Math Mastery

Pre-Algebra & Geometry Practice Worksheet

20 Questions · Key Concepts · Self-Study Edition

Part 1 — Pre-Algebra

01 **[Pre-Algebra]**

Order of Operations

Evaluate: 3 + 4 x 2 - 1

Key: PEMDAS — Parentheses > Exponents > Multiply/Divide > Add/Subtract

e.g. 2 + 3 x 4 = 2 + 12 = 14 (NOT 5 x 4 = 20)

A. 13

B. 10

C. 14

D. 18

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02 **[Pre-Algebra]**

Negative Numbers

What is (-3) x (-5) ?

Key: SIGN RULE — Same signs = Positive · Different signs = Negative

e.g. (-2)(-4) = +8 · (-2)(+4) = -8

A. -15

B. -8

C. +15

D. +8

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03 **[Pre-Algebra]**

Solving One-Step Equations

Solve for x: x - 7 = 12

Key: INVERSE OP — Do the opposite operation to both sides to isolate x

e.g. x - 3 = 9 => x = 9 + 3 = 12

A. x = 5

B. x = 19

C. x = 84

D. x = -5

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04 **[Pre-Algebra]**

Fractions — Multiplication

Calculate: (2/3) x (9/4)

Key: CROSS-CANCEL — Simplify diagonally before multiplying

e.g. (2/3) x (9/4): cancel 2 & 4 -> (1/1) x (3/2) = 3/2

A. 11/12

B. 3/2

C. 18/12 (unreduced)

D. 8/27

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05 **[Pre-Algebra]**

Ratios & Proportions

If 3 pencils cost $1.50, how much do 7 pencils cost?

Key: UNIT RATE — Find cost per 1 item, then multiply

e.g. 4 apples = $2 -> 1 apple = $0.50 -> 9 apples = $4.50

A. $2.50

B. $3.00

C. $3.50

D. $4.00

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06 **[Pre-Algebra]**

Exponents

Simplify: 2^3 x 2^4

Key: SAME BASE = ADD exponents: a^m x a^n = a^(m+n)

e.g. 5^2 x 5^3 = 5^(2+3) = 5^5

A. 2^12

B. 4^7

C. 2^7

D. 2^34

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07 **[Pre-Algebra]**

Percent

What is 30% of 80?

Key: OF = x | Convert % to decimal: 30% = 0.30, then multiply

e.g. 10% of 80 = 8 -> 30% = 3 x 8 = 24

A. 24

B. 2.4

C. 240

D. 30

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08 **[Pre-Algebra]**

Distributive Property

Expand: 4(3x - 5)

Key: DISTRIBUTE — Multiply outside number by EACH term inside

e.g. 3(2x + 7) = 6x + 21 · 2(x - 4) = 2x - 8

A. 12x - 5

B. 12x + 20

C. 12x - 20

D. 7x - 9

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09 **[Pre-Algebra]**

Inequalities

Solve: -2x > 10

Key: FLIP IT — Divide/multiply by NEGATIVE? Reverse the inequality sign!

e.g. -3x > 9 => x < -3 (sign flipped!)

A. x > -5

B. x < -5

C. x > 5

D. x < 5

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10 **[Pre-Algebra]**

Two-Step Equations

Solve: 3x + 6 = 21

Key: UNDO IN REVERSE — Subtract/add first, then multiply/divide

e.g. Step 1: 3x = 15 Step 2: x = 5

A. x = 9

B. x = 5

C. x = 7

D. x = 3

Part 2 — Geometry

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11 **[Geometry]**

Pythagorean Theorem

A right triangle has legs a = 6 and b = 8. Find the hypotenuse c.

Key: PYTHAGORAS — a^2 + b^2 = c^2 · Hypotenuse = longest side

e.g. 3-4-5 triple: 3^2 + 4^2 = 9+16 = 25 = 5^2 (6-8-10 is scaled!)

A. 14

B. 10

C. sqrt(48)

D. 100

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12 **[Geometry]**

Area of a Triangle

A triangle has base b = 10 cm and height h = 7 cm. Find its area.

Key: HALF BASE-HEIGHT — A = (1/2) x b x h · Height must be perpendicular

e.g. Base=6, Height=4 -> A = (1/2)(6)(4) = 12 cm^2

A. 70 cm^2

B. 34 cm^2

C. 35 cm^2

D. 17.5 cm^2

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13 **[Geometry]**

Triangle Angle Sum

Two angles of a triangle are 55 deg and 80 deg. Find the third angle.

Key: TRIANGLE SUM = 180 deg — Always. No exceptions.

e.g. Third angle = 180 - (sum of other two)

A. 55 deg

B. 45 deg

C. 135 deg

D. 25 deg

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14 **[Geometry]**

Circumference of a Circle

A circle has radius r = 5. Find circumference. (pi = 3.14)

Key: C = 2 x pi x r (NOT area formula pi*r^2!)

e.g. r=1 -> C ~ 6.28 · r=10 -> C ~ 62.8

A. 78.5

B. 15.7

C. 31.4

D. 10pi

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15 **[Geometry]**

Complementary & Supplementary Angles

Angles A and B are supplementary. Angle A = 113 deg. Find Angle B.

Key: S for Straight (180 deg) · C for Corner (90 deg)

e.g. 'S' is bigger letter -> Supplementary (180) is bigger sum

A. 67 deg

B. 23 deg

C. 77 deg

D. 113 deg

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16 **[Geometry]**

Volume of a Rectangular Prism

A box is 4 cm long, 3 cm wide, and 5 cm tall. Find its volume.

Key: V = l x w x h — Multiply ALL three dimensions. Answer in cm^3

e.g. Surface Area = sum of all 6 face areas =/= Volume

A. 47 cm^3

B. 60 cm^3

C. 35 cm^3

D. 94 cm^3

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17 **[Geometry]**

Parallel Lines & Transversals

Two parallel lines cut by a transversal. One angle = 70 deg. Find its alternate interior angle.

Key: Z-ANGLE — Alternate interior angles are EQUAL (form a Z-shape)

e.g. Corresponding=equal (F) · Alt.interior=equal (Z) · Co-interior=180 deg (C)

A. 110 deg

B. 180 deg

C. 70 deg

D. 35 deg

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18 **[Geometry]**

Area of a Circle

A circle has diameter d = 10. Find its area. (pi = 3.14)

Key: DIAMETER / 2 = RADIUS first! Then A = pi x r^2

e.g. d=10 -> r=5 (NOT 10!) -> A = pi(5)^2 = 25*pi

A. 314

B. 78.5

C. 31.4

D. 157

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19 **[Geometry]**

Coordinate Geometry — Distance

Find the distance between A(1, 2) and B(4, 6).

Key: DISTANCE = PYTHAGORAS: d = sqrt((dx)^2 + (dy)^2)

e.g. dx = 4-1 = 3 · dy = 6-2 = 4 -> d = sqrt(9+16) = 5

A. 7

B. sqrt(7)

C. 5

D. 25

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20 **[Geometry]**

Similar Triangles

Triangle ABC ~ Triangle DEF. AB=6, DE=9, BC=8. Find EF.

Key: SCALE FACTOR — Corresponding sides proportional: AB/DE = BC/EF

e.g. Ratio: 6/9 = 2/3 -> each DEF side = (3/2) x ABC side

A. 11

B. 12

C. 10

D. 6

Answer Key

Q01 B. 10	**Q02** C. +15	**Q03** B. x = 19	**Q04** B. 3/2
Q05 C. $3.50	**Q06** C. 2^7	**Q07** A. 24	**Q08** C. 12x - 20
Q09 B. x < -5	**Q10** B. x = 5	**Q11** B. 10	**Q12** C. 35 cm^2
Q13 B. 45 deg	**Q14** C. 31.4	**Q15** A. 67 deg	**Q16** B. 60 cm^3
Q17 C. 70 deg	**Q18** B. 78.5	**Q19** C. 5	**Q20** B. 12