# Algebra 1 & Geometry

20 Essential Problems — Multiple Choice Worksheet

Name: _____ Date: _____ Score: _____ / 20

## PART 1 — ALGEBRA 1

Linear Functions, Equations & Inequalities

**01** SLOPE

What is the slope of the line passing through (2, 5) and (6, 13)?

**KEY:** SLOPE = RISE / RUN  m = (y2 - y1) / (x2 - x1)

A. m = 1
B. m = 2
C. m = 3
D. m = 4

**02** SLOPE-INTERCEPT FORM

A line has equation 3x - 2y = 12. What are the slope and y-intercept?

**KEY:** REARRANGE to y = mx + b — isolate y first!

A. m = 3,  b = -12
B. m = 3/2, b = 12
C. m = 3/2, b = -6
D. m = -3/2, b = 6

**03** SOLVING EQUATIONS

Solve for x: 2(3x - 4) + 5 = 3x + 7

**KEY:** DISTRIBUTE -> COMBINE -> ISOLATE

A. x = 2
B. x = 3
C. x = 1
D. x = -2

**04** INEQUALITIES

Solve: -4x + 3 <= 11. Which value of x is in the solution set?

**KEY:** FLIP THE SIGN when multiplying or dividing by a NEGATIVE!

A. x = -3
B. x = -2
C. x = -4
D. x = 2

**05** SYSTEMS OF EQUATIONS

Solve the system: y = 2x + 1 and 3x + y = 16

**KEY:** SUBSTITUTION — plug one equation into the other

A. (2, 5)
B. (3, 7)
C. (4, 9)
D. (1, 3)

**06** PARALLEL LINES

Which equation represents a line parallel to y = -3x + 7 passing through (1, 2)?

**KEY:** PARALLEL = SAME SLOPE — only the y-intercept changes

A. y = 3x - 1
B. y = -3x + 7
C. y = -3x + 5
D. y = (1/3)x + 2

**07** COMPOUND INEQUALITY

Solve: -1 < 2x - 3 <= 5. Express as an interval.

**KEY:** DO THE SAME THING TO ALL THREE PARTS simultaneously

A. 1 < x <= 4
B. -2 < x <= 1
C. 0 < x <= 4
D. 1 <= x < 4

**08** FUNCTION NOTATION

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

**KEY:** SUBSTITUTE carefully — (-2)^2 = +4, not -4!

A. 9
B. 5
C. 7
D. 17

**09** LINEAR WORD PROBLEM

A taxi charges $3.50 base fare + $0.75 per mile. Total cost $12.50. How many miles?

**KEY:** SET UP: Total = Rate x (miles) + Fixed Cost

A. 10 miles
B. 12 miles
C. 9 miles
D. 15 miles

**10** ABSOLUTE VALUE EQUATION

Solve: |2x - 6| = 10

**KEY:** SPLIT into TWO equations: one = +10, one = -10

A. x = 8 only
B. x = -2 only
C. x = 8 or x = -2
D. x = 2 or x = -8

# PART 2 — GEOMETRY

Triangles, Polygons & Circles

**11** TRIANGLE ANGLE SUM

In triangle ABC, angle A = 47 degrees and angle B = 63 degrees. Find angle C.

**KEY:** TRIANGLE SUM = 180 degrees — always, no exceptions

A. 60 degrees
B. 70 degrees
C. 80 degrees
D. 110 degrees

**12** PYTHAGOREAN THEOREM

A right triangle has legs 5 cm and 12 cm. Find the hypotenuse.

**KEY:** a^2 + b^2 = c^2 (c = hypotenuse, the longest side)

A. 11 cm
B. 17 cm
C. 13 cm
D. 14 cm

**13** CIRCLE — ARC LENGTH

Circle with radius 8 cm. Central angle = 135 degrees. Arc length? (use pi = 3.14)

**KEY:** ARC LENGTH = (angle / 360) x 2pi x r

A. ~18.84 cm
B. ~22.5 cm
C. ~15.0 cm
D. ~30.14 cm

**14** POLYGON INTERIOR ANGLES

What is the sum of interior angles of a regular hexagon?

**KEY:** SUM = (n - 2) x 180 degrees (n = number of sides)

A. 540 degrees
B. 900 degrees
C. 1080 degrees
D. 720 degrees

**15** INSCRIBED ANGLE THEOREM

An inscribed angle intercepts an arc of 84 degrees. Find the inscribed angle.

**KEY:** INSCRIBED ANGLE = (1/2) x (intercepted arc)

A. 84 degrees
B. 42 degrees
C. 168 degrees
D. 21 degrees

**16** TRIANGLE CONGRUENCE

Two equal sides and the INCLUDED angle are equal. Which congruence rule?

**KEY:** SAS: the Angle must be BETWEEN (sandwiched by) the two Sides

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

**17** TRAPEZOID AREA

Trapezoid: parallel sides 6 cm and 10 cm, height 4 cm. Find the area.

**KEY:** A = (1/2)(b1 + b2) x h — average bases, multiply by height

A. 24 cm^2
B. 40 cm^2
C. 32 cm^2
D. 16 cm^2

**18** EXTERIOR ANGLES

Each exterior angle of a regular pentagon measures:

**KEY:** EXTERIOR ANGLE = 360 degrees / n (all exterior angles sum to 360)

A. 60 degrees
B. 72 degrees
C. 108 degrees
D. 45 degrees

**19** CIRCLE — TANGENT-SECANT

Tangent = 8 cm from point P. External secant = 4 cm, whole secant = 16 cm. Consistent?

**KEY:** tangent^2 = external part x whole secant (Power of a Point)

A. Yes -- 8^2 = 4 x 16 (check)
B. No -- formula does not apply
C. Yes -- only for r = 8
D. No -- 8^2 is not 4 x 16

**20** SIMILAR TRIANGLES

Triangle ABC ~ Triangle DEF. AB=6, BC=9, DE=10. Find EF.

**KEY:** CORRESPONDING SIDES ARE PROPORTIONAL — AB/DE = BC/EF

A. 12
B. 13.5
C. 16
D. 15

# ANSWER KEY

Cut or fold along this line — do not reveal until after the quiz

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

## Quick Solution Notes

**Q01:** m = (13-5)/(6-2) = 8/4 = 2

**Q02:** Rearrange: y = (3/2)x - 6 -> m=3/2, b=-6

**Q03:** Expand: 6x-8+5=3x+7 -> 3x=10 -> x=2

**Q04:** -4x<=8 -> x>=-2 (flip sign). x=2 is valid.

**Q05:** Sub y=2x+1 into 3x+y=16: 5x=15, x=3, y=7

**Q06:** Same slope m=-3 thru (1,2): y=-3x+5

**Q07:** Add 3: 2<2x<=8 -> divide by 2: 1<x<=4

**Q08:** 3(4)-2(-2)+1 = 12+4+1 = 17

**Q09:** 0.75x+3.50=12.50 -> x=12 miles

**Q10:** 2x-6=10->x=8; 2x-6=-10->x=-2

**Q11:** 180-47-63=70 degrees

**Q12:** 5^2+12^2=169 -> sqrt(169)=13 cm

**Q13:** (135/360)x2(3.14)(8)=18.84 cm

**Q14:** (6-2)x180=720 degrees

**Q15:** (1/2)x84=42 degrees

**Q16:** Included angle between two sides = SAS

**Q17:** (1/2)(6+10)(4)=32 cm^2

**Q18:** 360/5=72 degrees per exterior angle

**Q19:** 8^2=64; 4x16=64 check -> Yes

**Q20:** 6/10=9/EF -> EF=15