Algebra 2 & Geometry — Math Practice

Self-Study Worksheet · 20 Questions · Answers on Last Page

Part I — Algebra 2

■ MEMORY POINTS | FOIL · DISCRIMINANT (b²-4ac) · VERTEX = -b/2a · LOG↔EXP · REMAINDER THM · ASYMPTOTE · CONJUGATE PAIR · f■¹: swap x,y

Q01 [Quadratic — Vertex Form]

Which is the vertex form of f(x) = x² - 6x + 5 ?

Tip: Complete the square — VERTEX = -b/2a

A. f(x) = (x-3)² + 4
B. f(x) = (x+3)² - 4
C. f(x) = (x-3)² - 4
D. f(x) = (x-6)² + 5

Q02 [Discriminant]

How many real solutions does 2x² - 4x + 5 = 0 have?

Tip: Compute b² - 4ac first

A. Two distinct real solutions
B. No real solutions
C. Exactly one real solution
D. Infinitely many solutions

Q03 [Remainder Theorem]

When p(x) = x³ - 4x² + x + 6 is divided by (x-3), what is the remainder?

Tip: REMAINDER THEOREM — just plug in x = 3

A. -6
B. 6
C. 0
D. 3

Q04 [Logarithms]

Solve: log■(x + 3) = 4

Tip: LOG↔EXP — rewrite as 2■ = x + 3

A. x = 11
B. x = 13
C. x = 8
D. x = 19

Q05 [Inverse Functions]

If f(x) = 3x - 1, find the inverse function f■¹(x).

Tip: INVERSE — swap x and y, then solve for y

A. f■¹(x) = (x+1)/3
B. f■¹(x) = (x-1)/3
C. f■¹(x) = 3x + 1
D. f■¹(x) = 1/(3x-1)

Q06 [Rational Functions — Asymptotes]

What is the vertical asymptote of f(x) = (2x+1)/(x-4) ?

Tip: ASYMPTOTE — set denominator = 0

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

Q07 [Complex Numbers]

Simplify: (3 + 2i)(1 - i)

Tip: FOIL it — remember $i^2 = -1$

A. 1 - i
B. 5 - i
C. 3 - i
D. 5 + i

Q08 [Geometric Sequences]

Find the 10th term of: 2, 6, 18, 54, ...

Tip: GEO SEQ — a■ = a■ · r^(n-1)

A. 3■
B. 2 · 3¹■
C. 2 · 3■
D. 6■

Q09 [Systems of Equations]

Solve the system: $y = x^2 - 2$ and $y = x + 4$

Tip: Set equal → $x^2 - 2 = x + 4$, then solve the quadratic

A. x = 2 only
B. x = -2 and x = 3
C. No real solution
D. x = 2 and x = -3

Q10 [Exponential Equations]

Solve for x: $5^{2}\blacksquare = 125$

Tip: SAME BASE trick — express 125 as power of 5

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

Part II — Geometry: Trigonometry (Sin / Cos / Tan)

■ MEMORY POINTS | SOH-CAH-TOA · $\sin^2+\cos^2=1$ · tan=sin/cos · 30-60-90: 1:√3:2 · 45-45-90: 1:1:√2 · UNIT CIRCLE · ASTC (All Students Take Calculus)

Q11 [Basic Definition — SOH]

In a right triangle, opposite = 5 and hypotenuse = 13. What is sin θ?

Tip: SOH — Sin = Opposite / Hypotenuse

A. 12/13
B. 5/13
C. 5/12
D. 13/5

Q12 [SOH-CAH-TOA — Finding Tan]

In a right triangle with adjacent = 8 and hypotenuse = 10, what is tan θ?

Tip: Find opposite first using Pythagorean theorem, then TOA

A. 8/10
B. 6/10
C. 6/8
D. 8/6

Q13 [Special Angles — 30°]

What is the exact value of sin 30°?

Tip: 30-60-90 sides are 1 : √3 : 2

A. √3/2
B. 1/2
C. √2/2
D. 1

Q14 [Special Angles — 45°]

What is tan 45°?

Tip: 45-45-90 triangle has two equal legs

A. √2/2
B. 1/√2
C. 1
D. √2

Q15 [Pythagorean Identity]

If sin θ = 3/5 (θ in Quadrant I), what is cos θ?

Tip: IDENTITY — sin²θ + cos²θ = 1

A. 3/4
B. 5/4
C. 4/5
D. 2/5

Q16 [Finding Sides]

A right triangle has angle θ = 60° and hypotenuse = 10. Find the opposite side.

Tip: SOH — opposite = hypotenuse × sin(60°)

A. 5
B. 5√3
C. 5√2
D. 10√3

Q17 [Angle of Elevation]

A 10 m ladder makes a 60° angle with the ground. How high up the wall does it reach?

Tip: Draw triangle — ladder is hypotenuse, wall is opposite

A. 5 m
B. 10√3 m
C. 5√3 m
D. 10 m

Q18 [Tan Identity]

Which expression equals tan θ?

Tip: Quotient identity — TAN = SIN / COS

A. cosθ / sinθ
B. sinθ / cosθ
C. sinθ · cosθ
D. 1 / sinθ

Q19 [Quadrant Signs]

In which quadrant is sin θ > 0 AND cos θ < 0?

Tip: 'All Students Take Calculus' — ASTC by quadrant

A. Quadrant I
B. Quadrant III
C. Quadrant II
D. Quadrant IV

Q20 [Finding Angles — Inverse Trig]

In a right triangle, opposite = 7 and adjacent = 7. What is angle θ?

Tip: Find tan θ first, then use arctan

A. 30°
B. 60°
C. 45°
D. 90°

ANSWER KEY

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

Made for self-study. Review each explanation for any question you got wrong.