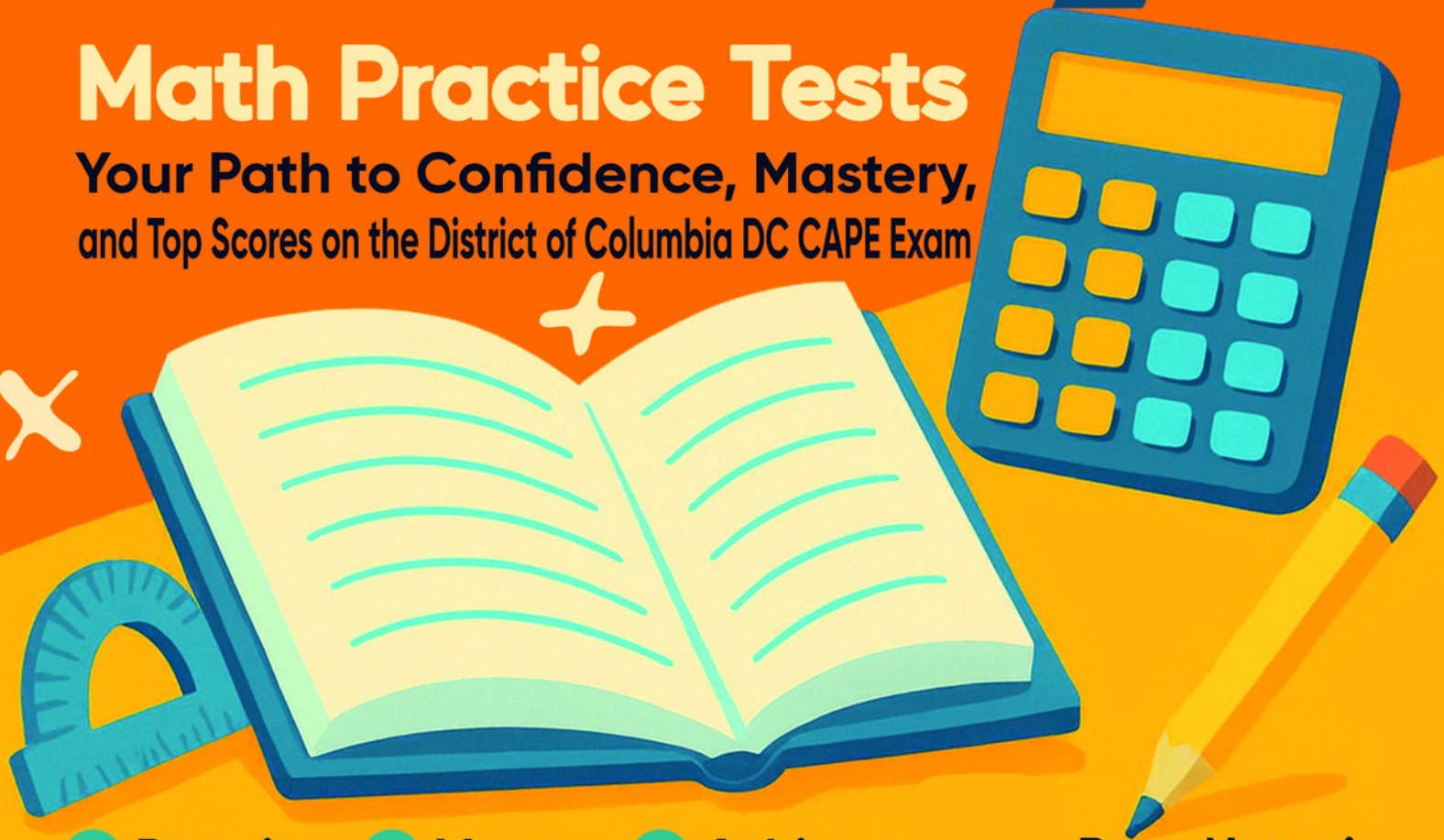
7 Full-Length District of Columbia DC CAPE Grade 7 Math Practice Tests

Your Path to Confidence, Mastery, and Top Scores on the District of Columbia DC CAPE Exam



Practice Master Achieve

Reza Nazari

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GRADE 7 MATH

Your Ultimate Quick Reference Guide

Master the Basics! | Ace Your Tests! | Build Confidence! | Succeed in Math!

NUMBER OPERATIONS & INTEGERS

INTEGER RULES Adding:

- **Same signs: add, keep sign.** $(-5) + (-3) = -8$
- **Different signs: subtract, sign of larger.** $(-8) + (5) = -3$

Mult./Divide:

- **Same signs → positive.** $(-4)(-3) = 12$
- **Different signs → negative.** $(6)(-2) = -12$

FRACTION OPERATIONS

Add/Subtract: Common denominator first.

Ex:

$1/4 + 1/6 = 3/12 + 2/12 = 5/12$

Multiply: Top×top, bottom×bottom.

Ex: $2/3 \times 5/7 = 10/21$

Divide: Flip the second, then multiply.

Ex:

$3/4 \div 2/5 = 3/4 \times 5/2 = 15/8$

Keep–Change–Flip for division!

▷ RATIOS, RATES & PERCENTS

RATIOS

Compares two quantities.

Notation: $3:5$ **or** $\frac{3}{5}$

Ex: **3 cats to 5 dogs ⇒ ratio** $3:5$

UNIT RATE

Amount per 1 unit.

Ex: **$4 per gallon**

Find it: Total ÷ number.

Ex: $\$12 \div 3 = \$4$ **per item**

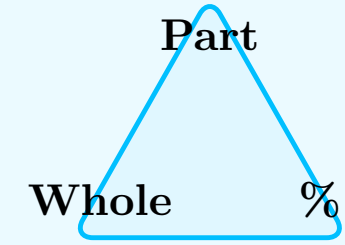
PROPORTIONS

Cross multiply:

$\frac{2}{3} = \frac{x}{9}$

$3x = 18 \Rightarrow x = 6$

% PERCENT MAGIC TRIANGLE (Cover what you're finding)



Cover the one you want to find!

- **Part** = %× **Whole.** ***Ex:*** $0.25 \times 80 = 20$
- **%** = **Part** ÷ **Whole.** ***Ex:*** $20 \div 80 = 25\%$
- **Whole** = **Part** ÷ **%.** ***Ex:*** $20 \div 0.25 = 80$

$\sqrt{x}$ ALGEBRA ESSENTIALS

PEMDAS

Order of Operations

- **P** Parentheses
- **E** Exponents
- **M** Multiply
- **D** Divide
- **A** Add
- **S** Subtract

Combining Like Terms

Only add/subtract terms with same variable:

$3x + 5x = 8x$ ✓

$3x + 5y$ (can't combine)

Solving Equations

Isolate variable using inverse operations:

$2x + 3 = 11$

$2x = 8$ (subtract 3)

$x = 4$ (divide by 2)

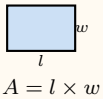
Distributive Property

$a(b + c) = ab + ac$

Ex: $3(x + 4) = 3x + 12$

△ GEOMETRY ESSENTIALS

RECTANGLE



$A = l \times w$

TRIANGLE



$A = \frac{1}{2}bh$

CIRCLE



$A = \pi r^2$

Perimeter: Add all sides | **Circumference:** $C = 2\pi r$ or $C = \pi d$

Scan Me

Watch negatives
Keep it steady

3D SHAPES - VOLUME & SURFACE AREA

RECT. PRISM



$V = l \times w \times h$

TRI. PRISM



$V = \text{Base} \times l$

CUBE



$V = s^3$

▾ **Remember: Volume = cubic units (units^3), Area = square units (units^2)**

♣ DATA ANALYSIS & PROBABILITY

STATISTICS CENTRAL

⋆ **MEAN**: Add all ÷ count. Ex: $\{5, 7, 8, 10\} \to 7.5$

⋆ **MEDIAN**: Order, find middle. Ex: $\{3, 5, 7, 9, 11\} \to 7$

⋆ **MODE**: Most frequent. Ex: $\{2, 5, 5, 7, 9\} \to 5$

⋆ **RANGE**: Max − Min. Ex: $\{3, 7, 9, 12\} \to 9$

PROBABILITY

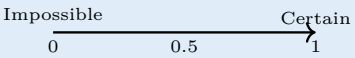
Formula:

$$P = \frac{\text{Favorable}}{\text{Total}}$$

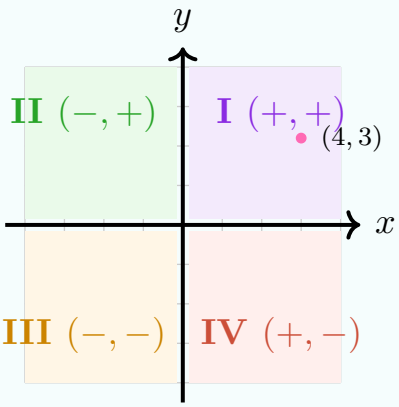
Rolling a die:

$$\text{P}(4) = \frac{1}{6}$$

$$\text{P(even)} = \frac{3}{6} = \frac{1}{2}$$



⊙ COORDINATE PLANE NAVIGATOR



▷ **How to plot (x, y):**
Start at $(0, 0)$ → move x left/right → move y up/down.

★ **Distance:**
Horizontal = subtract x's. Vertical = subtract y's.
Ex: $(2, 5)$ to $(7, 5)$ → dist = 5.

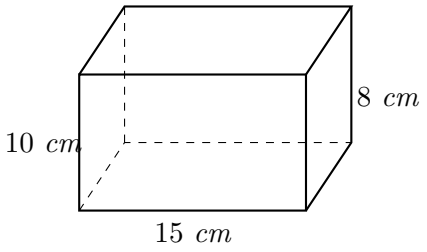
• **Remember:** x = horizontal (left/right), y = vertical (up/down).



Watch decimals
Be precise

Scan Me

10) A rectangular prism has dimensions shown. Use SA $= 2(lw + lh + wh)$.



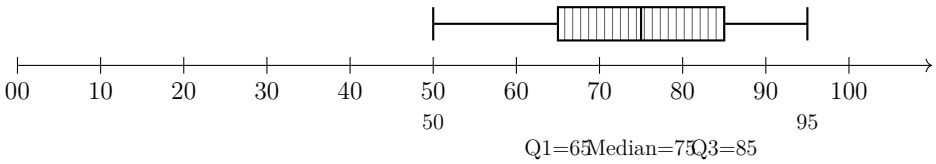
What is the total surface area of the prism?

☐ A. 580 cm^2
☐ B. 660 cm^2
☐ C. 700 cm^2
☐ D. 780 cm^2

11) A school orders n packs of markers. Each pack has 8 fine-tip markers and 5 broad-tip markers. Which expression represents the total number of markers in all n packs?

☐ A. $13 + n$
☐ B. $8n + 5$
☐ C. $8 + 5n$
☐ D. $13n$

12) The box plot shows test scores for a class.



What is the interquartile range (IQR) of the test scores?

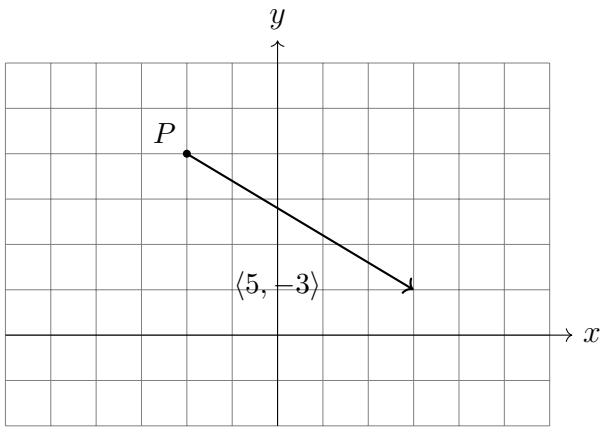
☐ A. 10
☐ B. 15
☐ C. 20
☐ D. 25

13) Which list orders the numbers from least to greatest: $-\frac{7}{8}$, -0.6, $-\frac{2}{3}$, -0.55?

☐ A. $-0.6,\ -\frac{2}{3},\ -0.55,\ -\frac{7}{8}$
☐ B. $-\frac{7}{8},\ -\frac{2}{3},\ -0.6,\ -0.55$
☐ C. $-\frac{2}{3},\ -0.6,\ -\frac{7}{8},\ -0.55$
☐ D. $-0.55,\ -0.6,\ -\frac{2}{3},\ -\frac{7}{8}$

14) A phone plan charges a fixed \$35 plus \$0.10 per text message. How much is the total monthly cost, in dollars, if a customer sends 80 text messages?

15) Point $P(-2, 4)$ is translated by $\langle 5, -3\rangle$. What are the coordinates of the image P'?



☐ A. $(3, 1)$
☐ B. $(-7, 7)$
☐ C. $(3, 7)$
☐ D. $(-7, 1)$

16) Which number is greater, $\frac{5}{6}$ or 0.82?

☐ A. 0.82
☐ B. $\frac{5}{6}$
☐ C. They are equal
☐ D. Cannot be determined

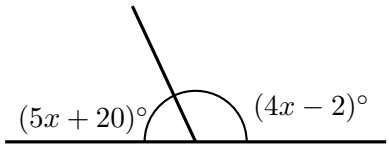
17) Evaluate: $(-6) + 9 - (-4)$.

☐ A. 7
☐ B. 5
☐ C. 3
☐ D. 1

18) In a classroom drawer, there are 6 yellow pencils, 4 green pencils, and 5 blue pencils. If one pencil is selected at random, what is the probability that it is **not yellow**?

☐ A. $\frac{2}{15}$
☐ B. $\frac{4}{15}$
☐ C. $\frac{5}{15}$
☐ D. $\frac{9}{15}$

19) Two angles are supplementary. One angle measures $5x + 20$ degrees, and the other measures $4x - 2$ degrees. What is the value of x?



☐ A. 15
☐ B. 18
☐ C. 20
☐ D. 25

20) A recipe calls for $\frac{5}{8}$ cup of sugar. If you want to make a batch that is 40 times larger, how many cups of sugar do you need?

☐ A. 20
☐ B. 25
☐ C. 30
☐ D. 35