _____

A) $x^2 - \frac{2}{11}x + \frac{2}{121} = \left(x - \frac{1}{11}\right)^2$ B) $x^2 - \frac{2}{11}x + \frac{1}{\underline{121}} = \left(x - \frac{1}{11}\right)^2$

C) $x^2 - \frac{2}{11}x + \frac{4}{121} = \left(x - \frac{2}{11}\right)^2$ D) $x^2 - \frac{2}{11}x + \frac{1}{\underline{121}} = \left(x + \frac{1}{11}\right)^2$

20) $x^2 + \frac{2}{13}x +$ _____ 20) _____

A) $x^2 + \frac{2}{13}x + \frac{4}{169} = \left(x + \frac{2}{13}\right)^2$

B) $x^2 + \frac{2}{13}x + \frac{1}{\underline{13}} = \left(x + \frac{1}{169}\right)^2$

C) $x^2 + \frac{2}{13}x + \frac{2}{169} = \left(x + \frac{1}{13}\right)^2$

D) $x^2 + \frac{2}{13}x + \frac{1}{\underline{169}} = \left(x + \frac{1}{13}\right)^2$

Solve the equation by completing the square.

21) $x^2 - 14x + 40 = 0$ 21) _____

A) $\sqrt{3}, -1$ B) 36, 4 C) $-10, -4$ D) 10, 4

22) $x^2 + 18x + 67 = 0$ 22) _____

A) $9 - \sqrt{67}, 9 + \sqrt{67}$

B) $-18 + \sqrt{67}$

C) $-9 - \sqrt{14}, -9 + \sqrt{14}$

D) $9 + \sqrt{14}$

23) $x^2 + 12x + 45 = 0$ 23) _____

A) $-3, -9$ B) $-6 + 3i, -6 - 3i$ C) $-6 + 3i$ D) $-6 - 9i, -6 + 9i$

24) $x^2 + 13 = -12x$ 24) _____

A) $-12 + \sqrt{13}$

B) $6 - \sqrt{13}, 6 + \sqrt{13}$

C) $-6 - \sqrt{23}, -6 + \sqrt{23}$

D) $6 + \sqrt{23}$

25) $8x^2 - 5x + 1 = 0$ 25) _____

A) $\frac{5 - i\sqrt{7}}{16}, \frac{5 + i\sqrt{7}}{16}$

B) $\frac{5 - i\sqrt{7}}{16}, \frac{-5 + i\sqrt{7}}{16}$

C) $\frac{-5 - i\sqrt{7}}{16}, \frac{5 + i\sqrt{7}}{16}$

D) $\frac{-5 - i\sqrt{7}}{16}, \frac{-5 + i\sqrt{7}}{16}$

Use the quadratic formula to solve the equation.

26) $x^2 + 7x - 8 = 0$ 26) _____

A) $-1, -8$ B) $1, -8$ C) $-1, 8$ D) $-8, 0$

27) $x^2 - 16x + 64 = 0$ 27) _____

A) -8 B) $-8 - i, -8 + i$ C) $-8, 8$ D) 8

28) $x^2 + 18x + 66 = 0$ 28) _____

A) $-9 - \sqrt{15}, -9 + \sqrt{15}$

B) $9 + \sqrt{15}$

C) $-18 + \sqrt{66}$

D) $9 - \sqrt{66}, 9 + \sqrt{66}$

29) $5x^2 + 8x = -1$ 29) _____

A) $\frac{-4-\sqrt{11}}{10}, \frac{-4+\sqrt{11}}{10}$ B) $\frac{-4-\sqrt{21}}{5}, \frac{-4+\sqrt{21}}{5}$

C) $\frac{-4-\sqrt{11}}{5}, \frac{-4+\sqrt{11}}{5}$ D) $\frac{-8-\sqrt{11}}{5}, \frac{-8+\sqrt{11}}{5}$

30) $-4x^2 + 9x - 8 = 0$ 30) _____

A) $\frac{-9-i\sqrt{47}}{-8}, \frac{-9+i\sqrt{47}}{-8}$ B) $\frac{9-\sqrt{47}}{-8}, \frac{9+\sqrt{47}}{-8}$

C) $\frac{9-i\sqrt{47}}{-8}, \frac{9+i\sqrt{47}}{-8}$ D) $\frac{-9-\sqrt{47}}{-8}, \frac{-9+\sqrt{47}}{-8}$

31) $\frac{z^2}{-2} = \frac{z}{8} + \frac{6}{-16}$ 31) _____

A) $\frac{3}{4}$ B) $-1, \frac{3}{4}$ C) $-\frac{3}{4}, 1$ D) $-\frac{3}{4}, -1$

32) $(x + 3)(x - 1) = 4$ 32) _____

A) $-1 - \sqrt{11}, -1 + \sqrt{11}$ B) $1 - i\sqrt{3}, 1 + i\sqrt{3}$

C) $-1 - i\sqrt{3}, -1 + i\sqrt{3}$ D) $1 - \sqrt{11}, 1 + \sqrt{11}$

33) $(x + 8)(2x - 9) = 2(x - 1) - 72$ 33) _____

A) $-\frac{5}{4} - \frac{\sqrt{41}}{4}, -\frac{5}{4} + \frac{\sqrt{41}}{4},$ B) $-2, -\frac{1}{2}$

C) $\frac{1}{2}, 2$ D) $\frac{5}{4} - \frac{\sqrt{41}}{4}, \frac{5}{4} + \frac{\sqrt{41}}{4},$

Use the quadratic formula and a calculator to approximate the solution to the nearest tenth.

34) $3x^2 + 4x - 2 = 0$ 34) _____

A) $x = 6, x = -7.3$ B) $x = 1.7, x = -0.4$ C) $x = 0.8, x = -3.4$ D) $x = 0.4, x = -1.7$

Solve.

35) A ball is thrown upward with an initial velocity of 42 meters per second from a cliff that is 30 meters high. The height of the ball is given by the quadratic equation $h = -4.9t^2 + 42t + 90$ where h is in meters and t is the time in seconds since the ball was thrown. Find the time that the ball will be 60 meters from the ground. Round your answer to the nearest tenth of a second. 35) _____

A) 10.3 seconds B) 9.3 seconds C) 9.2 seconds D) 10.4 seconds

36) The revenue for a small company is given by the quadratic function $r(t) = 8t^2 + 6t + 840$ where t is the number of years since 1998 and r(t) is in thousands of dollars. If this trend continues, find the year after 1998 in which the company's revenue will be $930 thousand. Round to the nearest whole year. 36) _____

A) 2003 B) 2002 C) 2004 D) 2001

Use the discriminant to determine the number and type of solutions of the equation.

37) $x^2 + 2x - 8 = 0$ 37) _____

A) two complex but not real solutions

B) two real solutions

C) one real solution

38) $5 - 3x^2 = 3x + 2$ 38) _____

A) one real solution

B) two real solutions

C) two complex but not real solutions

39) $4x^2 + 12x + 9 = 0$ 39) _____

A) two complex but not real solutions

B) two real solutions

C) one real solution

40) $4x^2 = 3x - 3$ 40) _____

A) two complex but not real solutions

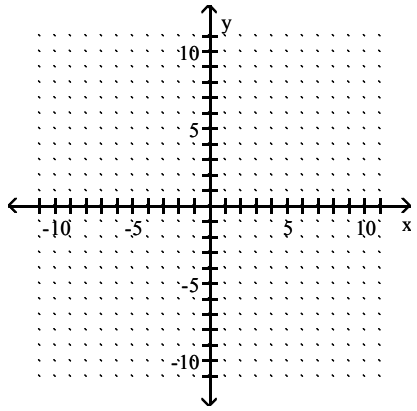
B) two real solutions

C) one real solution

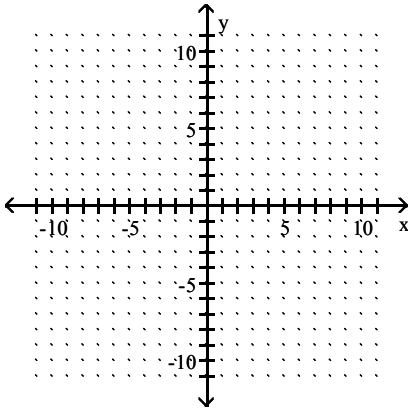
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Sketch the graph of the quadratic function. Give the vertex and axis of symmetry.

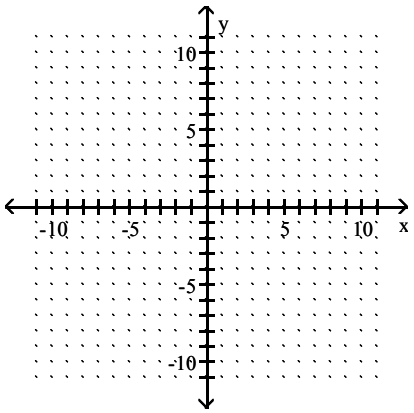
41) $f(x) = x^2 - 3$ 41) _____



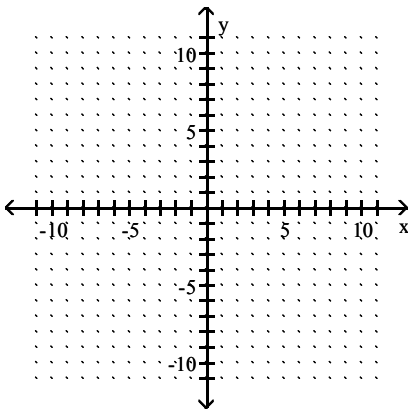
42) $f(x) = (x - 4)^2$ 42) _____



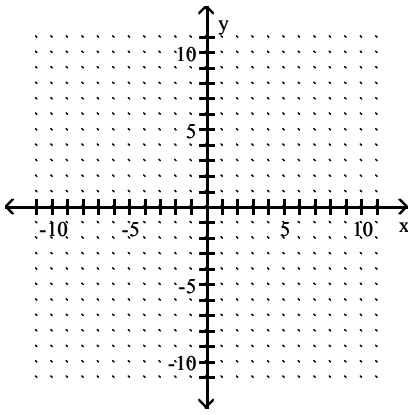
43) $f(x) = (x + 5)^2 - 3$ 43) _____



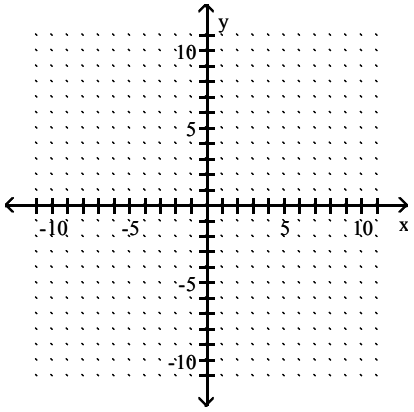
44) $f(x) = 5x^2$ 44) _____



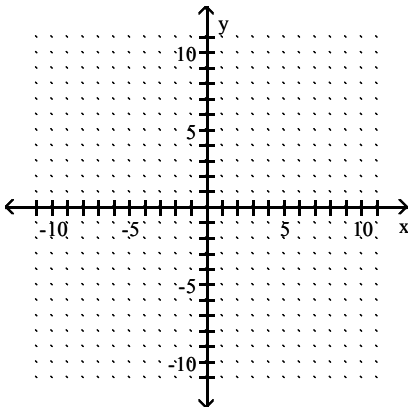
45) $f(x) = \frac{1}{3}(x + 4)^2 + 1$ 45) _____



46) $f(x) = 4(x - 4)^2 + 1$ 46) _____



47) $f(x) = -(x + 5)^2$ 47) _____



MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the function in the form $y = a(x - h)^2 + k$.

48) $f(x) = -x^2 - 10x - 5$ 48) _____

A) $y = -(x - 5)^2 - 80$

B) $y = -(x + 10)^2 - 5$

C) $y = -(x + 5)^2 + 20$

D) $y = -(x - 5)^2 - 30$

49) $f(x) = x^2 + 14x + 3$ 49) _____

A) $y = (x - 7)^2 + 150$ B) $y = (x + 7)^2 - 144$

C) $y = (x - 14)^2 + 395$ D) $y = (x + 7)^2 - 46$

Find the vertex of the graph of the quadratic function.

50) $f(x) = -x^2 + 6x - 3$ 50) _____

A) (3, 6) B) (–3, –12) C) (6, –3) D) (–3, –30)

51) $f(x) = 7x^2 - 14x + 5$ 51) _____

A) (2, 19) B) (–1, 26) C) (–2, 61) D) (1, –2)

52) $f(x) = x^2 - 8x - 7$ 52) _____

A) (–8, 121) B) (4, –23) C) (4, –55) D) (–4, 41)

53) $f(x) = x^2 - 9x - 5$ 53) _____

A) (–9, 157) B) $\left(-\frac{9}{2}, \frac{223}{4}\right)$ C) $\left(\frac{9}{2}, -\frac{101}{4}\right)$ D) (11, –5)

Solve.

54) Find two numbers whose sum is 118 and whose product is as large as possible. [Hint: Let x and 118 – x be the two numbers. Their product can be described by the function $f(x) = x(118 - x)$.] 54) _____

A) $\frac{1}{59}$ and $\frac{13}{59}$ B) 58 and 60 C) 59 and 59 D) 59 and 177

55) An arrow is fired into the air with an initial velocity of 64 feet per second. The height in feet of the arrow t seconds after it was shot into the air is given by the function $h(t) = -16t^2 + 64t$. Find the maximum height of the arrow. 55) _____

A) 64 ft B) 32 ft C) 96 ft D) 192 ft

56) The length and width of a rectangle must have a sum of 34 feet. Find the dimensions of the rectangle whose area is as large as possible. 56) _____

A) length $\frac{1}{17}$ ft; width $\frac{13}{17}$ ft B) length 16 ft; width 18 ft

C) length 17 ft; width 17 ft D) length 17 ft; width 51 ft

57) The cost in millions of dollars for a company to manufacture x thousand automobiles is given by the function $C(x) = 3x^2 - 30x + 200$. Find the number of automobiles that must be produced to minimize the cost. 57) _____

A) 15 thousand automobiles B) 125 thousand automobiles

C) 5 thousand automobiles D) 10 thousand automobiles

Find the maximum or minimum value of the function. Approximate to two decimal places.

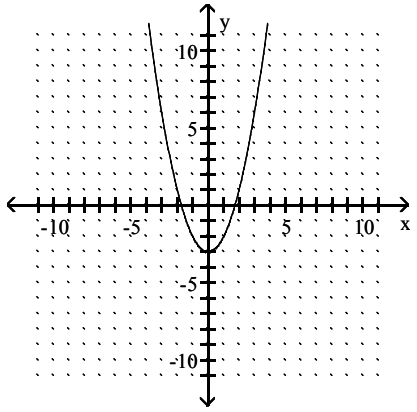
58) $f(x) = 6.6x^2 - 0.8x + 7.7$ 58) _____

A) 7.77 B) −0.06 C) 0.06 D) 7.68

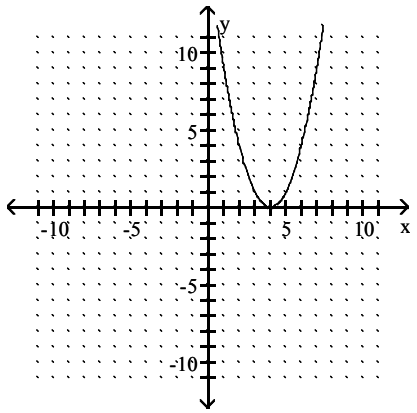
Answer Key
Testname: PRACTICE FOR THE EXAM (8.1, 8.2, 8.5, 8.6)

1) discriminant
2) $\pm\sqrt{b}$
3) $\frac{-b}{2a}$
4) quadratic inequality
5) completing the square
6) (0, k)
7) (h, 0)
8) (h, k)
9) quadratic formula
10) quadratic
11) A
12) D
13) A
14) D
15) B
16) C
17) B
18) B
19) B
20) D
21) D
22) C
23) B
24) C
25) A
26) B
27) D
28) A
29) C
30) A
31) B
32) A
33) B
34) D
35) C
36) D
37) B
38) B
39) C
40) A

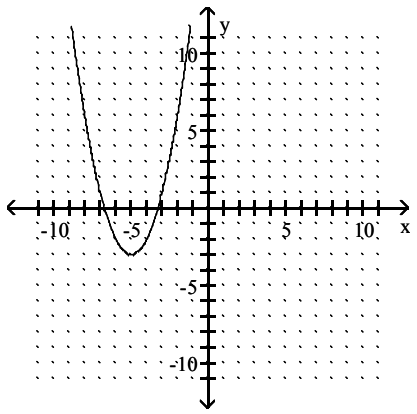
41) vertex (0, –3); axis x = 0



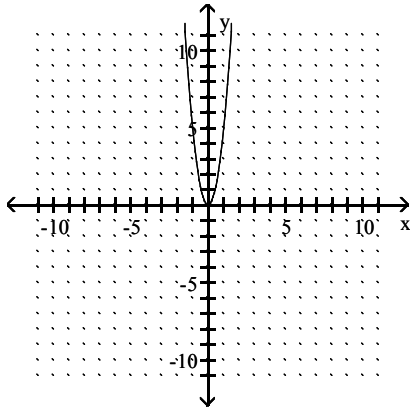
42) vertex (4, 0); axis x = 4



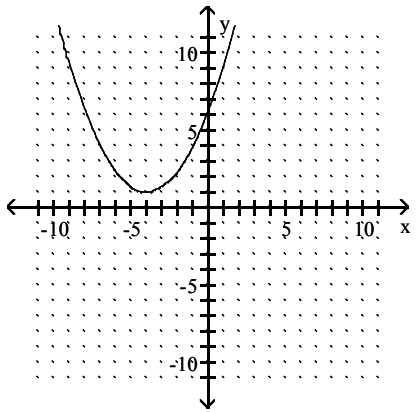
43) vertex (–5, –3); axis x = –5



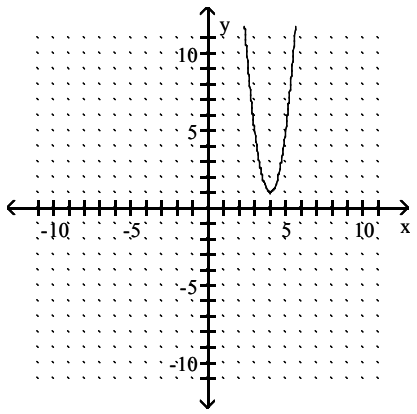
44) vertex (0, 0); axis x = 0



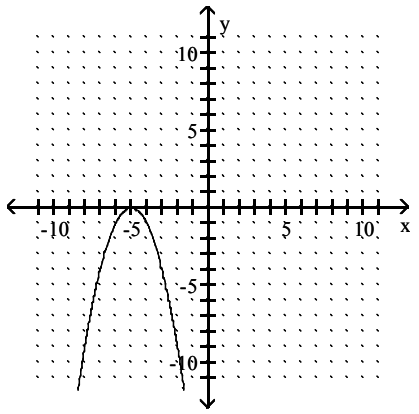
45) vertex (–4, 1); axis x = –4



46) vertex (4, 1); axis x = 4



47) vertex (–5, 0); axis x = –5



48) C
49) D
50) A
51) D
52) B
53) C
54) C
55) A
56) C
57) C
58) D