Name _____   Date _____

SAT/ACT Chapter Test
For use after Chapter 9

Multiple Choice

1. What is the degree of $3x^2 + 4x - x^3 + 6x^6$?

   (A) 0   (B) 1   (C) 2

   (D) 3   (E) 6

2. What is the sum of $3m + 6m^2 - m^3$ and $-11 + 2m - 4m^2 + 9m^3$?
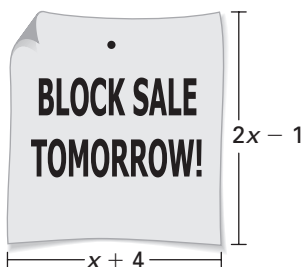
   (A) $10m^3 + 10m^2 + 5m + 11$

   (B) $8m^3 + 2m^2 + 5m - 11$

   (C) $8m^3 + 2m^2 + 5m$

   (D) $-10m^3 + 10m^2 + m + 11$

   (E) $9m^3 - 7m^2 + 8m - 8$

3. What is the product of $5x + 2$ and $-x + 8$?

   (A) $-5x^2 + 38x + 16$

   (B) $5x^2 + 42x + 16$

   (C) $4x + 10$

   (D) $-5x^2 + 42x - 16$

   (E) $-5x^2 - 38x + 16$

In Exercises 4–6, use the following information.

Your neighborhood is having a block sale and you are designing an advertising banner with the dimensions shown.

BLOCK SALE TOMORROW!
$2x - 1$
$x + 4$

4. Which polynomial represents the perimeter of the banner?

   (A) $3x + 3$ (B) $2x^2 + 7x - 4$

   (C) $6x + 6$ (D) $4x + 7$

   (E) $5x + 2$

5. Which polynomial represents the area of the banner?

   (A) $2x^2 - 4x$ (B) $6x + 6$

   (C) $2x^2 - 4$ (D) $2x^2 + 7x - 4$

   (E) $2x^2 + 9x - 4$

6. What is the area of the banner when $x = 2$?

   (A) 4 square units   (B) 12 square units

   (C) 18 square units   (D) 22 square units

   (E) 30 square units

7. What is the degree of the product of two polynomials of degrees m and n?

   (A) m (B) n

   (C) mn (D) $m - n$

   (E) $m + n$

8. What is the product of $2x - 9$ and $2x + 9$?

   (A) $4x^2 + 81$ (B) $4x^2 - 81$

   (C) $2x^2 - 81$ (D) $4x^2 - 18x - 81$

   (E) $4x^2 - 36x - 81$

9. What is the greatest common monomial factor of $30z^3 - 12z^2$?

   (A) $6z^2$ (B) $4z^2$ (C) $-6z^3$

   (D) $30z^3$ (E) $12z^2$

10. What are the solutions of $8r^2 = -12r$?

   (A) -3 and 2 (B) 0 and $\frac{3}{2}$

   (C) 3 and 4 (D) $-\frac{3}{2}$ and 0

   (E) -3 and 0

11. What are the solutions of $x^2 - 2x - 3 = 0$?

   (A) -3 and 1 (B) 1 and 3

   (C) -1 and 3 (D) 3 and 0

   (E) -1 and 0

CHAPTER 9

SAT/ACT Chapter Test *continued*

For use after Chapter 9

12. What is the correct factorization of $-3x^2 + 16x + 35$?

ⓐ $(3x + 5)(x - 7)$

ⓑ $-(3x + 5)(x - 7)$

ⓒ $-(3x - 5)(x + 7)$

ⓓ $-(3x - 7)(x + 5)$

ⓔ $(3x - 5)(x - 7)$

13. A rock is tossed upward with an initial velocity of 8 feet per second from the top of a 120-foot cliff that overlooks the ocean. After how many seconds does the rock hit the water?

ⓐ 2 seconds   ⓑ 2.5 seconds

ⓒ 3 seconds   ⓓ 3.5 seconds

ⓔ 4 seconds

14. What are the solutions of $3x^3 = 15x^2 + 18x$?

ⓐ -1 and 6 ⓑ $-1, 0,$ and 6

ⓒ $0, 2,$ and 3 ⓓ $-6, 0,$ and 1

ⓔ $-3, -2,$ and 0

15. What are the solutions of $25x^2 = 9$?

ⓐ $-\frac{3}{5}$ and $\frac{3}{5}$ ⓑ $-\frac{5}{3}$ and $\frac{5}{3}$

ⓒ 0 and $\frac{3}{5}$ ⓓ -3 and 3

ⓔ $-\frac{5}{3}$ and $\frac{3}{5}$

16. What is the correct factorization of $z^3 - 7z^2 - 4z + 28$?

ⓐ $(z + 2)(z - 2)(z - 4)$

ⓑ $(z + 2)(z + 2)(z - 7)$

ⓒ $(z + 2)(z - 2)(z + 7)$

ⓓ $(z + 2)(z - 2)(z - 7)$

ⓔ $-(z + 2)(z - 2)(z - 7)$

17. Which value of c makes the expression $x^2 + 18x + c$ a perfect square trinomial?

ⓐ 9   ⓑ 12   ⓒ 18

ⓓ 36   ⓔ 81

Gridded Answer

18. What is the degree of the polynomial $15x^5 + 9x^2 - x^7$?

19. Field hockey is played on a rectangular playing field in which the length of the field is 40 yards more than its width. The area of the field is 6000 square yards. What is the width (in yards) of the field?

20. The function $f(x) = 3x^2 - 22x + 24$ has two zeros. What is the smaller of the two zeros?

Answer Key

Chapter 9

SAT/ACT Chapter Test

1. E **2.** B **3.** A **4.** C **5.** D **6.** C **7.** E **8.** B

9. A **10.** D **11.** C **12.** B **13.** C **14.** B

15. A **16.** D **17.** E **18.** 7 **19.** 60 yd **20.** $\frac{4}{3}$

CHAPTER 9 **Standardized Test**
For use after Chapter 9

Multiple Choice

1. What is the degree of
$-5a^2b + 4a^2 - 2b + 5$?

A -5 **B** 2 **C** 3 **D** 4

2. Which expression is *not* a monomial?

A $-2n$ **B** $\dfrac{m}{2}$ **C** r^2 **D** $3p^{-3}$

3. What is the sum of $6m^2 - 5m + 4$ and
$7m^2 + 2m - 5$?

A $13m^2 - 7m - 9$

B $13m^2 - 3m - 1$

C $13m^2 + 3m - 1$

D $13m^2 - 3m + 1$

4. What is $(12s^2 + 8s - 6) - (9s^2 - 2s + 5)$ in
simplest form?

A $3s^2 + 6s - 1$ **B** $3s^2 + 10s - 11$

C $3s^2 + 10s + 11$ **D** $3s^2 + 6s - 11$

5. What is the product of $x + 5$ and $3x - 2$?

A $3x^2 + 13x - 10$ **B** $3x^2 - 10$

C $3x^2 + 17x - 10$ **D** $3x^2 - 13x - 10$

6. Which polynomial represents $f(x) \cdot g(x)$
if $f(x) = -4x^2$ and
$g(x) = x^3 + 2x^2 - 5x + 3$?

A $-4x^5 + 8x^4 - 20x^3 - 12x^2$

B $-4x^5 - 8x^3 - 20x^3 - 12x^2$

C $-4x^5 - 8x^4 + 20x^3 - 12x^2$

D $-4x^5 + 8x^4 + 20x^3 - 12x^2$

7. What is the simplest form of
$(5x + 2)(5x - 2)$?

A $25x^2 - 4$ **B** $10x^2$

C $25x^2 + 10x - 4$ **D** $25x^2 - 20x - 4$

8. What is the simplest form of $(2n + 3)^2$?

A $4n^2 + 12n + 6$ **B** $4n^2 + 6n + 9$

C $4n^2 + 9$ **D** $4n^2 + 12n + 9$

9. Which of the following are the roots of the
equation $(y - 3)(y + 2) = 0$?

A 2 and 3   **B** -2 and 3

C -3 and 2   **D** -3 and -2

10. What is the greatest monomial factor of
$32x^5 - 12x^2$?

A $4x^2$ **B** $32x^5$

C $12x^2$ **D** $20x^3$

11. What are the roots of the equation $5x^2 = x$?

A -5 and 0   **B** 0 and $-\dfrac{1}{5}$

C 0 and $\dfrac{1}{5}$ **D** 0 and 5

12. Which of the following is the correct
factorization of $x^2 - 15x + 56$?

A $(x - 7)(x - 8)$

B $(x + 7)(x - 8)$

C $(x - 7)(x + 8)$

D $(x + 7)(x + 8)$

13. What are the roots of the equation
$x^2 + 30x = 1000$?

A 20 and 50   **B** -50 and -20

C -20 and 50   **D** -50 and 20

14. Which of the following is the correct
factorization of $6x^2 - 2x - 20$?

A $(3x - 5)(2x + 4)$

B $(3x + 5)(2x - 4)$

C $(6x - 10)(x + 2)$

D $(6x + 2)(x - 10)$

CHAPTER 9 | **Standardized Test** *continued*
For use after Chapter 9

15. Which of the following is the correct factorization of $-y^2 + y + 6$?

   Ⓐ $(-y + 3)(y - 2)$

   Ⓑ $-(y + 6)(y + 1)$

   Ⓒ $-(y + 2)(y - 3)$

   Ⓓ $-(y + 2)(y + 3)$

16. What are the roots of the equation $1.5x^2 - 4.5x = -3$?

   Ⓐ -2 and -1 **Ⓑ** -1 and 1

   Ⓒ 1 and 2 **Ⓓ** 2 and 3

17. Which of the following is the correct factorization of $-60m^2 + 15n^2$?

   Ⓐ $15(2m + n)^2$

   Ⓑ $15(2m - n)(2m + n)$

   Ⓒ $-15(2m - n)^2$

   Ⓓ $-15(2m - n)(2m + n)$

18. Which of the following is the correct factorization of $3x^3 + 24x^2 - 27x$?

   Ⓐ $3x(x + 9)(x - 1)$

   Ⓑ $3x(x - 9)(x + 1)$

   Ⓒ $3x(x - 9)(x - 1)$

   Ⓓ $3x(x + 9)(x + 1)$

19. What is the completely factored form of $4x^5 - 256x^3$?

   Ⓐ $4x^3(x - 8)^2$

   Ⓑ $4x^3(x + 8)(x - 8)$

   Ⓒ $4x^3(x^2 - 64)$

   Ⓓ $4x^3(x + 8)^2$

Gridded Answer

20. The square of the binomial $x - 4$ has the form $x^2 - ax + 16$. What is the value of a?

Short Response

21. You made a square card to send to a friend. The card did not fit in the envelope so you had to trim the card. You trimmed 4 inches from the length and 5 inches from the width. The area of the resulting card is 20 square inches.

   a. What were the original dimensions of the card?

   b. What was the perimeter of the original card?

   c. What is the difference in the areas of the original and trimmed cards?

Extended Response

22. The length of a box is 2 centimeters less than its height. The width of the box is 7 centimeters more than its height.

   a. Draw a diagram of the box and label its dimensions in terms of the height h.

   b. Write a polynomial that represents the volume of the box.

   c. If the box has a volume of 180 cubic centimeters, what is its surface area? *Explain*.
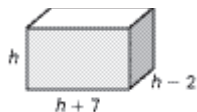
Answer Key

Chapter 9

Standardized Test

1. C **2.** D **3.** B **4.** B **5.** A **6.** C **7.** A **8.** D

9. B **10.** A **11.** C **12.** A **13.** D **14.** B

15. C **16.** C **17.** D **18.** A **19.** B **20.** 8

21. a. 9 in. $\times$ 9 in. **b.** 36 in. **c.** 61 in.^{2}

22. a.

b. $h^3 + 5h^2 - 14h$ **c.** 222 cm^2; If you set the polynomial in part (b) equal to 180 and solve for h, you will find that the height is 5 centimeters. From there, you find the area of each side and add to find the total surface area.

Name _____   Date _____

SAT/ACT Chapter Test
For use after Chapter 10

Multiple Choice

1. How would the graph of the function $y = x^2 - 8$ be affected if the function were changed to $y = x^2 - 3$?

Ⓐ The graph would shift 5 units to the left.

Ⓑ The graph would shift 5 units down.

Ⓒ The graph would shift 5 units up.

Ⓓ The graph would shift 3 units down.

Ⓔ The graph would shift 3 units up.

2. What is the vertex of the graph of the function $y = \frac{2}{5}x^2 - 6$?

Ⓐ $(0, -6)$ Ⓑ $(0, 6)$ Ⓒ $(-6, 0)$

Ⓓ $(6, 0)$ Ⓔ $(0, 0)$

3. Which function has the graph shown?
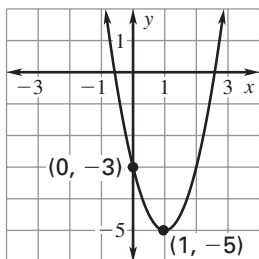
Ⓐ $y = -\frac{1}{2}x^2 - x - 3$

Ⓑ $y = \frac{1}{2}x^2 - x - 3$

Ⓒ $y = x^2 - 2x - 4$

Ⓓ $y = 2x^2 - 4x - 3$

Ⓔ $y = -2x^2 - 4x - 3$

4. What are the zeros of the function $f(x) = -x^2 + 13x - 36$?

Ⓐ -9 and 4 Ⓑ 4 and 9

Ⓒ -4 and -9 Ⓓ -4 and 9

Ⓔ 0 and 36

5. What are the solutions of the equation $2z^2 - 115 = 173$?

Ⓐ -8 and 8 Ⓑ -8.89 and 8.89

Ⓒ -10 and 10 Ⓓ -12 and 12

Ⓔ -16.97 and 16.97

6. A construction worker drops a hammer from a height of 50 feet. After how many seconds does the hammer land on the ground? Round your answer to the nearest hundredth.

Ⓐ 0.63 second   Ⓑ 1.77 seconds

Ⓒ 2.00 seconds   Ⓓ 5.00 seconds

Ⓔ 7.07 seconds

7. What are the solutions of the equation $a^2 + 8a = 18$?

Ⓐ $-4 \pm \sqrt{34}$ Ⓑ $-4 \pm \sqrt{2}$

Ⓒ $-4 \pm \sqrt{18}$ Ⓓ $4 \pm \sqrt{2}$

Ⓔ $4 \pm \sqrt{34}$

8. A cereal box has a volume of 441 cubic inches. Its height is 12 inches, its width is x inches, and its length is $(x + 7)$ inches. What is the width of the box?

Ⓐ 1.5 inches   Ⓑ 3 inches

Ⓒ 3.5 inches   Ⓓ 7 inches

Ⓔ 10.5 inches

9. What are the solutions of the equation $6x^2 - 10x = 3x - 5$?

Ⓐ $-\frac{1}{2}$ and $-\frac{5}{3}$ Ⓑ $-\frac{1}{3}$ and $\frac{5}{2}$

Ⓒ $\frac{2}{3}$ and $\frac{3}{2}$ Ⓓ $\frac{1}{3}$ and $-\frac{5}{2}$

Ⓔ $\frac{1}{2}$ and $\frac{5}{3}$

CHAPTER 10 — SAT/ACT Chapter Test *continued*
For use after Chapter 10

10. What is the value of the discriminant of the equation $4x^2 - 3x + 5 = 0$?

(A) -71 **(B)** -11 **(C)** 0

(D) 29 **(E)** 89

11. How man solutions does the equation $-\frac{2}{3}x^2 + 9x + 1 = 0$ have?

(A) None **(B)** One **(C)** Two

(D) Three **(E)** Four

12. Which value of c makes the equation $3x^2 + 2x + c = 0$ have no solution?

(A) -5 **(B)** -1 **(C)** 0

(D) $\frac{1}{3}$ **(E)** 5

13. Which function is represented by the following ordered pairs $(-1, 0.75)$, $(0, 0)$, $(1, 0.75)$, $(2, 3)$, $(3, 6.75)$?

(A) $y = 0.75^x$ **(B)** $y = 0.75x^2$

(C) $y = \frac{4}{3}x^2$ **(D)** $y = 0.75x$

(E) $y = \left(\frac{4}{3}\right)^x$

14. The table shows the number of hits h your new website receives after t days. Which function is represented by the data in the table?

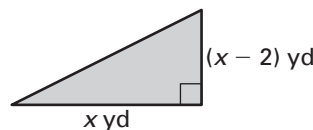| t	1	2	3	4	5
h	5	25	125	625	3125

(A) $y = 125x$ **(B)** $y = 25x^2$

(C) $y = 5x^2$ **(D)** $y = 5^x$

(E) $y = 5x$

Gridded Answer

15. What is the minimum value of the function $f(x) = 2x^2 - 6x + 7$?

16. The area of the triangle below is 60 square yards. What is the value of x?

$(x - 2)$ yd

x yd

17. The value of the discriminant of the equation $5x^2 - 9x + c$ is 61. What is the value of c?

Answer Key

Chapter 10
SAT/ACT Chapter Test

1. C **2.** A **3.** D **4.** B **5.** D **6.** B **7.** A **8.** C

9. E **10.** A **11.** C **12.** E **13.** B **14.** D

15. 2.5 **16.** 12 **17.** 1

Name _____   Date _____

CHAPTER
10

Standardized Test
For use after Chapter 10

Multiple Choice

1. What is the vertex of the graph of the function $y = -\frac{2}{3}x^2 + 5$?

Ⓐ $(0, 5)$ Ⓑ $(5, 0)$
Ⓒ $(0, -5)$ Ⓓ $(-5, 0)$

2. How would the graph of the function $y = x^2 - 3$ be affected if the function were changed to $y = x^2 + 2$?

Ⓐ The graph would shift 2 units up.
Ⓑ The graph would shift 5 units up.
Ⓒ The graph would shift 2 units to the right.
Ⓓ The graph would shift 5 unit down.

3. What is the vertex of the graph of the function $y = -2x^2 + 16x - 15$?

Ⓐ $(-4, -111)$ Ⓑ $(-4, -81)$
Ⓒ $(4, -47)$ Ⓓ $(4, 17)$

4. What is the axis of symmetry of the function $y = -x^2 + 6x - 8$?

Ⓐ $x = -3$ Ⓑ $x = 3$
Ⓒ $x = -8$ Ⓓ $x = 8$

5. What are the solutions of the equation shown?

Ⓐ 4 and 6 Ⓑ 4 and -6
Ⓒ -4 and -6 Ⓓ -4 and 6
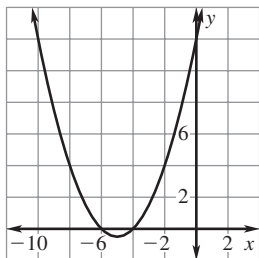
6. Which function has a zero between 7 and 8?

Ⓐ $f(x) = \frac{1}{2}x^2 + 5x + 12$
Ⓑ $f(x) = -4x^2 + 6x + 5$
Ⓒ $f(x) = 3x^2 - 24x + 12$
Ⓓ $f(x) = \frac{1}{2}x^2 + 12$

7. What are the approximate zeros of the function $y = -x^2 - 5x + 5$ to the nearest tenth?

Ⓐ 1.4 and 3.6 Ⓑ -0.9 and 5.9
Ⓒ -3.6 and -1.4 Ⓓ -5.9 and 0.9

8. Which of the following is a solution of the equation $107 - 5x^2 = -18$?

Ⓐ -25 Ⓑ -5 Ⓒ 15 Ⓓ 25

9. Which of the following is a solution of the equation $2x^2 - 5 = -4\frac{1}{2}$?

Ⓐ $-\frac{1}{2}$ Ⓑ $-\frac{1}{4}$ Ⓒ 1 Ⓓ $\frac{3}{4}$

10. What are the solutions of $4x^2 + 40x = -91$?

Ⓐ $-\frac{13}{2}, -\frac{7}{2}$ Ⓑ $-\frac{13}{2}, \frac{7}{2}$
Ⓒ $\frac{13}{2}, -\frac{7}{2}$ Ⓓ $\frac{13}{2}, \frac{7}{2}$

11. What are the solutions of $4x^2 + 48x + 20 = 0$?

Ⓐ $6 \pm \sqrt{41}$ Ⓑ $6 \pm \sqrt{31}$
Ⓒ $-6 \pm \sqrt{41}$ Ⓓ $-6 \pm \sqrt{31}$

12. What are the solutions of $4x^2 - 16x = 16x - 39$?

Ⓐ $-\frac{13}{2}, -\frac{3}{2}$ Ⓑ $-\frac{13}{2}, \frac{3}{2}$
Ⓒ $\frac{13}{2}, -\frac{3}{2}$ Ⓓ $\frac{13}{2}, \frac{3}{2}$

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13. What is the value of the discriminant of the equation $6x^2 - 5x - 3 = 0$?
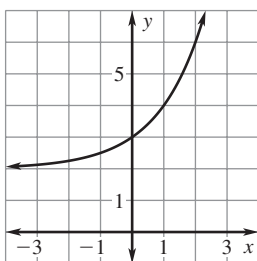
(A) -47 (B) 24 (C) 97 (D) 115

14. How many solutions does $5x^2 - 2x + 3$ have?

(A) None (B) One

(C) Two (D) Three

15. Which function is represented by the following ordered pairs: $(-5, 50), (-2, 8), (0, 0), (1, 2), (3, 18)$?

(A) $y = 2^x$ (B) $y = 2x$

(C) $y = 2x^2$ (D) $y = 0.5x^2$

16. The graph represents what kind of function?

(A) absolute value function

(B) exponential function

(C) linear function

(D) quadratic function

Gridded Answer

17. The value of the discriminant of the equation $2x^2 - x - c = 2$ is 49. What is the value of c?

Short Response

18. The science club wants to have fliers made to advertise their upcoming science fair. The table shows the cost y (in dollars) for x fliers.

Fliers, x	75	125	175	225
Cost (dollars), y	17	23	29	35

a. Tell whether the data can be modeled by a *linear function*, an *exponential function*, or a *quadratic function*. Then write an equation for the function.

b. If the number of fliers printed is tripled, does the price triple? *Explain*.

Extended Response

19. The Art Club is selling scrapbooks to raise money for supplies. Last year, when the students charged $10 per scrapbook, they sold 250 scrapbooks. The students want to increase the cost per scrapbook. They estimate that they will lose 5 sales for each $1 increase in the cost per package. The revenue R (in dollars) generated by selling the scrapbooks is given by the function $R = (10 + n)(250 - 5n)$ where n is the number of $1 increases.

a. Write the function in standard form.

b. Find the maximum value of the function.

c. At what price should the scrapbooks be sold to generate the most revenue? *Explain* your reasoning.

Answer Key

Chapter 10

Standardized Test

1. A **2.** B **3.** D **4.** B **5.** C **6.** C **7.** D

8. B **9.** A **10.** A **11.** D **12.** D **13.** C

14. A **15.** C **16.** B **17.** 4

18. a. Linear function; $y = \frac{3}{25}x + 8$ **b.** No, if the number of fliers printed is tripled, the price is not tripled. The price increases exponentially.

19. a. $R = -5n^2 + 200n + 2500$ **b.** 4500

c. $30; According to the function, the maximum amount of revenue is $4500. The maximum amount of revenue is made when n is 20. This means they can increase their price by $20 to make their maximum amount of revenue. So, the new selling price would be $30.