ALGEBRA 1 & GEOMETRY 1

Self-Study Practice Workbook · 20 Core Questions

— ALGEBRA 1 —

Q01 · Linear Equations

Solve for x: 3x - 7 = 14

◆ *Key: ISOLATE x — move constants AWAY from x*

A) x = 3
B) x = 7 (wrong sign)
C) x = 7
D) x = 21

Q02 · Slope of a Line

What is the slope through points (2, 5) and (6, 13)?

◆ *Key: RISE/RUN = (y2-y1)/(x2-x1) — subtract in correct order!*

A) m = 1/2
B) m = 2
C) m = 4
D) m = 8

Q03 · Systems of Equations

Solve: y = 2x + 1 and y = -x + 7. Find x.

◆ *Key: SUBSTITUTE — replace one variable, then solve*

A) x = 1
B) x = 2
C) x = 3
D) x = 4

Q04 · Factoring Quadratics

Factor completely: x^2 - 5x + 6

◆ *Key: PRODUCT x SUM — two numbers: multiply to c, add to b*

A) (x+2)(x+3)
B) (x-1)(x-6)
C) (x-2)(x-3)
D) (x+2)(x-3)

Q05 · Quadratic Formula

Solve using the quadratic formula: x^2 - 4x - 5 = 0

◆ *Key: x = (-b +/- sqrt(b^2 - 4ac)) / 2a — memorize this!*

A) x = 1, x = -5
B) x = 5, x = -1
C) x = 2, x = -3
D) x = 4, x = 1

Q06 · Inequalities

Solve: -2x + 4 > 10

◆ *Key: FLIP the sign when dividing / multiplying by a NEGATIVE number*

A) x > -3
B) x > 3
C) x < -3
D) x < 3

Q07 · Exponent Rules

Simplify: x^3 * x^5

◆ *Key: SAME BASE, multiply => ADD exponents*

A) x^15
B) x^8
C) 2x^8
D) x^2

Q08 · Functions & Evaluation

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

◆ *Key: f(x) = OUTPUT — plug x IN, careful with negative signs*

A) 0
B) 2
C) 6
D) -4

Q09 · Slope-Intercept Form

A line has slope m = -3/2 and y-intercept b = 4. Write its equation.

◆ *Key: y = mx + b => m = slope, b = y-intercept*

A) y = 4x - 3/2
B) y = -(3/2)x + 4
C) y = (3/2)x + 4
D) y = -(3/2)x - 4

Q10 · Distributive Property

Expand and simplify: -3(2x - 5) + 4x

◆ *Key: DISTRIBUTE => multiply outside factor to EVERY term inside*

A) -2x - 15
B) -2x + 15
C) 10x - 15
D) -6x - 15 + 4x

— GEOMETRY 1 —

Q11 · Pythagorean Theorem

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

◆ *Key: a^2 + b^2 = c^2 => c is the HYPOTENUSE (longest side)*

A) 10*sqrt(2)
B) 14
C) 10
D) 7

Q12 · Triangle Angle Sum

A triangle has angles 48 degrees and 65 degrees. Find the third angle.

◆ *Key: ALL triangles => 3 angles always ADD to 180 degrees*

A) 57 degrees
B) 67 degrees
C) 77 degrees
D) 113 degrees

Q13 · Area of a Circle

A circle has diameter 10 cm. Find the area in terms of pi.

◆ *Key: Area = pi*r^2 => use RADIUS (half the diameter)!*

A) 100*pi cm^2
B) 20*pi cm^2
C) 25*pi cm^2
D) 10*pi cm^2

Q14 · Parallel Lines & Transversal

Two parallel lines cut by a transversal. One angle = 112 degrees. Find the co-interior angle.

◆ *Key: CO-INTERIOR angles ADD to 180 degrees (supplementary)*

A) 112 degrees
B) 22 degrees
C) 68 degrees

D) 48 degrees

Q15 · Congruent Triangles

Two triangles share two equal sides and the included angle between them. Which postulate applies?

◆ *Key: SAS = Side-Angle-Side => angle must be BETWEEN the two sides*

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

Q16 · Volume of Rectangular Prism

A box: length = 5 cm, width = 4 cm, height = 3 cm. Find the volume.

◆ *Key: V = l * w * h => multiply ALL THREE dimensions*

A) 47 cm^3
B) 20 cm^3
C) 60 cm^3
D) 94 cm^2

Q17 · Similar Triangles

Similar triangles with ratio 3:5. Smaller triangle side = 12. Find the larger corresponding side.

◆ *Key: SIMILAR = same shape, different size => set up a RATIO/PROPORTION*

A) 15
B) 18
C) 20
D) 36

Q18 · Exterior Angle Theorem

A triangle has interior angles 42 degrees and 73 degrees. Find the exterior angle at the third vertex.

◆ *Key: EXTERIOR ANGLE = SUM of the two non-adjacent interior angles*

A) 65 degrees
B) 31 degrees
C) 115 degrees
D) 180 degrees

Q19 · Midpoint Formula

Find the midpoint of the segment from (-2, 4) to (8, -6).

◆ *Key: MIDPOINT = average both x's, average both y's*

A) (6, -2)

B) (3, -1)
C) (-3, 1)
D) (5, -5)

Q20 · Angle Bisector

An angle measures 124 degrees. An angle bisector divides it equally. Each smaller angle = ?

◆ *Key: BISECT = cut in HALF => each part = original / 2*

A) 31 degrees
B) 56 degrees
C) 62 degrees
D) 90 degrees

ANSWER KEY

Q#	Answer	Q#	Answer
Q01	**C**	Q02	**B**
Q03	**B**	Q04	**C**
Q05	**B**	Q06	**C**
Q07	**B**	Q08	**C**
Q09	**B**	Q10	**B**
Q11	**C**	Q12	**B**
Q13	**C**	Q14	**C**
Q15	**B**	Q16	**C**
Q17	**C**	Q18	**C**
Q19	**B**	Q20	**C**

STEP-BY-STEP SOLUTIONS

Q01 (Linear Equations): 3x - 7 = 14 => 3x = 21 => x = 7

Q02 (Slope of a Line): m = (13-5)/(6-2) = 8/4 = 2

Q03 (Systems of Equations): Set equal: 2x+1 = -x+7 => 3x = 6 => x = 2

Q04 (Factoring Quadratics): Need two numbers: product = 6, sum = -5 => -2 and -3 => (x-2)(x-3)

Q05 (Quadratic Formula): a=1, b=-4, c=-5. Discriminant = 16+20 = 36. x = (4+/-6)/2 => 5 or -1

Q06 (Inequalities): -2x > 6 => divide by -2, FLIP sign => x < -3

Q07 (Exponent Rules): x^3 * x^5 = x^(3+5) = x^8 (add exponents, same base)

Q08 (Functions & Evaluation): f(-1) = 3(1) - 2(-1) + 1 = 3 + 2 + 1 = 6

Q09 (Slope-Intercept Form): Plug into y = mx + b: y = -(3/2)x + 4

Q10 (Distributive Property): -3(2x) + (-3)(-5) + 4x = -6x + 15 + 4x = -2x + 15

Q11 (Pythagorean Theorem): 6^2 + 8^2 = 36 + 64 = 100 => c = sqrt(100) = 10

Q12 (Triangle Angle Sum): 180 - 48 - 65 = 67 degrees

Q13 (Area of a Circle): r = 10/2 = 5. Area = pi*(5)^2 = 25*pi cm^2

Q14 (Parallel Lines & Transversal): Co-interior angles are supplementary: 180 - 112 = 68 degrees

Q15 (Congruent Triangles): Two equal sides + the angle BETWEEN them = SAS (Side-Angle-Side)

Q16 (Volume of Rectangular Prism): V = 5 * 4 * 3 = 60 cm^3

Q17 (Similar Triangles): 3/5 = 12/x => 3x = 60 => x = 20

Q18 (Exterior Angle Theorem): Exterior angle = 42 + 73 = 115 degrees

Q19 (Midpoint Formula): x = (-2+8)/2 = 3; y = (4+(-6))/2 = -1 => (3, -1)

Q20 (Angle Bisector): 124 / 2 = 62 degrees