

# Algebra 1 & Geometry 1

Key Problems — Self-Study Worksheet | Answers on last page

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## ALGEBRA 1

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### Q01 - Solving Linear Equations

Solve for  $x$ :  $3x - 7 = 14$

■ *INVERSE OPERATIONS: Do the opposite to both sides.*

Answer: \_\_\_\_\_

### Q02 - Variables on Both Sides

Solve for  $x$ :  $7x - 4 = 3x + 16$

■ *COLLECT variables to one side, numbers to the other.*

Answer: \_\_\_\_\_

### Q03 - Slope of a Line

Find the slope of the line through (2, 5) and (6, 13).

■ *SLOPE = Rise/Run =  $(y_2 - y_1) / (x_2 - x_1)$*

Answer: \_\_\_\_\_

### Q04 - Slope-Intercept Form

Write the equation of a line with slope  $1/2$  and  $y$ -intercept  $-3$ .

■  *$y = mx + b$  ( $m = \text{slope}$ ,  $b = y\text{-intercept}$ )*

Answer: \_\_\_\_\_

### Q05 - Systems of Equations

Solve the system:  $y = 3x$  and  $x + y = 8$ . Find  $x$ .

■ *SUBSTITUTION: Plug one equation into the other.*

Answer: \_\_\_\_\_

### Q06 - Exponent Rules

Simplify:  $(x^3)^5$

■ *POWER RULE:  $(x^a)^b = x^{(a*b)}$  — multiply the exponents.*

Answer: \_\_\_\_\_

### Q07 - Factoring

Factor completely:  $8x^2 + 12x$

■ *GCF FIRST — pull out the Greatest Common Factor.*

Answer: \_\_\_\_\_

**Q08 - Quadratic Formula**

Solve:  $x^2 - 7x + 10 = 0$ . What is the SMALLER solution?

■  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Answer: \_\_\_\_\_

**Q09 - Inequalities**

Solve:  $-3x + 9 \geq 0$

■ *FLIP THE SIGN when dividing/multiplying by a negative!*

Answer: \_\_\_\_\_

**Q10 - Functions**

If  $f(x) = x^2 - 3x + 2$ , find  $f(5)$ .

■  $f(x)$ : Replace  $x$  with the given number and calculate.

Answer: \_\_\_\_\_

## GEOMETRY 1

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**Q11 - Triangle Angle Sum**

A triangle has angles 52 degrees and 79 degrees. Find the third angle.

■ *ALL angles in a triangle add up to 180 degrees.*

Answer: \_\_\_\_\_

**Q12 - Pythagorean Theorem**

A right triangle has legs  $a = 6$  and  $b = 8$ . Find hypotenuse  $c$ .

■  $a^2 + b^2 = c^2$  ( $c = \text{hypotenuse, always longest side}$ )

Answer: \_\_\_\_\_

**Q13 - Area of a Triangle**

Find the area of a triangle with base 14 and height 9.

■  $\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$

Answer: \_\_\_\_\_

**Q14 - Complementary & Supplementary**

Two angles are supplementary. One is 127 degrees. Find the other.

■  $\text{Complementary} = 90 \text{ deg} \mid \text{Supplementary} = 180 \text{ deg}$

Answer: \_\_\_\_\_

**Q15 - Perimeter & Area of Rectangles**

A rectangle has length 11 and width 6. What is its area?

■  $Perimeter = 2(l + w) \mid Area = l \times w$

Answer: \_\_\_\_\_

**Q16 - Parallel Lines & Transversals**

A co-interior angle is 112 degrees. Find the other co-interior angle.

■  $Co\text{-interior angles} = 180\text{ deg} \mid Alternate\text{ angles} = equal$

Answer: \_\_\_\_\_

**Q17 - Circle: Area & Circumference**

A circle has radius 7. What is its area? (Leave in terms of pi)

■  $C = 2(\pi)r \mid A = (\pi)r^2$  ( $r = radius$ )

Answer: \_\_\_\_\_

**Q18 - Volume of Rectangular Prism**

Find the volume of a box with length 8, width 5, and height 3.

■  $Volume = l \times w \times h$  (multiply all THREE dimensions)

Answer: \_\_\_\_\_

**Q19 - Congruence Rules**

Two angles and the INCLUDED side are equal. Which rule applies? (abbreviation)

■  $SSS / SAS / ASA / AAS = 4\text{ congruence shortcuts}$

Answer: \_\_\_\_\_

**Q20 - Midpoint Formula**

Find the midpoint of (3, 7) and (9, 3).

■  $Midpoint = ((x1+x2)/2, (y1+y2)/2)$  — average both coordinates

Answer: \_\_\_\_\_

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**ANSWER KEY**

Q01. Solving Linear Equations	→ $x = 7$
Q02. Variables on Both Sides	→ $x = 5$
Q03. Slope of a Line	→ $m = 2$
Q04. Slope-Intercept Form	→ $y = (1/2)x - 3$

Q11. Triangle Angle Sum	→ 49 degrees
Q12. Pythagorean Theorem	→ $c = 10$
Q13. Area of a Triangle	→ 63 sq units
Q14. Complementary & Supplementary	→ 53 degrees

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Q05. Systems of Equations	→ $x = 2$
Q06. Exponent Rules	→ $x^{15}$
Q07. Factoring	→ $4x(2x + 3)$
Q08. Quadratic Formula	→ $x = 2$
Q09. Inequalities	→ $x \leq 3$
Q10. Functions	→ 12

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Q15. Perimeter & Area of Rectangles	→ 66 sq units
Q16. Parallel Lines & Transversals	→ 68 degrees
Q17. Circle: Area & Circumference	→ $49(\pi)$ sq units
Q18. Volume of Rectangular Prism	→ 120 cubic units
Q19. Congruence Rules	→ ASA
Q20. Midpoint Formula	→ (6, 5)

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