

MATH PRACTICE EXAM

Algebra 2 & Geometry

20 Problems · 3 Questions Each · Multiple Choice

Name: _____

Date: _____

Score: _____ / 60

INSTRUCTIONS: Each problem has 3 questions. Circle the best answer for each. All 3 must be correct for full credit on each problem. Partial credit may be awarded at teacher's discretion.

SECTION A: ALGEBRA 2

Problem 1 | Quadratic Functions

Q1.1 Find the vertex of $f(x) = 2x^2 - 8x + 5$.

- A) (2, -3)
- B) (-2, 25)
- C) (4, 5)
- D) (2, 3)

Q1.2 The discriminant of $3x^2 - 6x + 3 = 0$ is:

- A) 36
- B) 0
- C) -36
- D) 12

Q1.3 Which function has NO real roots?

- A) $f(x) = x^2 - 4$
- B) $f(x) = x^2 + x - 6$
- C) $f(x) = x^2 + 2x + 5$
- D) $f(x) = 2x^2 - 8$

Problem 2 | Polynomial Operations

Q2.1 What is the remainder when $p(x) = x^3 - 5x + 4$ is divided by $(x - 2)$?

- A) 2
- B) -2
- C) 6
- D) 0

Q2.2 Which is a factor of $p(x) = x^3 - x^2 - 4x + 4$?

- A) $(x - 3)$
- B) $(x - 1)$
- C) $(x + 2)$
- D) $(x - 2)$

Q2.3 What is the quotient of $(x^3 + 2x^2 - x - 2) \div (x - 1)$?

- A) $x^2 + x - 2$
 - B) $x^2 + 3x + 2$
 - C) $x^2 + 3x - 2$
 - D) $x^2 + x + 2$
-

Problem 3 | Rational Expressions

Q3.1 Simplify: $(x^2 - 9) / (x + 3)$

- A) $x - 3$
- B) $x + 3$
- C) $(x-3)(x+3)$
- D) $x^2 - 3$

Q3.2 What are the restrictions for $(x + 2) / (x^2 - 5x + 6)$?

- A) $x \neq 2, 3$
- B) $x \neq -2$
- C) $x \neq 2$
- D) $x \neq 3$

Q3.3 Add: $3/(x-1) + 2/(x+1)$. What is the numerator of the simplified sum?

- A) $5x + 1$
 - B) $5x - 1$
 - C) 5
 - D) $5x + 5$
-

Problem 4 | Radical & Exponential Equations

Q4.1 Solve: $\sqrt{2x - 1} = 5$

- A) $x = 13$
- B) $x = 3$
- C) $x = 12$
- D) $x = 26$

Q4.2 Solve: $4^{(x+1)} = 16^2$

- A) $x = 3$
- B) $x = 4$
- C) $x = 2$
- D) $x = 7$

Q4.3 Which is an extraneous solution of $\sqrt{x + 7} = x - 5$?

- A) $x = 9$
 - B) $x = 2$
 - C) $x = -2$
 - D) $x = 7$
-

Problem 5 | Logarithms

Q5.1 What is $\log_{\blacksquare}(81)$?

- A) 4
- B) 3
- C) 9
- D) 27

Q5.2 Expand: $\log_{\blacksquare}(8x^3) = ?$

- A) $3 + 3\log_{\blacksquare}(x)$
- B) $3\log_{\blacksquare}(x)$
- C) $8 + 3\log_{\blacksquare}(x)$
- D) $3 + \log_{\blacksquare}(x)$

Q5.3 Solve: $\log(x - 1) + \log(x + 1) = \log(8)$

- A) $x = 3$
 - B) $x = -3$
 - C) $x = \pm 3$
 - D) $x = 9$
-

Problem 6 | Systems of Equations

Q6.1 Solve: $x + y = 7$ and $2x - y = 2$. What is x ?

- A) $x = 3$
- B) $x = 2$
- C) $x = 5$
- D) $x = 4$

Q6.2 How many solutions does $2x + 4y = 8$ and $x + 2y = 3$ have?

- A) No solution
- B) 1 solution
- C) Infinitely many
- D) 2 solutions

Q6.3 Solve: $x^2 + y = 5$ and $y = -x + 3$. Find x values.

- A) $x = 1$ or 2
 - B) $x = -1$ or 2
 - C) $x = 0$ or 3
 - D) $x = 1$ or -2
-

Problem 7 | Sequences & Series

Q7.1 Find the 15th term: $5, 9, 13, 17, \dots$

- A) 61
- B) 57
- C) 65
- D) 53

Q7.2 Sum of geometric series $3 + 6 + 12 + \dots + 192$ is:

- A) 381
- B) 384
- C) 192
- D) 255

Q7.3 Infinite geometric series sum: $8 + 4 + 2 + 1 + \dots$

- A) 16
 - B) 12
 - C) 20
 - D) 15
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Problem 8 | Conic Sections

Q8.1 What is the radius of $x^2 + y^2 - 4x + 6y - 3 = 0$?

- A) 3
- B) 4
- C) 5
- D) 6

Q8.2 The conic $x^2/9 + y^2/4 = 1$ is a(n):

- A) Ellipse
- B) Circle
- C) Parabola
- D) Hyperbola

Q8.3 The focus of parabola $y = x^2/8$ is at:

- A) (0, 2)
 - B) (0, 8)
 - C) (2, 0)
 - D) (0, -2)
-

Problem 9 | Complex Numbers

Q9.1 Simplify: i^4

- A) $-i$
- B) i
- C) 1
- D) -1

Q9.2 Multiply: $(2 + 3i)(2 - 3i) = ?$

- A) 13
- B) $4 - 9i$
- C) -5
- D) $4 + 9$

Q9.3 What is $(1 + i)/(1 - i)$?

- A) i
 - B) 1
 - C) $-i$
 - D) 0
-

Problem 10 | Probability & Statistics

Q10.1 In how many ways can you arrange 4 books from 7?

- A) 840
- B) 35
- C) 210
- D) 5040

Q10.2 A bag has 3 red and 5 blue marbles. P(red then red) without replacement?

- A) $\frac{3}{28}$
- B) $\frac{9}{64}$
- C) $\frac{6}{56}$
- D) $\frac{1}{4}$

Q10.3 $C(8, 3) = ?$

- A) 56
- B) 336
- C) 24
- D) 512

SECTION B: GEOMETRY

Problem 11 | Triangle Congruence

Q11.1 Which postulate CANNOT prove triangle congruence?

- A) AAA
- B) SSS
- C) AAS
- D) HL

Q11.2 Two sides and the included angle are equal. Which postulate applies?

- A) SAS
- B) SSS
- C) ASA
- D) AAS

Q11.3 In right triangles, hypotenuse and one leg are equal. Congruence by:

- A) HL
- B) SAS
- C) SSS
- D) AAS

Problem 12 | Circle Theorems

Q12.1 An inscribed angle intercepts an arc of 140° . The angle measures:

- A) 70°
- B) 140°
- C) 280°
- D) 35°

Q12.2 The angle between a tangent and radius at point of tangency is:

- A) 90°
- B) 45°
- C) 180°
- D) 60°

Q12.3 Two chords intersect inside a circle, arcs 60° and 100° . Chord-chord angle?

- A) 80°
 - B) 160°
 - C) 40°
 - D) 60°
-

Problem 13 | Similarity & Proportions

Q13.1 Two similar triangles have a side ratio of 3:5. Their area ratio is:

- A) 9:25
- B) 3:5
- C) 6:10
- D) 27:125

Q13.2 In $\triangle ABC$, $DE \parallel BC$, $AD = 4$, $DB = 6$, $AE = 5$. Find EC .

- A) 7.5
- B) 5
- C) 6
- D) 8

Q13.3 Two similar polygons have perimeters 18 and 30. Their area ratio:

- A) 9:25
 - B) 3:5
 - C) 18:30
 - D) 6:10
-

Problem 14 | Right Triangles & Trigonometry

Q14.1 In a right triangle, leg opposite $30^\circ = 7$. What is the hypotenuse?

- A) 14
- B) $7\sqrt{2}$
- C) $7\sqrt{3}$
- D) $7/2$

Q14.2 In a 45-45-90 triangle with legs of length 5, the hypotenuse is:

- A) $5\sqrt{2}$
- B) $5\sqrt{3}$
- C) 10
- D) 5

Q14.3 If $\sin(\theta) = 4/5$, what is $\cos(\theta)$?

- A) $3/5$
 - B) $4/3$
 - C) $5/4$
 - D) $\sqrt{7/5}$
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Problem 15 | Area & Volume

Q15.1 A sphere has radius 6. Its volume is:

- A) 288π
- B) 144π
- C) 36π
- D) 216π

Q15.2 A cylinder has radius 5 and height 10. Its lateral surface area is:

- A) 100π
- B) 50π
- C) 150π
- D) 200π

Q15.3 A pyramid has a square base of side 6 and height 4. Volume = ?

- A) 48
 - B) 144
 - C) 36
 - D) 72
-

Problem 16 | Coordinate Geometry

Q16.1 Distance between $(-2, 1)$ and $(3, 13)$ is:

- A) 13
- B) 12
- C) 5
- D) $\sqrt{119}$

Q16.2 Midpoint of $(4, -2)$ and $(-2, 8)$ is:

- A) $(1, 3)$
- B) $(2, 6)$
- C) $(1, 5)$
- D) $(3, 3)$

Q16.3 Line ℓ has slope $3/4$. A perpendicular line has slope:

- A) $-4/3$
 - B) $4/3$
 - C) $-3/4$
 - D) $3/4$
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Problem 17 | Parallel Lines & Angles

Q17.1 Co-interior angle is 65° . The other co-interior angle is:

- A) 115°
- B) 65°
- C) 25°
- D) 130°

Q17.2 Parallel lines cut by transversal. Corresponding angle = 78° . Alternate interior angle?

- A) 78°
- B) 102°
- C) 12°
- D) 156°

Q17.3 Vertical angles are always:

- A) Equal
 - B) Supplementary
 - C) Complementary
 - D) Adjacent
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Problem 18 | Transformations

Q18.1 Point $(4, -3)$ reflected over the x-axis. Image is:

- A) $(4, 3)$
- B) $(-4, -3)$
- C) $(-4, 3)$
- D) $(3, 4)$

Q18.2 Point $(2, 5)$ rotated 90° counter-clockwise. Image is:

- A) $(-5, 2)$
- B) $(5, -2)$
- C) $(-2, 5)$
- D) $(5, 2)$

Q18.3 Which transformation does NOT preserve size?

- A) Dilation
 - B) Translation
 - C) Rotation
 - D) Reflection
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Problem 19 | Quadrilateral Properties

Q19.1 In a parallelogram, one angle is 110° . The consecutive angle is:

- A) 70°
- B) 110°
- C) 55°
- D) 140°

Q19.2 Which quadrilateral has diagonals that are perpendicular bisectors of each other?

- A) Rhombus
- B) Rectangle
- C) Trapezoid
- D) Kite

Q19.3 In rectangle ABCD, diagonal $AC = 10$. What is diagonal BD?

- A) 10
 - B) 5
 - C) $5\sqrt{2}$
 - D) 20
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Problem 20 | Pythagorean Theorem

Q20.1 A right triangle has legs 9 and 12. The hypotenuse is:

- A) 15
- B) 21
- C) 18
- D) $\sqrt{225}$

Q20.2 A rectangular box is $3 \times 4 \times 12$. The space diagonal length is:

- A) 13
- B) $\sqrt{169}$
- C) $\sqrt{144}$
- D) 12

Q20.3 Do sides 7, 24, 25 form a right triangle?

- A) Yes, $7^2 + 24^2 = 25^2$
 - B) No
 - C) Only approximately
 - D) Cannot determine
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ANSWER KEY

#	Topic	Q1	Q2	Q3
1	Quadratic Functions	A	B	C
2	Polynomial Operations	A	D	B
3	Rational Expressions	A	A	A
4	Radical & Exponential Equations	A	A	B
5	Logarithms	A	A	A
6	Systems of Equations	A	A	B
7	Sequences & Series	A	A	A
8	Conic Sections	B	A	A
9	Complex Numbers	A	A	A
10	Probability & Statistics	A	A	A
11	Triangle Congruence	A	A	A
12	Circle Theorems	A	A	A
13	Similarity & Proportions	A	A	A
14	Right Triangles & Trigonometry	A	A	A
15	Area & Volume	A	A	A
16	Coordinate Geometry	A	A	A
17	Parallel Lines & Angles	A	A	A
18	Transformations	A	A	A
19	Quadrilateral Properties	A	A	A
20	Pythagorean Theorem	A	A	A

Scoring Guide: Each problem = 3 sub-questions. Full credit (1 pt/problem) = all 3 correct. Maximum score = 20 points.
90–100% = A | 80–89% = B | 70–79% = C | Below 70% = Review recommended.