Algebra 2 & Geometry

Word Problem Practice — 20 Questions | Self-Study Worksheet

— ALGEBRA 2 —

Q1. Quadratic Word Problems

Memory Key: KEY: vertex time = -b/(2a), max height = f(vertex time)

A ball is thrown upward from a cliff 80 feet above the ground. Its height is h(t) = -16t^2 + 64t + 80 (h in feet, t in seconds). What is the maximum height the ball reaches?

(A) 112 feet
(B) 144 feet
(C) 128 feet
(D) 160 feet

Q2. Systems of Equations

Memory Key: KEY: SUBSTITUTE = replace one variable | ELIMINATE = add/subtract rows

Mia sells bracelets for $8 each, Jake sells for $5 each. Together they sold 60 bracelets and earned $390. How many bracelets did Mia sell?

(A) 25
(B) 30
(C) 35
(D) 20

Q3. Exponential Growth

Memory Key: KEY: GROWTH A = P(1+r)^t | DECAY A = P(1-r)^t

A bacteria population starts at 500 and doubles every 3 hours: P(t) = 500 * 2^(t/3). How many bacteria after 9 hours?

(A) 2,000
(B) 4,000
(C) 3,500
(D) 1,500

Q4. Rational Equations

Memory Key: KEY: WORK RATE = 1/time | COMBINED: 1/a + 1/b = 1/T

Pipe A fills a tank in 6 hours, Pipe B in 4 hours. How long does it take both pipes together?

(A) 2.4 hours
(B) 3.0 hours
(C) 2.0 hours
(D) 5.0 hours

Q5. Logarithms

*Memory Key: KEY: log(a*b) = log a + log b | log(a^n) = n*log a*

An investment grows: A = 2000 * e^(0.05t). After how many years does it double? (ln 2 ≈ 0.693)

(A) 12 years
(B) 14 years
(C) 10 years
(D) 16 years

Q6. Arithmetic Sequences

Memory Key: KEY: a_n = a_1 + (n-1)d | S_n = n(a_1 + a_n)/2

A theater has 20 rows. The first row has 15 seats, each row has 3 more than the previous. What is the total number of seats?

(A) 720
(B) 870
(C) 660
(D) 810

Q7. Quadratic Inequalities

Memory Key: KEY: FACTOR -> number line -> TEST each interval

Profit P(x) = -x^2 + 10x - 16. For what values of x is profit positive?

(A) 2 < x < 8
(B) 0 < x < 10
(C) 1 < x < 9
(D) 3 < x < 7

Q8. Inverse Functions

Memory Key: KEY: INVERSE: swap x and y, then solve for y

F(C) = (9/5)C + 32 converts Celsius to Fahrenheit. If the thermometer reads 77°F, what is the temperature in Celsius?

(A) 25 C
(B) 30 C
(C) 22 C
(D) 28 C

Q9. Complex Numbers

Memory Key: KEY: i^2 = -1 | (a+bi)(c+di): FOIL then replace i^2 = -1

Impedances Z1 = 3 + 4i and Z2 = 1 - 2i. What is Z1 * Z2?

(A) 11 + 2i
(B) 7 - 2i
(C) 3 + 8i
(D) 5 - 3i

Q10. Geometric Series

Memory Key: KEY: S_inf = a/(1-r) if |r|<1 | Total bounce = drop + 2(bounce sum)*

A ball is dropped from 100 cm and each bounce reaches 60% of previous height. What is the total distance traveled?

(A) 400 cm
(B) 500 cm
(C) 350 cm
(D) 600 cm

— GEOMETRY —

Q11. Pythagorean Theorem

Memory Key: KEY: a^2 + b^2 = c^2 | c = hypotenuse (longest side)

A 13-foot ladder leans against a wall. The base is 5 feet from the wall. How high up the wall does the ladder reach?

(A) 10 feet
(B) 12 feet
(C) 11 feet
(D) 14 feet

Q12. Area of Composite Figures

Memory Key: KEY: COMPOSITE = split into rectangles + circles -> add/subtract

A park is a 40m x 25m rectangle with a semicircular fountain (diameter 10m) cut from one short side. What is the park area? (pi ≈ 3.14)

(A) 960.75 m^2
(B) 921.5 m^2
(C) 978.5 m^2
(D) 1000 m^2

Q13. Similar Triangles

Memory Key: KEY: SIMILAR -> ratios of corresponding sides are EQUAL (set up proportion)

A tree casts a shadow 18 feet long. At the same time, a 5-foot person casts a 3-foot shadow. How tall is the tree?

(A) 24 feet
(B) 30 feet
(C) 36 feet
(D) 18 feet

Q14. Volume of Solids

*Memory Key: KEY: Cylinder V = pi*r^2*h | Cone V = (1/3)*pi*r^2*h*

A cylindrical tank (r=6 ft, h=10 ft) has a conical cap (same base, h=4 ft). What is the total volume? (pi ≈ 3.14)

(A) 1281.12 ft^3
(B) 1130.4 ft^3
(C) 1582.56 ft^3
(D) 904.32 ft^3

Q15. Circle Theorems

Memory Key: KEY: INSCRIBED ANGLE = (1/2) x intercepted arc | CENTRAL ANGLE = arc

A central angle measures 110 degrees. An inscribed angle intercepts the same arc. What is the inscribed angle?

(A) 55 degrees
(B) 110 degrees
(C) 220 degrees
(D) 45 degrees

Q16. Coordinate Geometry

Memory Key: KEY: MIDPOINT = ((x1+x2)/2, (y1+y2)/2) | DISTANCE = sqrt[(dx)^2+(dy)^2]

Points A(2,-1) and B(8,5) are endpoints of a diameter. What are the center and radius of the circle?

(A) Center (5,2), r=3sqrt(2)
(B) Center (5,2), r=3
(C) Center (4,3), r=3sqrt(2)
(D) Center (3,2), r=5

Q17. Trigonometry

Memory Key: KEY: SOH-CAH-TOA | sin=O/H cos=A/H tan=O/A

From the top of a 50-meter building, the angle of depression to a car is 30 degrees. How far is the car from the base? (tan 30 ≈ 0.577)

(A) 86.6 m
(B) 50 m
(C) 100 m
(D) 70.7 m

Q18. Surface Area

*Memory Key: KEY: SA of cylinder = 2*pi*r^2 + 2*pi*r*h*

A soup can has radius 4 cm and height 12 cm. What is the total surface area? (pi ≈ 3.14)

(A) 401.92 cm^2
(B) 602.88 cm^2
(C) 351.68 cm^2
(D) 452.16 cm^2

Q19. Parallel Lines & Angles

Memory Key: KEY: CO-INTERIOR = 180 degrees | ALTERNATE INTERIOR = equal | CORRESPONDING = equal

Two parallel lines cut by a transversal. Angles are (3x+15) and (2x+25) degrees (co-interior). Find x.

(A) 28

(B) 32
(C) 24
(D) 36

Q20. Polygons & Interior Angles

Memory Key: KEY: Sum = (n-2) x 180 degrees | Each angle (regular) = sum / n

What is the measure of each interior angle of a regular hexagon?

(A) 108 degrees
(B) 120 degrees
(C) 135 degrees
(D) 150 degrees

Answer Key

Q	Answer	Q	Answer
Q1	B (A ball is thrown upward from a clif...)	Q2	B (Mia sells bracelets for $8 each, Ja...)
Q3	B (A bacteria population starts at 500...)	Q4	A (Pipe A fills a tank in 6 hours, Pip...)
Q5	B (An investment grows: A = 2000 * e^(...)	Q6	B (A theater has 20 rows. The first ro...)
Q7	A (Profit P(x) = -x^2 + 10x - 16. For ...)	Q8	A (F(C) = (9/5)C + 32 converts Celsius...)
Q9	A (Impedances Z1 = 3 + 4i and Z2 = 1 -...)	Q10	A (A ball is dropped from 100 cm and e...)
Q11	B (A 13-foot ladder leans against a wa...)	Q12	A (A park is a 40m x 25m rectangle wit...)
Q13	B (A tree casts a shadow 18 feet long....)	Q14	A (A cylindrical tank (r=6 ft, h=10 ft...)
Q15	A (A central angle measures 110 degree...)	Q16	A (Points A(2,-1) and B(8,5) are endpo...)
Q17	A (From the top of a 50-meter building...)	Q18	A (A soup can has radius 4 cm and heig...)
Q19	A (Two parallel lines cut by a transve...)	Q20	B (What is the measure of each interio...)