Pre-Algebra & Geometry

Self-Study Worksheet · 20 Core Problems · Answer Key Included

PART 1 · Pre-Algebra

Q01 · Integers · Number Line

The temperature at midnight was -8°F. By noon it rose 15°F, then dropped 3°F by evening. What was the evening temperature?

★ KEY: RISE = ADD, DROP = SUBTRACT

A) -4°F

B) 4°F

C) 10°F

D) 26°F

Q02 · Fractions · Operations

A recipe uses 2/3 cup of sugar. If you make 1 and 1/2 batches, how much sugar is needed in total?

★ KEY: MIXED NUMBER → IMPROPER FIRST, THEN MULTIPLY

A) 4/3 cups

B) 1 cup

C) 2/3 cup

D) 5/3 cups

Q03 · Ratios & Proportions

A car travels 150 miles in 3 hours. At the same speed, how many miles will it travel in 5 hours?

★ KEY: UNIT RATE × TIME = DISTANCE

A) 200 miles

B) 225 miles

C) 250 miles

D) 300 miles

Q04 · Percents · Discount

A jacket costs $80 and is on sale for 25% off. What is the sale price?

★ KEY: SALE PRICE = ORIGINAL × (1 - DISCOUNT%)

A) $20

B) $55

C) $60

D) $65

Q05 · One-Step Equations

Sarah has $42 after spending money on lunch. She originally had $57. How much did lunch cost?

★ KEY: ORIGINAL - SPENT = REMAINING → SPENT = ORIGINAL - REMAINING

A) $15

B) $99

C) $42

D) $12

Q06 · Order of Operations · PEMDAS

Evaluate: $3 + 2 \times (8 - 5)^2 \div 6$

★ KEY: PEMDAS: Parentheses → Exponent → × ÷ → + -

A) 7.5

B) 6

C) 12.5

D) 25

Q07 · Inequalities

Jake needs at least $100. He has $67 and earns $11/hr. What is the minimum number of whole hours he must work?

★ KEY: MINIMUM → ROUND UP (ceiling), NEVER DOWN

A) 2 hours

B) 4 hours

C) 3 hours

D) 9 hours

Q08 · Variables & Expressions

A store charges $5 per notebook and $2 per pen. Which expression gives the total cost of n notebooks and p pens?

★ KEY: RATE × QUANTITY, ONE TERM PER ITEM

A) 5p + 2n

B) 5n + 2p

C) 7(n + p)

D) (5+2)(n+p)

Q09 · Two-Step Equations

Five times a number, decreased by 7, equals 28. What is the number?

★ KEY: UNDO +/- FIRST, THEN × ÷

A) 4.2

B) 4

C) 7

D) 6

Q10 · Unit Conversion

A marathon is about 26.2 miles. If 1 mile ≈ 1.61 km, about how many kilometers is a marathon? (Round to nearest whole number.)

★ KEY: miles → km: MULTIPLY (km is bigger, so the number gets bigger)

A) 16 km

B) 38 km

C) 42 km

D) 51 km

PART 2 · Geometry

Q11 · Perimeter · Rectangle

A rectangular garden is 12 m long and 7 m wide. How much fencing is needed to go all the way around it?

★ KEY: PERIMETER = 2(l + w) — count ALL four sides

A) 19 m

B) 84 m

C) 38 m

D) 48 m

Q12 · Area · Triangle

A triangular park has a base of 20 m and a height of 9 m. What is its area?

★ KEY: TRIANGLE AREA = (1/2) × base × height — DON'T FORGET THE HALF!

A) 180 m²

B) 90 m²

C) 29 m²

D) 45 m²

Q13 · Pythagorean Theorem

A ladder's base is 6 ft from a wall, and it reaches 8 ft up the wall. How long is the ladder?

★ KEY: a² + b² = c² (c = hypotenuse, always the longest side)

A) 14 ft

B) √28 ft

C) 10 ft

D) 12 ft

Q14 · Circles · Circumference

A circular fountain has a diameter of 10 m. What is its circumference? ($\pi \approx 3.14$)

★ KEY: C = π × d (diameter given? Use πd directly — no need to halve first!)

A) 78.5 m

B) 31.4 m

C) 62.8 m

D) 15.7 m

Q15 · Angles · Supplementary

Two supplementary angles measure (3x + 10)° and (x + 30)°. Find x.

★ KEY: SUPPLEMENTARY = 180° | COMPLEMENTARY = 90°

A) 45

B) 25

C) 35

D) 20

Q16 · Volume · Rectangular Prism

A fish tank is 60 cm × 30 cm × 40 cm. How many liters of water can it hold? (1 L = 1,000 cm^3)

★ KEY: V = l × w × h then ÷ 1,000 to convert cm^3 → liters

A) 7,200 L

B) 72 L

C) 130 L

D) 720 L

Q17 · Similar Triangles · Scale

A tree's shadow is 15 ft long. At the same time, a 5 ft person casts a 3 ft shadow. How tall is the tree?

★ KEY: SIMILAR TRIANGLES: height/shadow = constant → set up a proportion

A) 9 ft

B) 45 ft

C) 3 ft

D) 25 ft

Q18 · Coordinate Geometry · Distance

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

★ KEY: d = √[(x■-x■)² + (y■-y■)²] — it's Pythagorean Theorem on a grid!

A) 7

B) √7

C) 5

D) 25

Q19 · Area · Circle

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

★ KEY: $A = \pi \times r^2$ (radius = diameter ÷ 2 — SQUARE the radius!)

A) 43.96 in²

B) 615.44 in²

C) 153.86 in²

D) 196 in²

Q20 · Interior Angles · Polygon

What is the sum of the interior angles of a hexagon (6-sided polygon)?

★ KEY: Sum = (n - 2) × 180° (n = number of sides)

A) 540°

B) 720°

C) 1080°

D) 360°

ANSWER KEY

No.	Answer	No.	Answer
Q01	B) 4°F	Q11	C) 38 m
Q02	B) 1 cup	Q12	B) 90 m²
Q03	C) 250 miles	Q13	C) 10 ft
Q04	C) $60	Q14	B) 31.4 m
Q05	A) $15	Q15	C) 35
Q06	B) 6	Q16	B) 72 L
Q07	C) 3 hours	Q17	D) 25 ft
Q08	B) 5n + 2p	Q18	C) 5
Q09	C) 7	Q19	C) 153.86 in²
Q10	C) 42 km	Q20	B) 720°