Algebra 1 & Geometry 1

Core Problems — Self-Study Worksheet

ALGEBRA 1

Q01 · Linear Equations — Solving Multi-Step Equations
■ *Key: ISOLATE → COMBINE → DIVIDE | Move variable to one side, constants to the other*

Solve for x: 5x - 3 = 2x + 12

(Hint: move x terms to one side first)

x = _____

Q02 · Inequalities — Solving Linear Inequalities
■ *Key: FLIP the inequality sign when multiplying/dividing by a NEGATIVE number*

Solve for x: -4x + 1 >= 13

Answer: _____

Q03 · Slope & Lines — Slope-Intercept Form
■ *Key: y = mx + b | m = slope (rise/run) | b = y-intercept*

A line passes through (2, 1) and (6, 9). What is the slope?

m = _____

Q04 · Systems of Equations — Substitution Method
■ *Key: SUBSTITUTE → SOLVE → BACK-SUBSTITUTE*

Solve the system:

y = 2x - 1

3x + y = 14

What is the value of x?

x = _____

Q05 · Exponents — Laws of Exponents
■ *Key: ADD exponents when MULTIPLYING | SUBTRACT when DIVIDING | MULTIPLY when power to a power*

Simplify: x^8 / x^3

(Write your answer as x^n — type just the exponent)

x^_____

Q06 · Factoring — Factoring Trinomials
■ *Key: Find two numbers that MULTIPLY to c and ADD to b in x^2+bx+c*

Factor completely: x^2 - 7x + 10

(Write as (x - a)(x - b), give values of a and b)

a = ____, b = ____

Q07 · Quadratic Equations — Discriminant & Number of Solutions
■ *Key: Discriminant = b^2 - 4ac | > 0: two roots | = 0: one root | < 0: no real roots*

How many REAL solutions does this equation have?

2x^2 + 3x + 5 = 0

(Answer: 0, 1, or 2)

Number of real solutions: _____

Q08 · Functions — Function Notation
■ *Key: f(x) means PLUG x in | DOMAIN = all allowed inputs*

Given f(x) = x^2 - 3x + 1, find f(4).

f(4) = _____

Q09 · Percent Change — Calculating Percent Decrease
■ *Key: % change = (new - old) / old x 100*

A jacket was $80, now on sale for $60.

What is the percent decrease? (no % symbol needed)

% decrease = _____

Q10 · Word Problems — Setting Up Equations from Context
■ *Key: READ → DEFINE variable → TRANSLATE to equation → SOLVE*

Maria and Tom together have 35 books.

Maria has 5 more books than Tom.

How many books does Tom have?

Tom = _____

GEOMETRY 1

Q01 · Angles — Complementary & Supplementary Angles
■ *Key: Complementary = 90 deg total | Supplementary = 180 deg total*

Two supplementary angles: (3x + 10) deg and (x + 30) deg.

Find x.

x = _____

Q02 · Triangles — Triangle Angle Sum
■ *Key: ALL triangles sum to 180 deg | Exterior angle = sum of two non-adjacent interior angles*

A triangle has angles 2x deg, 3x deg, and 4x deg.

Find x.

x = _____

Q03 · Pythagorean Theorem — Finding the Hypotenuse
■ *Key: a^2 + b^2 = c^2 | c is ALWAYS the hypotenuse | Triples: 3-4-5, 5-12-13*

A right triangle has legs of length 9 and 12.

Find the hypotenuse.

c = _____

Q04 · Area & Perimeter — Area of a Trapezoid
■ *Key: A = 1/2 x (b1 + b2) x h | b1, b2 are the two parallel sides*

A trapezoid has bases 8 cm and 14 cm, height 5 cm.

Find the area (in cm^2).

Area = _____ cm^2

Q05 · Circles — Area of a Circle
■ *Key: A = pi x r^2 | C = 2 x pi x r | Always check: radius or DIAMETER?*

A circle has a DIAMETER of 12.

What is the area? (Express as multiple of pi)

Area = _____ pi

Q06 · Congruence — Triangle Congruence Theorems
■ *Key: SSS / SAS / ASA / AAS / HL | SSA and AAA do NOT prove congruence*

Two triangles: two pairs of equal sides,

and the INCLUDED angle (between those sides) is equal.

Which congruence theorem applies?

Theorem: _____

Q07 · Parallel Lines — Angles Formed by a Transversal

■ *Key: Alt. Interior = EQUAL | Corresponding = EQUAL | Co-interior = 180 deg*

Two parallel lines cut by a transversal.

Co-interior angles: (2x + 15) deg and (3x + 10) deg.

Find x.

x = _____

Q08 · Similar Triangles — Ratios in Similar Figures

■ *Key: Similar = same shape, different size | Set up proportion: a/b = c/d → cross multiply*

Two similar triangles. Smaller triangle has a side of 5;

corresponding side in larger triangle is 20.

Smaller triangle has another side of 9.

Find the corresponding side in the larger triangle.

Side = _____

Q09 · Volume — Volume of a Cone

■ *Key: V(cone) = 1/3 x pi x r^2 x h | Prism/Cylinder: V = Base area x h*

A cone has base radius 3 and height 7.

Find the volume. (Express as multiple of pi)

V = _____ pi

Q10 · Coordinate Geometry — Distance Formula

■ *Key: d = sqrt((x2-x1)^2 + (y2-y1)^2) | It's Pythagorean theorem on a grid*

Find the distance between A(0, 0) and B(6, 8).

d = _____

ANSWER KEY

ALGEBRA 1

#	Answer	Quick Explanation
A01	x = 5	
A02	x <= -3	
A03	m = 2	
A04	x = 3	
A05	x^5	
A06	a = 2, b = 5 -> (x-2)(x-5)	
A07	0 (discriminant = 9-40 = -31 < 0)	
A08	f(4) = 5	
A09	25	
A10	Tom = 15	

GEOMETRY 1

#	Answer	Quick Explanation
G01	x = 35	
G02	x = 20	
G03	c = 15 (9-12-15 = 3x of 3-4-5)	
G04	55 cm^2	
G05	36pi (r = 6, A = pi(6^2) = 36pi)	
G06	SAS	
G07	x = 31	
G08	36 (scale factor = 20/5 = 4, so 9x4=36)	
G09	21pi (V = 1/3 x pi x 9 x 7 = 21pi)	
G10	d = 10 (sqrt(36+64) = sqrt(100) = 10)	