MATH MASTERY EXAM

Pre-Algebra & Geometry | Core Concepts Practice Test

Date: _____ Name: _____ Score: ____/20

SECTION A: PRE-ALGEBRA (Questions 1–10)

1. Evaluate: 3 + 4 x 2 - (6 / 3)

Concept: Parentheses > Exponents > Multiply/Divide (L to R) > Add/Subtract (L to R)

A) 7 B) 9

C) 5 D) 11

---

2. What is (-8) - (-3) + 5?

Concept: Subtracting a negative = adding a positive. (-a) - (-b) = -a + b

A) -16 B) 0

C) 10 D) -10

---

3. Simplify: 2/3 + 3/4

Concept: Find LCD before adding fractions. 1/3 + 1/4 = 4/12 + 3/12 = 7/12

A) 5/7 B) 17/12

C) 5/12 D) 6/7

---

4. If 3/x = 9/15, what is x?

Concept: Cross-multiply to solve proportions: a/b = c/d → ad = bc

A) 3 B) 5

C) 7 D) 45

---

5. What is 35% of 120?

Concept: % of a number: multiply by decimal form. 30% of 80 = 0.30 x 80 = 24

A) 40 B) 42

C) 35 D) 48

---

6. Solve: 4x - 6 = 18

Concept: Do the same operation to both sides. x + 7 = 12 → x = 12 - 7 = 5

A) x = 3 B) x = 6

C) x = 8 D) x = 4

---

7. Simplify: 2^3 x 2^(-1)

Concept: a^m x a^n = a^(m+n). Negative exponent: a^(-n) = 1/a^n

A) 2 B) 4

C) 8 D) 16

---

8. Simplify: sqrt(72)

Concept: sqrt(a x b) = sqrt(a) x sqrt(b). Simplify by factoring perfect squares.

A) 6 sqrt(2)
B) 8 sqrt(3)
C) 6 sqrt(3)
D) 4 sqrt(6)

---

9. Solve and graph: -2x + 3 > 7

Concept: Flip inequality sign when multiplying/dividing by a negative number.

A) x > -2
B) x < -2
C) x < 2
D) x > 2

---

10. Simplify: 3(2x - 4) + 5x - 2

Concept: a(b + c) = ab + ac. Like terms share the same variable and exponent.

A) 10x - 10
B) 11x - 14
C) 11x - 6
D) 10x - 14

SECTION B: GEOMETRY (Questions 11–20)

11. Two supplementary angles are in ratio 2:3. What is the smaller angle?

Concept: Supplementary angles sum to 180 degrees. Complementary angles sum to 90 degrees.

A) 54 degrees
B) 72 degrees
C) 60 degrees
D) 90 degrees

---

12. A triangle has angles of 45 degrees and 75 degrees. Find the third angle.

Concept: All interior angles of a triangle sum to 180 degrees.

A) 80 degrees
B) 55 degrees
C) 60 degrees
D) 70 degrees

---

13. A right triangle has legs 6 and 8. Find the hypotenuse.

Concept: In a right triangle: a^2 + b^2 = c^2 where c is the hypotenuse.

A) 12
B) 10
C) 14
D) 100

---

14. A trapezoid has parallel sides 8 and 12, height 5. Find its area.

Concept: Area of triangle = (1/2) x base x height. Area of trapezoid = (1/2)(b1+b2) x h

A) 40
B) 50
C) 60
D) 100

---

15. A circle has radius 7. Find its area (use pi = 3.14).

Concept: Circumference = 2 pi r. Area = pi r^2. Use pi = 3.14.

A) 43.96
B) 153.86

C) 49 pi

D) 21.98

---

16. A rectangle is 10 cm by 6 cm. An identical rectangle is attached to its long side. What is the new perimeter?

Concept: Perimeter = sum of all sides. Break composite shapes into simpler parts.

A) 44 cm

B) 56 cm

C) 32 cm

D) 40 cm

---

17. A cylinder has radius 3 and height 10. Find its volume (use pi = 3.14).

Concept: Volume of rectangular prism = l x w x h. Volume of cylinder = pi r^2 h

A) 94.2

B) 282.6

C) 188.4

D) 314

---

18. Two similar triangles: one has sides 3, 4, 5. The shortest side of the other is 9. Find the longest side.

Concept: Similar triangles have proportional sides. Set up ratios to find missing sides.

A) 12

B) 15

C) 18

D) 10

---

19. Find the distance between (1, 2) and (4, 6).

Concept: Distance = sqrt((x2-x1)^2 + (y2-y1)^2). Midpoint = ((x1+x2)/2, (y1+y2)/2)

A) 3

B) 5

C) 7

D) 25

---

20. Point (3, -5) is reflected over the y-axis. What are the new coordinates?

Concept: Reflection over y-axis: (x,y) -> (-x,y). Rotation 90 CCW: (x,y) -> (-y,x)

A) (-3, 5)

B) (-3, -5)

C) (3, 5)

D) (5, -3)

ANSWER KEY

1. B) 9	**2.** B) 0	**3.** B) 17/12	**4.** B) 5
5. B) 42	**6.** B) x = 6	**7.** B) 4	**8.** A) 6 sqrt(2)
9. B) x < -2	**10.** B) 11x - 14	**11.** B) 72 degrees	**12.** C) 60 degrees
13. B) 10	**14.** B) 50	**15.** B) 153.86	**16.** A) 44 cm
17. B) 282.6	**18.** B) 15	**19.** B) 5	**20.** B) (-3, -5)