PreCalc 11 Chapter 3 Review Pack v2

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. Factor: $49x^2 - 16y^2$

A.
$$(4x + 7y)(4x - 7y)$$

B.
$$(7x-4y)(7x-4y)$$

C.
$$(7x + 4y)(7x - 4y)$$

D.
$$(7x+4)(7x-4)$$

2. Factor: $4m^2 - 36m + 81$

A.
$$(2m+9)^2$$

B.
$$(2m-81)(2m-1)$$

C.
$$(2m-9)^2$$

D.
$$(2m-9)(2m+9)$$

3. Factor this polynomial: $24x^2 - 52x - 112$

A.
$$4(2x+7)(3x+4)$$

B.
$$(2x+7)(3x-4)$$

C.
$$(2x-7)(12x-16)$$

D.
$$4(2x-7)(3x+4)$$

4. Factor this polynomial: $\frac{15}{4} - x - x^2$

A.
$$\frac{1}{4}(5-2x)(3+2x)$$

C.
$$\frac{1}{2}(5+2x)(3-4x)$$

B.
$$\frac{1}{2}(5-2x)(3+4x)$$

D.
$$\frac{1}{4}(5+2x)(3-2x)$$

5. Factor this polynomial expression: $2(3x-2)^2 + 9(3x-2) - 5$

A.
$$3(x+1)(6x-5)$$

C.
$$2(3x+2)(x-5)$$

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

D.
$$3(x-1)(6x+5)$$

6. Which statement is true for the equation $x = \sqrt{-x+6}$?

- **A.** 2 and -3 are roots.
- **B.** 2 and 3 are both extraneous roots.
- C. 3 is a root of the original equation and -2 is an extraneous root.
- **D.** 2 is a root of the original equation and -3 is an extraneous root.

7. Which equations are quadratic equations?

i)
$$x^2 = 0$$

ii)
$$x^2 = x$$

iii)
$$x(x-2) = 0$$

iv)
$$\sqrt{x-4} = 2$$

A. i and iii

B. ii and iii

C. i, ii, and iii

D. All of the above

8. Solve by factoring: $3x^2 - 27 = 0$

A.
$$x = 9$$
 or $x = -9$

C.
$$x = 9$$

B.
$$x = 3$$
 or $x = -3$

D.
$$x = 3$$

9. Solve by factoring: $6x^2 - 19x + 15 = 0$

A.
$$x = \frac{3}{2}$$
 or $x = -\frac{5}{3}$

C.
$$x = \frac{3}{2}$$
 or $x = \frac{5}{3}$

B.
$$x = -\frac{3}{2}$$
 or $x = \frac{5}{3}$

D.
$$x = -\frac{3}{2}$$
 or $x = -\frac{5}{3}$

10. Solve by factoring: $4x^2 - 13x = 12$

A.
$$x = 1$$
 or $x = 3$

C.
$$x = -3$$
 or $x = 1$

B.
$$x = -\frac{3}{4}$$
 or $x = 4$

D.
$$x = -\frac{3}{4}$$
 or $x = -4$

11. Solve this equation: $(x-7)^2 - 9 = 30$

A.
$$x = -7 \pm \sqrt{21}$$

C.
$$x = -7 \pm \sqrt{39}$$

B.
$$x = 7 \pm \sqrt{21}$$

D.
$$x = 7 \pm \sqrt{39}$$

12. For which quadratic equation is $2 + \sqrt{5}$ a solution?

A.
$$x^2 - 4x = 1$$

C.
$$x^2 - 2x = 5$$

B.
$$x^2 - 2x = 3$$

D.
$$x^2 - 4x = 3$$

13. A square garden in a city park is to be expanded. The length of each side of the garden is to be increased by 10 m. The area of the new garden will be 121 m². Determine the side length of the original garden.

- **A.** 21 m
- **B.** $\sqrt{1}$ m
- **C.** 11 m
- **D.** 1 m

14. Which expression is a solution of the equation $4x^2 + 6x + 1 = 0$?

A. $1 + \sqrt{5}$

C. $\frac{3+\sqrt{6}}{4}$

B. $1+4\sqrt{6}$

D. $\frac{-3+\sqrt{5}}{4}$

15. What is the coefficient of x in the quadratic equation $-8x - 5x^2 + 3 = 0$?

- **D.** −5

16. Solve this quadratic equation: $4x^2 + 5x = 2$

A. $\frac{-5 \pm \sqrt{57}}{8}$

C. $\frac{5 \pm \sqrt{57}}{8}$

B. $\frac{-5 \pm \sqrt{57}}{4}$

D. $\frac{5 \pm \sqrt{57}}{4}$

17. Solve this quadratic equation: $2x^2 - 3x - 10 = 0$

 $\mathbf{A.} \quad \frac{4 \pm \sqrt{178}}{4}$

C. $\frac{3 \pm \sqrt{89}}{2}$

B. $\frac{3 \pm \sqrt{89}}{4}$

D. $\frac{3 \pm \sqrt{46}}{2}$

18. Solve this radical equation: $2x = \sqrt{12 - 2x}$ Check for extraneous roots.

- **B.** $\frac{3}{2}$ and -2 **C.** -2
- **D.** $-\frac{3}{2}$

19. The coefficients of a quadratic equation are all integers. Which discriminant indicates that the equation has two irrational roots?

- **A.** $\frac{4}{36}$
- **B.** 0.04
- **C.** 0.4
- **D.** 4

20. The roots of any quadratic equation are: $x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$ and $x = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$

Which expression represents the product of these roots?

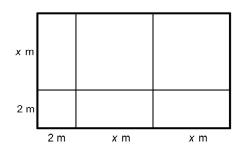
- A. $-\frac{2c}{a}$
- **B.** 4*ac*
- **D.** $\frac{2b^2}{a}$

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21. Without solving, determine the number of real roots of this equation: $x^2 + 6x + 12 = 0$

Short Answer

- **22.** Factor this trinomial: $4.5x^2 + 1.5x 15$
- 23. Factor this trinomial: $x^2 + \frac{21}{5}x 4$
- **24.** Factor this polynomial expression: $32(2x-1)^2 162(2y+3)^2$
- **25.** Factor this polynomial expression: $(4x 1)^2 8(4x 1) + 16$
- **26.** The total area of the large rectangle below is 40 m^2 . Determine the value of x.



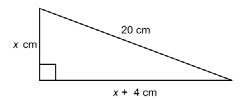
- 27. Solve this equation: $\sqrt{2x^2+4}+2=2x$
- **28.** When 4 times a number is added to the square of the number, the result is 21. Determine the number.
- **29.** Solve this equation: $(3x-2)^2 = (x+3)^2$

- **30.** The formula $h = -5t^2 + 442$ models the height, h metres, of an object t seconds after it is dropped from the top of a tower that is 442 m tall.
 - a) When will the object hit the ground? Give the answer to the nearest tenth of a second.
 - b) What is the height of the object 5 s after it is dropped from the top of the tower?
- 31. Consider the quadratic equation $x^2 + bx + 3 = 0$, where b is a constant. Determine the possible values of b so that this equation has real solutions.
- 32. A car was travelling at a constant speed of 19 m/s, then accelerated for 10 s. The distance travelled during this time, d metres, is given by the formula $d = 19t + 0.7t^2$, where t is the time in seconds since the acceleration began. How long did it take the car to travel 1100 m? Give the answer to the nearest tenth of a second.
- 33. Consider this quadratic equation: $-\frac{1}{2}x^2 \frac{3}{4}x + 1 = 0$
 - a) Rewrite the equation so that it does not contain fractions.
 - b) Solve the equation. Give the answer to 3 decimal places.
- **34.** a) Calculate the value of the discriminant for the equation $-2.15x^2 1.2x + 0.8 = 0$.
 - b) How many roots does the equation have?
- **35.** A model rocket is launched. Its height, h metres, after t seconds is described by the formula $h = -4.9t^2 + 33t$. Without solving the equation, determine whether the rocket reaches a height of 30 m.
- **36.** a) Determine the value of the discriminant for this equation: $x^2 + 5x 14 = 0$
 - b) Use the value of the discriminant to choose a solution strategy, then solve the equation.

Problem

37. Solve this equation, then verify the solution: $\sqrt{x+14} = x-16$ Explain your steps.

38. Determine the lengths of the legs in this right triangle. Explain your strategy.



- **39.** Solve $x^2 11x 11 = 0$ by completing the square. Show your work.
- **40.** Consider the quadratic equation $2x^2 + 6x + c = 0$, where c is a constant. Determine the possible values of c so that this equation has 2 real solutions. Explain your strategy.
- **41.** A student wrote the solution below to solve this quadratic equation: $2x^2 8x 15 = 0$

$$2x^{2} - 8x - 15 = 0$$

$$2x^{2} - 8x = 15$$

$$2(x^{2} - 4x) = 15$$

$$2(x^{2} - 4x + 4) = 15 + 4$$

$$2(x - 2)^{2} = 19$$

$$(x - 2)^{2} = \frac{19}{2}$$

$$x - 2 = \pm \sqrt{\frac{19}{2}}$$

$$x = 2 \pm \sqrt{\frac{19}{2}}$$
The roots are: $x = 2 + \sqrt{\frac{19}{2}}$ and $x = 2 - \sqrt{\frac{19}{2}}$

Identify the error, then write the correct solution.

- **42.** A ball is thrown in the air. The approximate height of the ball, h metres, after t seconds can be modelled by the equation $h = -5t^2 + 15t$. Will the ball ever reach a height of 25 m? Explain your answer.
- **43.** a) Solve this quadratic equation by expanding, simplifying, then applying the quadratic formula: $(x+2)^2 5(x+2) 9 = 0$
 - b) Solve the equation in part a using the quadratic formula without expanding.