MATH SELF-STUDY WORKSHEET

Pre-Algebra · Geometry · 20 Essential Problems

PART 1: PRE-ALGEBRA

01 Order of Operations

[Memory: PEMDAS -- Parentheses, Exponents, Multiply/Divide, Add/Subtract]

Evaluate: 3 + 4 x 2 - 1

A) 13
B) 10
C) 14
D) 12

02 Negative Integers

[Memory: Same signs ADD, different signs SUBTRACT (keep sign of larger absolute value)]

A submarine is at -45 m. It rises 18 m. What is its new depth?

A) -63 m
B) -27 m
C) 27 m
D) 63 m

03 Fractions

[Memory: KCF -- Keep, Change, Flip when dividing fractions]

A recipe uses 3/4 cup of sugar. If you make 1/2 of the recipe, how many cups of sugar do you need?

A) 3/2
B) 1/2
C) 3/8
D) 1/4

04 Variables and Expressions

[Memory: SUBSTITUTE -- replace x with its value, then follow PEMDAS]

If x = 3, what is the value of 2x^2 - x + 4?

A) 19
B) 25
C) 13
D) 21

05 Solving Equations

[Memory: INVERSE OPERATIONS -- undo addition with subtraction, undo multiplication with division]

Solve for n: 3n - 7 = 14

A) n = 7
B) n = 3
C) n = 21
D) n = 2.33

06 Ratios and Proportions

[Memory: CROSS-MULTIPLY -- a/b = c/d means a x d = b x c]

Map scale: 1 inch = 15 miles. Two cities are 4.5 inches apart on the map. Actual distance?

A) 60 miles
B) 67.5 miles
C) 45 miles
D) 19.5 miles

07 Percentages

[Memory: IS/OF -- 'is' means equals, 'of' means multiply. Percent = per 100.]

A shirt costs $40. It is on sale for 25% off. What is the sale price?

A) $10
B) $35
C) $30
D) $25

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08 Inequalities

[Memory: FLIP THE SIGN -- when multiplying or dividing by a NEGATIVE number, reverse the inequality!]

Solve -2x + 5 > 11. Which value of x is in the solution set?

A) x = 4
B) x = -4
C) x = 0
D) x = -2

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09 Exponents

[Memory: PRODUCT RULE -- same base, ADD exponents: x^a x x^b = x^(a+b)]

Simplify: x^3 x x^4

A) x^12
B) x^7
C) 2x^7
D) x^(3/4)

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10 Rate Word Problem

[Memory: D = R x T -- Distance = Rate x Time]

Train 1 travels at 60 mph. Train 2 leaves 30 minutes later at 80 mph. How many hours after Train 2 departs will they be at equal distances?

A) 1 hour
B) 1.5 hours
C) 2 hours
D) 3 hours

PART 2: GEOMETRY

G01 Triangle Angles

[Memory: TRIANGLE SUM = 180 degrees -- all three interior angles always add up to 180]

A triangle has angles of 47 degrees and 63 degrees. What is the third angle?

A) 80 deg
B) 70 deg
C) 110 deg
D) 90 deg

G02 Perimeter

[Memory: P = 2(l + w) for rectangles. Perimeter = distance AROUND. Area = space INSIDE.]

A rectangular garden is 12 m long and 7 m wide. How many meters of fencing are needed?

A) 84 m
B) 38 m
C) 19 m
D) 42 m

G03 Pythagorean Theorem

[Memory: a^2 + b^2 = c^2 -- c is ALWAYS the hypotenuse (longest side)]

A right triangle has legs of 6 cm and 8 cm. What is the length of the hypotenuse?

A) 14 cm
B) 100 cm
C) 10 cm
D) 7 cm

G04 Area of Circle

[Memory: A = pi x r^2. If given DIAMETER, divide by 2 to get RADIUS first!]

A circular pizza has a diameter of 14 inches. What is its area? (pi = 3.14)

A) 43.96 in^2
B) 615.44 in^2
C) 153.86 in^2
D) 87.92 in^2

G05 Supplementary Angles

[Memory: Supplementary = 180 deg (Straight line). Complementary = 90 deg (Corner).]

Two supplementary angles are in a 1:3 ratio. What are the two angle measures?

A) 45 and 135 deg
B) 30 and 150 deg
C) 60 and 120 deg
D) 22.5 and 67.5 deg

G06 Area of Triangle

[Memory: A = (1/2) x b x h. Height must be PERPENDICULAR to the base.]

A triangle has a base of 10 cm and a height of 6 cm. What is its area?

A) 60 cm^2
B) 30 cm^2
C) 16 cm^2
D) 15 cm^2

G07 Similar Triangles

[Memory: Area ratio = (side ratio)^2. SQUARE the scale factor for areas!]

Two similar triangles have side ratio 2:3. Smaller area = 16 cm^2. Larger area = ?

A) 24 cm^2
B) 36 cm^2
C) 48 cm^2
D) 64 cm^2

G08 Circumference

[Memory: C = 2 x pi x r = pi x d. One rotation = one circumference.]

A wheel has radius 21 cm. How far does it travel in one full rotation? (pi = 22/7)

A) 66 cm
B) 132 cm
C) 1386 cm^2
D) 42 cm

G09 Distance Formula

[Memory: d = sqrt[(x2-x1)^2 + (y2-y1)^2]. It is Pythagorean Theorem on a graph!]

What is the distance between A(1, 2) and B(4, 6)?

A) 5
B) 7
C) sqrt(7)
D) 25

G10 Volume of Cylinder

[Memory: V = pi x r^2 x h. Use RADIUS (not diameter) in the formula!]

A cylindrical can has diameter 10 cm and height 15 cm. Volume? (pi = 3.14)

A) 4710 cm^3
B) 1177.5 cm^3
C) 471 cm^3
D) 2355 cm^3

ANSWER KEY

Pre-Algebra

No.	Ans	No.	Ans	No.	Ans	No.	Ans	No.	Ans
01	B	02	B	03	C	04	A	05	A
06	B	07	C	08	B	09	B	10	B

Geometry

No.	Ans	No.	Ans	No.	Ans	No.	Ans	No.	Ans
G01	B	G02	B	G03	C	G04	C	G05	A
G06	B	G07	B	G08	B	G09	A	G10	B