NAME: _____ BLOCK: _____ DATE: _____

PRECALC MATH 11 - PRACTICE MIDTERM

Multiple Choice

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

1. Which of these sequences has a common difference of –10?
   A. 2.5, 11, 19.5, 28
   B. 2, –7, –17, –27
   C. 8, –2, –12, –22
   D. –10.5, –9.5, –8.5, –7.5

2. Determine t_{11} of this arithmetic sequence: –20, –35, –50, –65, ...
   A. $t_{11} = -80$
   B. $t_{11} = -170$
   C. $t_{11} = -15$
   D. $t_{11} = -20$

3. The general term of an arithmetic sequence is: $t_n = -17 + (-4)(n-1)$
   Determine the first 4 terms of the sequence.
   A. –21, –25, –29, –33
   B. –17, –4, –25, –29
   C. –17, –25, –33, –41
   D. –17, –21, –25, –29

4. Determine the sum of the given terms of this arithmetic series: $5+8+11+14+17+20+23+26$
   A. 104
   B. 520
   C. 124
   D. 69

5. Determine the sum of the first 23 terms of this arithmetic series: $9+5+1-3-7-11-15-19-...$
   A. $S_{23} = -344$
   B. $S_{23} = -908.5$
   C. $S_{23} = -8176.5$
   D. $S_{23} = -805$

6. An arithmetic series has $t_{11} = 17$ and $S_{11} = 132$; determine t_1.
   A. $t_1 = -7$
   B. $t_1 = 7$
   C. $t_1 = 1$
   D. $t_1 = 8$

7. Which sequence could be geometric?
   A. 4, 12, 20, 28, ...
   B. –4, –16, –64, –256, ...
   C. 8, 39, 70, 101, ...
   D. –4, –3.1, –2.2, –1.3, ...

8. Determine the 8th term of this geometric sequence: 7, 21, 63, 189, ...
   A. 45 927
   B. 19 683
   C. 21 870
   D. 15 309

9. Write the first 4 terms of the geometric sequence with $t_1 = 405$ and $r = -\frac{1}{3}$.
   A. 405, –135, 45, –15
   B. $405, -\frac{1}{135}, \frac{1}{45}, -\frac{1}{15}$
   C. 405, 135, –45, 15
   D. 405, –1215, 3645, –10935

10. The sum of the first 7 terms of which geometric series is 508?
    A. $4+8+16+...+256$
    B. $3+6+12+...+192$
    C. $2+8+16+...+128$
    D. $5+10+20+...+320$

11. Determine the sum of the first 5 terms of this geometric series: $18+6+2+\ldots$

A. 27
B. 36
C. 45
D. 26.89

12. Determine the common ratio of a geometric series that has these partial sums: $S_4=-3.5$, $S_5=-3.75$, $S_6=-3.875$

A. $r=1$
B. $r=-2$
C. $r=-0.5$
D. $r=0.5$

13. Determine the common ratio of this infinite geometric series: $-5+2-\frac{4}{5}+\frac{8}{25}-\ldots$

Does the series have a finite sum?

A. $r=-0.4$, so the sum is finite.
B. $r=-\frac{4}{5}$, so the sum is finite.
C. $r=-3.57$, so the sum is not finite.
D. $r=-\frac{2}{5}$, so the sum is finite.

14. An infinite geometric series has $t_1=5$ and $r=-2$. Determine S_∞.

A. $S_\infty=5$
B. The sum is not finite.
C. $S_\infty=2$
D. $S_\infty=-4$

15. What is the distance between $1\frac{4}{5}$ and $-2\frac{1}{5}$ on a number line?

A. $2\frac{1}{2}$ **B.** 4 **C.** $\frac{1}{4}$ **D.** $\frac{2}{5}$

16. Evaluate: $|-11+(-1)|-7|7-(21)|$

A. –86 **B.** –208 **C.** 266 **D.** –206

17. Evaluate $|x^2+(-5)x+(7)|$ when $x=-5$.

A. 57 **B.** 50 **C.** 27 **D.** 123

18. Write this mixed radical as an entire radical: $5\sqrt[5]{5}$

A. $\sqrt[5]{25}$ **B.** $\sqrt[5]{625}$ **C.** $\sqrt[5]{125}$ **D.** $\sqrt[5]{15625}$

19. Write this entire radical as a mixed radical: $\sqrt[3]{-320}$

A. $-4\sqrt[3]{5}$ **B.** $-8\sqrt[3]{10}$ **C.** $-4\sqrt[3]{25}$ **D.** $-8\sqrt[3]{5}$

20. For which values of the variable, x, is this radical defined?
$\sqrt{78x^2}$

A. $x\in\mathbb{R}$
B. $x\le 0$
C. $x\ge 0$
D. $x>0$

21. Write this radical in simplest form: $\sqrt{63a^9b^8}$
Then state the values of the variables, a and b, for which the radical is defined.

A. $3a^4b^4\sqrt{7a}$; $a\in\mathbb{R}, b\ge 0$
B. $3ab\sqrt{7a^4b^4}$; $a\ge 0, b\in\mathbb{R}$
C. $3ab\sqrt{7a^4b^4}$; $a\in\mathbb{R}, b\ge 0$
D. $3a^4b^4\sqrt{7a}$; $a\ge 0, b\in\mathbb{R}$

22. Simplify by adding or subtracting like terms: $8\sqrt{13}-7\sqrt{13}+5\sqrt{13}$

A. $6\sqrt{13}$ **B.** $\sqrt{78}$ **C.** $10\sqrt{13}$ **D.** $6\sqrt{10}$

23. Simplify by adding or subtracting like terms: $\sqrt{9}+\sqrt{125}-\sqrt{81}+\sqrt{3125}$

A. $30\sqrt{5}-6$
B. $-8\sqrt{3}$
C. $-8\sqrt{5}$
D. $30\sqrt{3}-6$

24. Simplify by adding or subtracting like terms: $\sqrt[3]{64w^2}-4\sqrt[3]{w^2}-\sqrt[3]{8w^2}, w \in \mathbb{R}$

A. $2\sqrt[3]{w^2}$ **B.** $-2\sqrt[3]{w^2}$ **C.** $10\sqrt[3]{w^2}$ **D.** $6\sqrt[3]{w^2}$

25. Expand and simplify this expression: $-\sqrt{2}\left(\sqrt{7}-5\right)$

A. $-7\sqrt{2}+\sqrt{10}$
B. $-2\sqrt{7}+5\sqrt{2}$
C. $-\sqrt{14}+5\sqrt{2}$
D. $\sqrt{14}-\sqrt{10}$

26. Expand and simplify this expression: $\left(\sqrt{7}+7\right)\left(\sqrt{3}-2\right)$

A. $\sqrt{21}-14\sqrt{7}-14$
B. $\sqrt{21}-2\sqrt{7}+7\sqrt{3}-14$
C. $7\sqrt{3}-2\sqrt{7}+7\sqrt{7}-14$
D. $\sqrt{21}+3\sqrt{7}+7\sqrt{3}+\sqrt{49}$

27. Expand and simplify this expression: $\sqrt{a}\left(3\sqrt{a}-2\right), a \geq 0$

A. $3a-2\sqrt{a}$
B. $3\sqrt{a}-2a$
C. $\sqrt{3a}-2$
D. $\sqrt{3a-2}$

28. Simplify this expression: $\dfrac{-9\sqrt{5}-3}{\sqrt{5}}$

A. $\dfrac{-45-3\sqrt{5}}{5}$
B. $-225-3\sqrt{5}$
C. $\dfrac{-9-15\sqrt{5}}{5}$
D. $\dfrac{-45\sqrt{5}-15}{5}$

29. Simplify this expression: $\dfrac{-8\sqrt{7}+5\sqrt{3}}{\sqrt{7}-\sqrt{3}}$

A. $\dfrac{-41+40\sqrt{21}}{4}$
B. $\dfrac{-41-3\sqrt{21}}{4}$
C. $\dfrac{-71+40\sqrt{21}}{4}$
D. $\dfrac{-71-3\sqrt{21}}{21}$

30. Solve this equation: $9\sqrt{4x}=72$

A. $x=16$ **B.** $x=64$ **C.** $x=\dfrac{1}{8}$ **D.** $x=8$

31. Solve this equation: $-4\sqrt{x}-43=-10\sqrt{x}-7$

A. $x=12$ **B.** $x=36$ **C.** $x=6$ **D.** $x=25$

32. Solve this equation: $3x = \sqrt{30+3x}$

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

B. $x = 2$

C. $x = -2$

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

33. Solve this equation: $\frac{\sqrt{2x+54}}{2} = 4$

A. $x = \frac{5}{2}$ **B.** $x = 25$ **C.** $x = 5$ **D.** $x = 10$

34. Factor: $49b^2 - 64$

A. $(7b-8)(7b-8)$

B. $(8b+7)(8b-7)$

C. $(7b+8)(7b-8)$

D. $(7b+8)(7b+8)$

35. Factor: $25m^2 - 40m + 16$

A. $(5m-16)(5m-1)$

B. $(5m-4)(5m+4)$

C. $(5m+4)^2$

D. $(5m-4)^2$

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

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

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

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

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

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

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

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

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

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

38. Which statement is true for the equation $x = \sqrt{6x+7}$?

A. 7 and –1 are roots.

B. 7 is a root of the original equation and –1 is an extraneous root.

C. 1 is a root of the original equation and –7 is an extraneous root.

D. 7 and 1 are both extraneous roots.

39. Solve by factoring: $x^2 + 4x - 21 = 0$

A. $x = -7$ or $x = 3$

B. $x = -7$ or $x = -3$

C. $x = 7$ or $x = -3$

D. $x = 7$ or $x = 3$

40. Solve this equation: $(x-1)^2 - 7 = 24$

A. $x = 1 \pm \sqrt{17}$

B. $x = 1 \pm \sqrt{31}$

C. $x = -1 \pm \sqrt{31}$

D. $x = -1 \pm \sqrt{17}$

41. Determine the value of that makes $x^2 + 10x + \square$ a perfect square.

A. 25 **B.** 10 **C.** 100 **D.** 625

42. Solve $x^2 + 8x + 13 = 0$ by completing the square.

A. $x = -4 \pm \sqrt{3}$
B. $x = 4 \pm \sqrt{19}$
C. $x = 64 \pm \sqrt{3}$
D. $x = -8 \pm \sqrt{19}$

43. Solve this equation: $2x^2 = 20$

A. $x = \sqrt{10}$
B. $x = 10$
C. $x = -\sqrt{10}$
D. $x = -\sqrt{10}$ or $x = \sqrt{10}$

44. Which expression is a solution of the equation $4x^2 - 2x - 1 = 0$?

A. $-1 + \sqrt{5}$
B. $\frac{-1 + \sqrt{2}}{4}$
C. $\frac{1 + \sqrt{5}}{4}$
D. $-1 + 4\sqrt{2}$

45. Solve this quadratic equation: $4x^2 - 5x = 3$

A. $\frac{5 \pm \sqrt{73}}{4}$
B. $\frac{-5 \pm \sqrt{73}}{4}$
C. $\frac{-5 \pm \sqrt{73}}{8}$
D. $\frac{5 \pm \sqrt{73}}{8}$

46. Solve this quadratic equation: $4x^2 + 5x - 9 = 0$
Give the solution to 2 decimal places.

A. $x = 1.63$ or $x = -1.63$
B. $x = 1.00$ or $x = -2.25$
C. $x = 2.25$ or $x = -1.00$
D. $x = 2.00$ or $x = -4.50$

47. Without solving, determine the number of real roots of this equation: $x^2 + 17 = 0$

A. 0
B. 1
C. 2

48. Calculate the value of the discriminant for this equation: $-3x^2 + 6x - 2 = 0$

A. –9
B. 15
C. 0
D. 12

49. For a quadratic function, which characteristic of its graph is equivalent to the zero of the function?

A. minimum point
B. maximum point
C. x-intercept
D. y-intercept

50. Identify the y-intercept of the graph of this quadratic function: $y = -3(x + 3)^2 + 4$

A. 23
B. 13
C. –27
D. –23

51. Use graphing technology to approximate the solution of this equation: $2x^2 - 3x - 4 = 0$
Write the roots to 1 decimal place.

A. The roots are approximately $x = 2.4$ and $x = -0.9$.
B. The roots are approximately $x = 1.6$ and $x = -1.6$.
C. The roots are approximately $x = 0.9$ and $x = -2.4$.
D. The roots are approximately $x = 4.7$ and $x = -1.7$.

52. Which statement is NOT true for the graph of $y = x^2 + q$?

A. When q is positive, the graph lies above the x-axis.
B. As q increases, the graph moves up.
C. When q is negative, the vertex is above the x-axis.
D. The graph has the same size and shape as the graph of $y = x^2$.

53. Identify the coordinates of the vertex of the graph of this quadratic function: $y = \frac{1}{8}(x-4)^2 - 4$

A. (4, 4) **B.** (–4, –4) **C.** (–4, 4) **D.** (4, –4)

54. Write $y = -x^2 + 60x - 400$ in standard form, then identify the coordinates of the vertex.

A. $y = -(x-60)^2 + 300$; vertex: (30, 600)
B. $y = -(x-30)^2 + 500$; vertex: (30, 500)
C. $y = -(x-60)^2 + 300$; vertex: (60, 300)
D. $y = -(x-30)^2 + 500$; vertex: (50, 300)

55. A quadratic function has zeros –3 and 8. What is the equation of the axis of symmetry of its graph?

A. $x = 2.5$ **C.** $x = -2.5$
B. $x = -5.5$ **D.** $x = 5.5$

56. Does the quadratic function $y = (x + 10)(34 - x)$ have a maximum value or a minimum value? What is that value?

A. minimum value; 484
B. minimum value; 340
C. maximum value; 484
D. maximum value; 340

PRECALC MATH 11 - PRACTICE MIDTERM
Answer Section

MULTIPLE CHOICE

1.	ANS: C	DIF: Easy	REF: 1.1 Arithmetic Sequences
2.	ANS: B	DIF: Easy	REF: 1.1 Arithmetic Sequences
3.	ANS: D	DIF: Easy	REF: 1.1 Arithmetic Sequences
4.	ANS: C	DIF: Easy	REF: 1.2 Arithmetic Series
5.	ANS: D	DIF: Easy	REF: 1.2 Arithmetic Series
6.	ANS: B	DIF: Moderate	REF: 1.2 Arithmetic Series
7.	ANS: B	DIF: Easy	REF: 1.3 Geometric Sequences
8.	ANS: D	DIF: Easy	REF: 1.3 Geometric Sequences
9.	ANS: A	DIF: Moderate	REF: 1.3 Geometric Sequences
10.	ANS: A	DIF: Moderate	REF: 1.4 Geometric Series
11.	ANS: D	DIF: Easy	REF: 1.4 Geometric Series
12.	ANS: D	DIF: Moderate	REF: 1.4 Geometric Series
13.	ANS: D	DIF: Easy	REF: 1.6 Infinite Geometric Series
14.	ANS: B	DIF: Easy	REF: 1.6 Infinite Geometric Series
15.	ANS: B	DIF: Moderate	REF: 2.1 Absolute Value of a Real Number
16.	ANS: A	DIF: Moderate	REF: 2.1 Absolute Value of a Real Number
17.	ANS: A	DIF: Moderate	REF: 2.1 Absolute Value of a Real Number
18.	ANS: D	DIF: Easy	REF: 2.2 Simplifying Radical Expressions
19.	ANS: A	DIF: Moderate	REF: 2.2 Simplifying Radical Expressions
20.	ANS: A	DIF: Moderate	REF: 2.2 Simplifying Radical Expressions
21.	ANS: D	DIF: Difficult	REF: 2.2 Simplifying Radical Expressions
22.	ANS: A	DIF: Easy	REF: 2.3 Adding and Subtracting Radical Expressions
23.	ANS: A	DIF: Moderate	REF: 2.3 Adding and Subtracting Radical Expressions
24.	ANS: B	DIF: Easy	REF: 2.3 Adding and Subtracting Radical Expressions
25.	ANS: C	DIF: Easy	REF: 2.4 Multiplying and Dividing Radical Expressions
26.	ANS: B	DIF: Easy	REF: 2.4 Multiplying and Dividing Radical Expressions
27.	ANS: A	DIF: Moderate	REF: 2.4 Multiplying and Dividing Radical Expressions
28.	ANS: A	DIF: Moderate	REF: 2.4 Multiplying and Dividing Radical Expressions
29.	ANS: B	DIF: Moderate	REF: 2.4 Multiplying and Dividing Radical Expressions
30.	ANS: A	DIF: Easy	REF: 2.5 Solving Radical Equations
31.	ANS: B	DIF: Moderate	REF: 2.5 Solving Radical Equations
32.	ANS: B	DIF: Moderate	REF: 2.5 Solving Radical Equations
33.	ANS: C	DIF: Moderate	REF: 2.5 Solving Radical Equations
34.	ANS: C	DIF: Easy	REF: 3.1 Factoring Polynomial Expressions
35.	ANS: D	DIF: Easy	REF: 3.1 Factoring Polynomial Expressions
36.	ANS: D	DIF: Moderate	REF: 3.1 Factoring Polynomial Expressions
37.	ANS: A	DIF: Moderate	REF: 3.1 Factoring Polynomial Expressions
38.	ANS: B	DIF: Moderate	REF: 3.2 Solving Quadratic Equations by Factoring
39.	ANS: A	DIF: Easy	REF: 3.2 Solving Quadratic Equations by Factoring
40.	ANS: B	DIF: Easy	REF: 3.3 Using Square Roots to Solve Quadratic Equations

41. ANS: A DIF: Easy REF: 3.3 Using Square Roots to Solve Quadratic Equations
42. ANS: A DIF: Moderate REF: 3.3 Using Square Roots to Solve Quadratic Equations
43. ANS: D DIF: Easy REF: 3.3 Using Square Roots to Solve Quadratic Equations
44. ANS: C DIF: Moderate REF: 3.4 Developing and Applying the Quadratic Formula
45. ANS: D DIF: Moderate REF: 3.4 Developing and Applying the Quadratic Formula
46. ANS: B DIF: Moderate REF: 3.4 Developing and Applying the Quadratic Formula
47. ANS: A DIF: Easy REF: 3.5 Interpreting the Discriminant
48. ANS: D DIF: Easy REF: 3.5 Interpreting the Discriminant
49. ANS: C DIF: Easy REF: 4.1 Properties of a Quadratic Function
50. ANS: D DIF: Easy REF: 4.1 Properties of a Quadratic Function
51. ANS: A DIF: Easy REF: 4.2 Solving a Quadratic Equation Graphically
52. ANS: C DIF: Easy REF: 4.3 Transforming the Graph of y = x^2
53. ANS: D DIF: Easy
REF: 4.4 Analyzing Quadratic Functions of the Form y = a(x - p)^2 + q
54. ANS: B DIF: Moderate
REF: 4.5 Equivalent Forms of the Equation of a Quadratic Function
55. ANS: A DIF: Easy
REF: 4.6 Analyzing Quadratic Functions of the Form y = ax^2 + bx + c
56. ANS: C DIF: Easy
REF: 4.7 Modelling and Solving Problems with Quadratic Functions