

Algebra 2 & Geometry

Core Problems · Self-Study Workbook · 20 Questions

Directions: Choose the best answer for each question. Answers are at the end.

01 Algebra 2

Q1 ALGEBRA 2 QUADRATIC FUNCTIONS

$f(x) = x^2 - 6x + 5$ in vertex form. Minimum value?

■ **COMPLETE THE SQUARE**
vertex form $a(x-h)^2+k$, add & subtract $(b/2)^2$

A $(x-3)^2 - 4$, min = -4

B $(x-3)^2 + 4$, min = 4

C $(x+3)^2 - 4$, min = -4

D $(x-3)^2 - 4$, min = 3

Q2 ALGEBRA 2 DISCRIMINANT

How many real solutions does $3x^2 - 5x + 4 = 0$ have?

■ **DISCRIMINANT: $b^2 - 4ac$**
>0 two real | =0 one real | <0 no real

A Two distinct real solutions

B Exactly one real solution

C No real solutions (complex)

D One real, one complex

Q3 ALGEBRA 2 POLYNOMIAL DIVISION

$p(x) = 2x^3 - 3x^2 + x - 5$ divided by $(x-2)$. Remainder?

■ **REMAINDER THEOREM**

remainder = $p(c)$, just plug in $x=c$

A 1

B 3

C -1

D 5

Q4 ALGEBRA 2 LOGARITHMS

Solve: $\log_2(x+3) + \log_2(x-3) = 4$

■ **LOG PRODUCT RULE**

$\log(M) + \log(N) = \log(MN)$, then convert to exponential, check domain

A $x = 5$

B $x = +/-5$

C $x = 7$

D $x = 4$

Q5 ALGEBRA 2 RATIONAL FUNCTIONS

Excluded values from domain of $f(x) = \frac{x^2-4}{x^2-x-6}$?

■ **DOMAIN: DENOM not equal 0**

factor denominator, set each factor = 0

A $x=2$ only

B $x=-2$ only

C $x=3$ and $x=-2$

D $x=2$ and $x=-2$

Q6 ALGEBRA 2 SYSTEMS OF EQUATIONS

Solve: $2x + y = 7$ and $x - 3y = -7$

■ **ELIMINATION: align & cancel**
multiply to match coefficients, subtract rows

A $x=2, y=3$

B $x=1, y=5$

C $x=3, y=1$

D $x=0, y=7$

Q7 ALGEBRA 2 GEOMETRIC SERIES

First term=3, common ratio=2. Sum of first 6 terms?

■ **GEO SUM: $S = a(r^n - 1)/(r-1)$**
don't add manually, plug in a, r, n

A 189

B 96

C 63

D 192

Q8 ALGEBRA 2 COMPLEX NUMBERS

Simplify: $(3+2i)(1-4i)$

■ **FOIL + $i^2 = -1$**
distribute like binomials, replace i^2 with -1

A $11 - 10i$

B $3 - 10i$

C $11 + 2i$

D $-5 - 10i$

Q9 ALGEBRA 2 INVERSE FUNCTIONS

If $f(x) = \frac{2x+1}{x-3}$, find $f^{-1}(x)$.

■ **INVERSE: swap x and y, solve for y**
replace $f(x)$ with y , swap x,y , solve

A $\frac{3x+1}{x-2}$

B $\frac{x-3}{2x+1}$

C $\frac{3x-1}{x-2}$

D $\frac{x+3}{2-x}$

Q1
0 ALGEBRA 2 BINOMIAL THEOREM

Coefficient of x^2 in expansion of $(2x+3)^4$?

■ $nCr \cdot a^{(n-r)} \cdot b^r$
 $r=2$ for x^2 term: $C(4,2) \cdot (2x)^2 \cdot (3)^2$

A 216

B 54

C 96

D 108

02 Geometry

Q1
1

GEOMETRY TRIANGLE CONGRUENCE

Two angles + the included side are congruent. Which rule?

■ **ASA: angle-SIDE-angle**

INCLUDED side = between the two angles. AAS = side NOT between

A ASA (Angle-Side-Angle)

B SAS (Side-Angle-Side)

C AAS (Angle-Angle-Side)

D SSS

Q1
2

GEOMETRY PARALLEL LINES

Parallel lines, co-interior angles: $(3x+15)$ and $(2x+25)$. Find x .

■ **CO-INTERIOR = 180 degrees (supplementary)**

alternate interior = EQUAL; co-interior = add to 180

A $x = 28$

B $x = 14$

C $x = 32$

D $x = 20$

Q1
3

GEOMETRY CIRCLE THEOREMS

Inscribed angle intercepts arc of 130 degrees. Angle measure?

■ **INSCRIBED = $1/2 \times \text{arc}$**
central angle = full arc; inscribed = HALF arc

A 65 degrees

B 130 degrees

C 260 degrees

D 45 degrees

Q1
4

GEOMETRY 30-60-90 TRIANGLE

30-60-90 triangle, hypotenuse = 10. Leg lengths?

■ **30-60-90: $x, x\sqrt{3}, 2x$**
hyp= $2x$, divide by 2 for short leg, multiply by $\sqrt{3}$ for long

A short=5, long= $5\sqrt{3}$

B short= $5\sqrt{3}$, long=5

C short=5, long= $5\sqrt{2}$

D short= $\sqrt{5}$, long= $\sqrt{15}$

Q1
5

GEOMETRY REGULAR POLYGON AREA

Regular hexagon, side = 6. Area?

■ **HEX AREA = $(3\sqrt{3}/2)s^2$**
or: 6 equilateral triangles with area $(\sqrt{3}/4)s^2$ each

A $54\sqrt{3}$

B $36\sqrt{3}$

C $108\sqrt{3}$

D $27\sqrt{3}$

Q1
6

GEOMETRY VOLUME OF CONE

Cone, radius=4, height=9. Volume (in terms of pi)?

■ **CONE V = $(1/3)\pi r^2 h$**
cone = 1/3 of cylinder. Don't forget the 1/3!

A 48π

B 144π

C 36π

D 16π

Q1
7

GEOMETRY SIMILAR TRIANGLES

Similar triangles, side ratio 3:5, smaller area=27. Larger area?

■ **AREA RATIO = (side ratio)²**
sides scale by k, areas scale by $k^2 = 9:25$

A 75

B 45

C 135

D 15

Q1
8

GEOMETRY PERPENDICULAR LINES

Line through (1,3) and (4,9). Perpendicular line through (4,9)?

■ **PERP SLOPES: $m_1 \times m_2 = -1$**
flip and negate the slope, then use point-slope form

A $y = -1/2 x + 11$

B $y = 2x + 1$

C $y = -2x + 17$

D $y = 1/2 x + 7$

Q1
9 GEOMETRY INTERIOR ANGLES

Each interior angle of a regular 12-sided polygon?

■ **INTERIOR = $(n-2)*180 / n$**
sum = $(n-2)*180$, divide by n for regular polygon

A 150 degrees

B 135 degrees

C 160 degrees

D 144 degrees

Q2
0 GEOMETRY RIGHT TRIANGLE TRIG

Right triangle, $\sin A = 3/5$. Find $\tan A$.

■ **SOH-CAH-TOA + Pythagorean**
 $\sin = \text{opp}/\text{hyp}$ -> find adj by Pythagorean -> $\tan = \text{opp}/\text{adj}$

A 3/4

B 4/3

C 3/5

D 4/5

Answer Key

Q1: A	Q2: C	Q3: A	Q4: A	Q5: C
Q6: A	Q7: A	Q8: A	Q9: A	Q10: A
Q11: A	Q12: A	Q13: A	Q14: A	Q15: A
Q16: A	Q17: A	Q18: A	Q19: A	Q20: A

Note: All answers are A for this edition. See the interactive web version for full explanations.