

Math Practice Worksheet

Algebra 2 (Q1–10) · Geometry (Q11–20) · 20 Questions

Name: _____ Date: _____ Score: ____ / 20

— ALGEBRA 2 —

[QUADRATIC FORMULA]

1. Sarah launches a model rocket. Its height (in feet) after t seconds is: $h(t) = -16t^2 + 64t + 5$ How many seconds after launch does the rocket hit the ground? (Round to the nearest tenth.)

Key: MEMORY: Ground = $h(t) = 0$. Use Quadratic Formula: $x = (-b \pm \sqrt{b^2 - 4ac}) / 2a$. Pick the POSITIVE root.

- A) 3.0 seconds B) 4.1 seconds
C) 5.0 seconds D) 2.5 seconds

[SYSTEMS OF EQUATIONS]

2. A movie theater sells adult tickets for \$12 and child tickets for \$7. On Friday, 210 tickets were sold for a total of \$1,960. How many adult tickets were sold?

Key: MEMORY: SETUP two equations — (1) quantity: $a + c = 210$, (2) money: $12a + 7c = 1960$. Then SUBSTITUTE.

- A) 100 B) 110
C) 70 D) 140

[EXPONENTIAL GROWTH]

3. A bacteria culture starts with 500 bacteria and doubles every 3 hours. Which expression gives the number after t hours?

Key: MEMORY: Doubling formula: $N = N_0 * 2^{(t/d)}$, where $d =$ doubling time. 'Every 3 hours' -> exponent is $t/3$, NOT t !

- A) $500 * 2^{(3t)}$ B) $500 * 3^t$
C) $500 * 2^t$ D) $500 * 2^{(t/3)}$

[LOGARITHMS]

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

Key: MEMORY: $\log(A) + \log(B) = \log(AB)$. Convert: $\log_b(M) = N$ means $b^N = M$. ALWAYS check for extraneous solutions!

- A) $x = 5$ B) $x = 4$
C) $x = +/-5$ D) $x = 7$

[COMPLEX NUMBERS]

5. Simplify: $(3 + 2i)(3 - 2i)$, where $i = \sqrt{-1}$.

Key: MEMORY: Conjugate product: $(a+bi)(a-bi) = a^2 + b^2$. Always REAL. Key: $i^2 = -1$. Trap: $9 - 4 = 5$ is WRONG!

- A) $9 + 4i$ B) 13
C) $9 - 4i$ D) 5

[POLYNOMIAL DIVISION]

6. What is the remainder when $2x^3 - 5x^2 + 3x - 7$ is divided by $(x - 2)$?

Key: MEMORY: REMAINDER THEOREM: Remainder = $f(c)$ when dividing by $(x - c)$. Here $c = 2$. Just PLUG IN $f(2)$!

- A) -7
B) 0
C) -5
D) 3

[RATIONAL EXPRESSIONS]

7. Simplify: $(x^2 - 9) / (x^2 - x - 6)$. State restrictions on x .

Key: MEMORY: FACTOR BOTH, then cancel. Restrictions come from the ORIGINAL denominator — find them BEFORE canceling!

- A) $(x+3)/(x+2)$, $x \neq 3$, $x \neq -2$
B) $(x-3)/(x-2)$, $x \neq 3$
C) $(x+3)/(x+2)$, $x \neq -2$
D) $x - 3$

[ARITHMETIC SERIES]

8. The first three terms of an arithmetic sequence are 5, 11, 17, ... What is the sum of the first 30 terms?

Key: MEMORY: Sum formula: $S_n = (n/2)(a_1 + a_n)$. Find $a_{30} = a_1 + (n-1)d$ first, then plug in.

- A) 2,400
B) 1,580
C) 3,100
D) 2,760

[INVERSE FUNCTIONS]

9. Find the inverse of $f(x) = (2x + 1) / (x - 3)$. What is $f^{-1}(x)$?

Key: MEMORY: SWAP x and y , then SOLVE for y . Write $y = f(x)$, swap to get $x = f(y)$, then isolate y .

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

[VERTEX FORM OF PARABOLA]

10. A ball follows the path $h = -2(t - 3)^2 + 18$, where h is height (m) and t is time (s). What is the maximum height, and when does it occur?

Key: MEMORY: Vertex form $y = a(x-h)^2 + k$. Vertex is (h, k) . If $a < 0$, vertex = MAX. Read directly — no calculation!

- A) Max 3m at $t = 18$ s
B) Max 18m at $t = 0$ s
C) Max 18m at $t = 3$ s
D) Max 9m at $t = 3$ s

— GEOMETRY —

[PYTHAGOREAN THEOREM]

11. A 10-foot ladder leans against a wall. The base is 6 feet from the wall. How high up the wall does the ladder reach?

Key: MEMORY: $a^2 + b^2 = c^2$. The hypotenuse c is ALWAYS the longest side (the ladder). Draw the triangle first!

- A) 6 feet
B) 8 feet
C) $2\sqrt{34}$ feet
D) 4 feet

[CIRCLE — ARC LENGTH]

12. A pizza has a diameter of 16 inches. A slice has a central angle of 45° . What is the arc length of the crust? (Leave in terms of pi.)

Key: MEMORY: Arc length = $(\theta/360) * 2 * \pi * r$. Use RADIUS (not diameter). Tip: $45/360 = 1/8$.

- A) $4 * \pi$ inches B) $8 * \pi$ inches
C) $2 * \pi$ inches D) π inches

[SIMILAR TRIANGLES]

13. A tree casts a 24-foot shadow. At the same time, a 5-foot person casts a 4-foot shadow. How tall is the tree?

Key: MEMORY: Similar triangles -> set up a PROPORTION. $h1/shadow1 = h2/shadow2$. Cross-multiply to solve.

- A) 30 feet B) 19.2 feet
C) 24 feet D) 48 feet

[PARALLEL LINES & TRANSVERSALS]

14. Two parallel lines are cut by a transversal. One angle measures $(3x + 20)^\circ$ and its co-interior (same-side interior) angle measures $(2x + 10)^\circ$. Find x.

Key: MEMORY: Co-interior (same-side interior) angles are SUPPLEMENTARY (add to 180°). Alternate interior = EQUAL. Corresponding = EQUAL.

- A) $x = 15$ B) $x = 36$
C) $x = 25$ D) $x = 30$

[VOLUME — COMPOSITE SHAPES]

15. An ice cream cone: radius 3 cm, height 10 cm. A full sphere scoop: radius 3 cm sits on top. What is the total volume? (Use $\pi = 3.14$)

Key: MEMORY: Cone $V = (1/3) * \pi * r^2 * h$. Sphere $V = (4/3) * \pi * r^3$. The $1/3$ in the cone formula is most often forgotten!

- A) 471 cm^3 B) 207 cm^3
C) 339 cm^3 D) 565 cm^3

[MIDPOINT FORMULA]

16. Point M is the midpoint of segment AB. If A = (-2, 5) and M = (3, 1), what are the coordinates of B?

Key: MEMORY: Midpoint = AVERAGE of coordinates. To find endpoint: double the midpoint, subtract the known point.

- A) (8, -3) B) (1, 6)
C) (0.5, 3) D) (5, 3)

[TRIANGLE CONGRUENCE]

17. In triangles ABC and DEF: $AB = DE$, angle B = angle E, $BC = EF$. Which congruence postulate proves the triangles congruent?

Key: MEMORY: The 5 postulates: SSS, SAS, ASA, AAS, HL. The angle is BETWEEN the two sides = SAS. SSA is NOT valid!

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

[TRIGONOMETRY — ANGLE OF DEPRESSION]

18. From the top of a 50-meter cliff, the angle of depression to a boat is 30° . How far is the boat from the base of the cliff (horizontal distance)?

Key: MEMORY: SOH-CAH-TOA. Angle of depression = angle below horizontal. DRAW IT! $\tan(30^\circ) = \text{opposite/adjacent} = 50/d$.

- A) 25 m
B) $25\sqrt{3}$ m
C) 50 m
D) $50\sqrt{3}$ m

[SURFACE AREA — COMPOSITE]

19. A cylinder ($r = 4$ cm, $h = 9$ cm) with a hemisphere ($r = 4$ cm) on top. Find the total lateral surface area of cylinder + curved surface of hemisphere. (In terms of pi.)

Key: MEMORY: Cylinder lateral SA = $2\pi r h$. Hemisphere curved SA = $2\pi r^2$. Shared circle is NOT counted!

- A) 104π cm²
B) 72π cm²
C) 128π cm²
D) 80π cm²

[TRANSFORMATIONS]

20. Triangle PQR has vertices P(2,3), Q(5,1), R(4,6). It is reflected over the y-axis, then translated 3 units down. What are the new coordinates of P?

Key: MEMORY: Reflect over y-axis: $(x,y) \rightarrow (-x, y)$. Over x-axis: $(x,y) \rightarrow (x,-y)$. Apply transformations in ORDER!

- A) (-2, 6)
B) (-2, 0)
C) (2, 0)
D) (-2, -3)

ANSWER KEY

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