

Grade 7 Math Diagnostic Test

Answer Key, Worked Solutions, and Score Interpretation

Student Name	
Date	
Teacher/Parent	

20 Questions	35 Minutes	No Calculator
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Common Core-aligned skill check for US middle-school mathematics

Original assessment content. Not an official or endorsed Common Core assessment.

Quick Answer Key | One point per question

Question	Answer	Question	Answer
1	B. 5 miles per hour	6	-5.75
2	$y = 3.5x$	7	$-2/3$
3	C. \$60	8	B. -3.25 degrees Celsius
4	\$24	9	$13x - 12$
5	C. 5	10	B. $x = 6$

Question	Answer	Question	Answer
11	$x = 9$	16	52 square centimeters
12	A. $n \leq 5$	17	256 students
13	28 feet	18	B. Data set B
14	B. 31.4 cm	19	$7/10$
15	53 degrees	20	B. $1/4$

Skills Assessed

Domain	Questions	Maximum Score
Ratios and Proportional Relationships	1-4	4
The Number System	5-8	4
Expressions and Equations	9-12	4
Geometry	13-16	4
Statistics and Probability	17-20	4

Score Interpretation | Use patterns, not one score alone

Overall score guide

- 17-20: Strong Grade 7 readiness. Maintain skills with mixed application and explanation.
- 13-16: Mostly ready. Review the domain(s) with missed questions.
- 9-12: Developing readiness. Plan targeted instruction before advancing.
- 0-8: Priority review. Revisit Grade 6 prerequisites and core Grade 7 foundations.

Domain score guide

Domain	Questions	Score	Interpretation
Ratios and Proportional Relationships	1-4	___ / 4	4 = secure; 3 = mostly secure; 2 = developing; 0-1 = priority review
The Number System	5-8	___ / 4	4 = secure; 3 = mostly secure; 2 = developing; 0-1 = priority review
Expressions and Equations	9-12	___ / 4	4 = secure; 3 = mostly secure; 2 = developing; 0-1 = priority review
Geometry	13-16	___ / 4	4 = secure; 3 = mostly secure; 2 = developing; 0-1 = priority review
Statistics and Probability	17-20	___ / 4	4 = secure; 3 = mostly secure; 2 = developing; 0-1 = priority review

Important: This informal diagnostic does not diagnose a learning disability or replace school placement, standardized testing, or professional evaluation.

Questions 1-4 | Ratios and Proportional Relationships

1 A cyclist travels 7.5 miles in 1.5 hours. What is the unit rate?

Answer: B. 5 miles per hour

Divide distance by time: $7.5 / 1.5 = 5$. The unit rate is 5 miles per hour.

2 The table shows a proportional relationship: $x = 2, 4, 6$ and $y = 7, 14, 21$. Write an equation relating y to x .

Answer: $y = 3.5x$

The constant of proportionality is $y / x = 7 / 2 = 3.5$. Therefore, $y = 3.5x$.

3 A jacket costs \$80 and is discounted by 25%. What is the sale price?

Answer: C. \$60

The discount is $0.25 \times 80 = 20$ dollars. Sale price = $80 - 20 = 60$ dollars.

4 Find the simple interest on \$300 at 4% per year for 2 years.

Answer: \$24

Use $I = Prt$. $I = 300 \times 0.04 \times 2 = 24$ dollars.

Questions 5-8 | The Number System

5 Compute: $-8 + 13$

Answer: C. 5

Starting at -8 and moving 13 units to the right gives 5.

6 Compute: $-3.5 - 2.25$

Answer: -5.75

Subtracting a positive number moves farther left: $-3.5 - 2.25 = -5.75$.

7 Compute: $(-3/4) \times (8/9)$

Answer: -2/3

Multiply numerators and denominators: $(-3 \times 8) / (4 \times 9) = -24/36 = -2/3$.

8 The temperature was 6.5 degrees Celsius and then dropped 9.75 degrees. What was the new temperature?

Answer: B. -3.25 degrees Celsius

New temperature = $6.5 - 9.75 = -3.25$ degrees Celsius.

Questions 9-12 | Expressions and Equations

9 Simplify: $4(2x - 3) + 5x$

Answer: $13x - 12$

Distribute 4: $8x - 12 + 5x$. Combine like terms: $13x - 12$.

10 Solve: $3x + 7 = 25$

Answer: B. $x = 6$

Subtract 7 from both sides: $3x = 18$. Divide by 3: $x = 6$.

11 Solve: $5(x - 2) = 35$

Answer: $x = 9$

Divide by 5: $x - 2 = 7$. Add 2: $x = 9$.

12 Solve and graph mentally: $4n - 3 \leq 17$

Answer: A. $n \leq 5$

Add 3: $4n \leq 20$. Divide by 4: $n \leq 5$.

Questions 13-16 | Geometry

- 13** On a scale drawing, 1 inch represents 8 feet. A wall measures 3.5 inches on the drawing. What is the actual length?

Answer: 28 feet

Multiply the drawing length by the scale: $3.5 \times 8 = 28$ feet.

- 14** A circle has radius 5 cm. Using $\pi = 3.14$, find its circumference.

Answer: B. 31.4 cm

Use $C = 2 \times \pi \times r$. $C = 2 \times 3.14 \times 5 = 31.4$ cm.

- 15** Two adjacent angles form a straight line. One angle measures 127 degrees. Find the other angle.

Answer: 53 degrees

Angles on a straight line total 180 degrees. $180 - 127 = 53$ degrees.

- 16** Find the surface area of a rectangular prism with length 4 cm, width 3 cm, and height 2 cm.

Answer: 52 square centimeters

$SA = 2lw + 2lh + 2wh = 2(12) + 2(8) + 2(6) = 24 + 16 + 12 = 52$ square centimeters.

Questions 17-20 | Statistics and Probability

- 17** In a random sample of 50 students, 32 prefer option A. About how many students out of 400 would be expected to prefer option A?

Answer: 256 students

The sample proportion is $32/50 = 0.64$. Estimate: $0.64 \times 400 = 256$ students.

- 18** Data set A has mean 12 and MAD 1.5. Data set B has mean 12 and MAD 4. Which data set is more spread out?

Answer: B. Data set B

Both centers are the same, but data set B has the larger MAD. A larger MAD means greater spread.

- 19** A bag contains 5 red, 3 blue, and 2 green counters. What is the probability of selecting a counter that is not blue?

Answer: 7/10

There are 10 counters total. Seven are not blue: 5 red + 2 green. Probability = $7/10$.

- 20** A fair spinner numbered 1 through 4 is spun and a fair coin is tossed. What is the probability of spinning an even number and getting heads?

Answer: B. 1/4

$P(\text{even}) = 2/4 = 1/2$ and $P(\text{heads}) = 1/2$. Multiply: $1/2 \times 1/2 = 1/4$.

Recommended response

- Group errors by domain and by error type: concept, procedure, representation, language, or attention.
- Select one or two high-priority targets rather than reteaching every missed item at once.
- Teach the prerequisite, model the reasoning, and move from guided to independent practice.
- Reassess with fresh or equivalent questions after a focused learning cycle.
- Use the Grade 7 Math Skills Checklist to track broader readiness.

Suggested follow-up resources

- Grade 7 Math Skills Checklist
- Preparing for Grade 7 Math
- Grade 6 Ratios and Rates Practice Guide
- Grade 6 Fractions and Decimals Review
- Grade 6 Expressions and Equations Practice Guide
- Grade 6 Geometry Review
- Grade 6 Statistics and Data Review