

# Massachusetts MCAS Grade 8 Math Quizzes

*Quick Topic Assessments with Answer Key*

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QUICK QUIZZES FOR EVERY TOPIC

# Grade 8 Math Quizzes

Topic Quizzes • Chapter Reviews • Answer Key

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*Quick, focused quizzes are one of the best ways to find out what you really know — and what you still need to work on.*

*This book has a short quiz for every Grade 8 math topic. Each one takes about 10–15 minutes and covers the most important skills for that section. Take a quiz, score it, and see exactly where you stand.*

*Use it after studying a topic, the night before a test, or anytime you want a fast check-in on your math skills.*



## Take the Quiz

*10–15 minutes  
per quiz*



## Score It

*Check every answer  
in the key*



## Review & Retry

*Study what you missed  
then quiz again*

CHAPTER

1

# *Irrational Numbers*

## ★ *What's Inside* ★

*Quiz 1: Rational and Irrational Numbers* ..... 3



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 CHAPTER 1

# Quiz 1

## Rational and Irrational Numbers

Name: \_\_\_\_\_

Date: \_\_\_\_\_

★ Score: \_\_\_\_\_ / 8

1 Which of the following numbers is **irrational**?

A. 0.75

B.  $\sqrt{5}$

C.  $-3$

D.  $0.\overline{3}$

2 Circle **all** the irrational numbers from the cards below.

$\sqrt{16}$

$\pi$

$0.\overline{45}$

$\sqrt{11}$

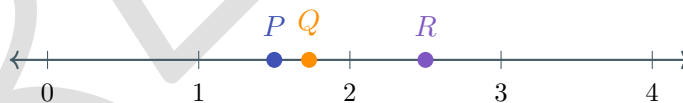
$-7$

3 True or False: Every number with a **non-terminating** decimal is irrational.

True

False

4 Three points are plotted on the number line below. Their exact values are  $\frac{3}{2}$ ,  $\sqrt{3}$ , and  $\frac{5}{2}$ . Which point represents the **irrational** number?



P

Q

R

All are rational

5 Simplify:  $\sqrt{81} =$  \_\_\_\_\_. Is  $\sqrt{81}$  rational or irrational? \_\_\_\_\_

6 Compare  $\sqrt{2}$  and 1.5. Circle  $>$ ,  $<$ , or  $=$ .

$\sqrt{2}$



1.5



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### Bonus Challenge

This is a bonus question for extra credit. Give it your best attempt.

7 A student claims: " $\sqrt{n}$  is **always** irrational." Find **three** values of  $n$  (where  $1 \leq n \leq 20$ ) that prove the student wrong. Explain why each one is rational.

 Show your work

### Score Summary

I got \_\_\_\_\_ out of \_\_\_\_\_ correct.



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CHAPTER

2

# Lines and Linear Equations

## ★ What's Inside ★

Quiz 2: Graphing Proportional Relationships .....	7
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 CHAPTER 3

## Quiz 2

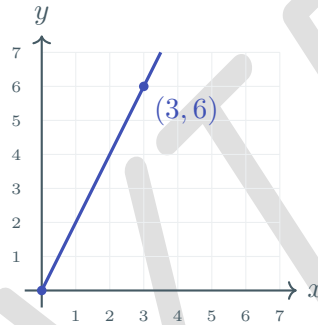
### Graphing Proportional Relationships

 Name: \_\_\_\_\_

 Date: \_\_\_\_\_

 Score: \_\_\_\_\_ / 8

- 1 The graph shows a proportional relationship. What is the **constant of proportionality** ( $k$ )?



A. 3

B. 2

C. 6

D.  $\frac{1}{2}$

- 2 Complete the table for a proportional relationship.

Time (h)	1	3	5
Distance (mi)	8	_____	_____

- 3 True or False: The equation  $y = 5x + 2$  represents a **proportional relationship**.



True



False

- 4 Compare the **unit rates** (gallons per minute). Circle  $>$ ,  $<$ , or  $=$ .



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**Pipe A: 36 gal in 4 min** **Pipe B: 50 gal in 5 min**

- 5 A proportional relationship passes through  $(5, 20)$ . Write the equation in the form  $y = kx$ .

Equation: \_\_\_\_\_

- 6 A car uses gas at a constant rate: 2 gallons for every 50 miles. How many gallons does it need for 175 miles?

Gallons: \_\_\_\_\_

### Bonus Challenge

This is a bonus question for extra credit. Give it your best attempt.

- 7 Store A sells fruit for  $y = 3x$  (dollars per pound). Store B's prices: 2 lb costs \$5, 4 lb costs \$10. Which store is cheaper, and how much would 10 pounds cost there? Show your work.

 Show your work

### Score Summary

I got \_\_\_\_\_ out of \_\_\_\_\_ correct.



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# *Answer Key & Explanations*



## Answer Key

First try each quiz on your own, then check your work here.

### Chapter 1

#### Quiz 1: Rational and Irrational Numbers

1 B ( $\sqrt{5}$ )

2  $\pi$  and  $\sqrt{11}$

3 False

4 Q

5 9; Rational

6 <

7  $n = 1, 4, 9,$  or  $16$  (any three)

#### Explanations

1  $0.75 = \frac{3}{4}$  (terminates — rational).  $\sqrt{5} \approx 2.2360\dots$  (non-repeating, non-terminating — irrational).  $-3 = \frac{-3}{1}$  (integer — rational).  $0.\bar{3} = \frac{1}{3}$  (repeats — rational). Common mistake: thinking  $-3$  is irrational because it is negative. Negative numbers can absolutely be rational! ✓

2  $\sqrt{16} = 4$  (perfect square — rational).  $\pi \approx 3.14159\dots$  (never terminates or repeats — irrational).  $0.\bar{45}$  repeats, so it equals  $\frac{5}{11}$  (rational).  $\sqrt{11} \approx 3.316\dots$  (11 is not a perfect square — irrational).  $-7 = \frac{-7}{1}$  (integer — rational). Common mistake: forgetting that  $\sqrt{16}$  simplifies to a whole number. ✓

3 A non-terminating decimal can still **repeat**, which makes it rational. For example,  $0.333\dots = 0.\bar{3} = \frac{1}{3}$  never terminates, but it repeats, so it is rational. Only decimals that are non-terminating **and** non-repeating are irrational. ✓



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4  $P$  is at  $\frac{3}{2} = 1.5$  (rational — it is a fraction of integers).  $Q$  is at  $\sqrt{3} \approx 1.732$  (irrational — 3 is not a perfect square).  $R$  is at  $\frac{5}{2} = 2.5$  (rational). Only  $Q$  is irrational. On the number line,  $Q$  sits between 1 and 2, slightly past 1.7. ✓

5  $\sqrt{81} = 9$  because  $9 \times 9 = 81$ . Since 9 is an integer, it can be written as  $\frac{9}{1}$ , making it rational. Common mistake: assuming **all** square roots are irrational. Only square roots of non-perfect squares (like  $\sqrt{2}$ ,  $\sqrt{11}$ ) are irrational. ✓

6  $\sqrt{2} \approx 1.414$ . Since  $1.414 < 1.5$ , we have  $\sqrt{2} < 1.5$ . Verify:  $1.5^2 = 2.25 > 2$ , so  $1.5 > \sqrt{2}$ .  $1.4^2 = 1.96 < 2$ , so  $1.4 < \sqrt{2}$ . This confirms  $\sqrt{2}$  is between 1.4 and 1.5, and therefore less than 1.5. ✓

7 The perfect squares between 1 and 20 are 1, 4, 9, and 16.  $\sqrt{1} = 1$ ,  $\sqrt{4} = 2$ ,  $\sqrt{9} = 3$ ,  $\sqrt{16} = 4$ . Each is an integer, so each is rational ( $\frac{1}{1}$ ,  $\frac{2}{1}$ , etc.). Any three of these disprove the claim. ✓

## Chapter 2

### Quiz 2: Graphing Proportional Relationships

1 B (2)

2 24 and 40

3 False

4 <

5  $y = 4x$

6 7

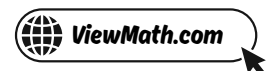
7 Store B; \$25

### Explanations

1 For a proportional relationship  $y = kx$ , pick any point on the line:  $k = \frac{y}{x} = \frac{6}{3} = 2$ . Common mistake: choosing  $k = 3$  (the  $x$ -value) or  $k = 6$  (the  $y$ -value) instead of dividing  $y \div x$ . ✓



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2 The unit rate is  $k = 8$  miles per hour. At 3 h:  $8 \times 3 = 24$  mi. At 5 h:  $8 \times 5 = 40$  mi. In a proportional table, multiply each  $x$ -value by  $k$ . ✓

3 A proportional relationship has the form  $y = kx$  and passes through the origin  $(0, 0)$ . The equation  $y = 5x + 2$  has a  $y$ -intercept of 2, so at  $x = 0$  we get  $y = 2$ , not 0. That extra  $+2$  means it is **not** proportional. ✓

4 Pipe A:  $\frac{36}{4} = 9$  gal/min. Pipe B:  $\frac{50}{5} = 10$  gal/min. Since  $9 < 10$ , Pipe A's rate is **less than** Pipe B's rate. Common mistake: comparing totals (36 vs 50) instead of unit rates. ✓

5 Find  $k$ :  $k = \frac{y}{x} = \frac{20}{5} = 4$ . So the equation is  $y = 4x$ . Check:  $y = 4(5) = 20$ . ✓

6 Unit rate:  $\frac{2}{50} = 0.04$  gal/mi (or  $\frac{50}{2} = 25$  mi/gal). For 175 mi:  $175 \div 25 = 7$  gallons. Alternatively, set up a proportion:  $\frac{2}{50} = \frac{x}{175}$ , so  $x = \frac{2 \times 175}{50} = 7$ . ✓

7 Store A:  $k = 3$  (\$3/lb). Store B:  $k = \frac{5}{2} = 2.50$  (\$2.50/lb). Since  $\$2.50 < \$3.00$ , Store B is cheaper. At 10 lb:  $10 \times 2.50 = \$25$ . Check Store A:  $10 \times 3 = \$30$  — that's \$5 more. ✓



**Well done checking your answers!**

Keep practicing to strengthen your skills.



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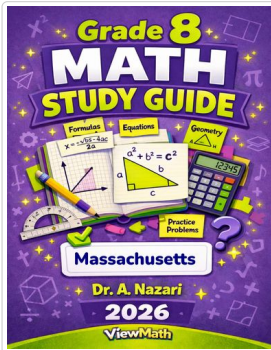


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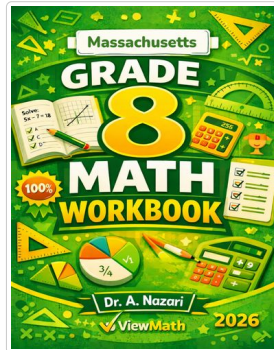
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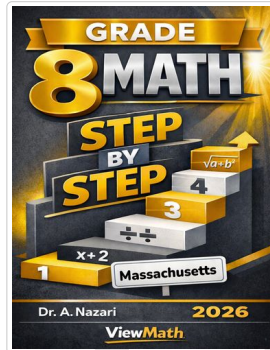
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Workbook



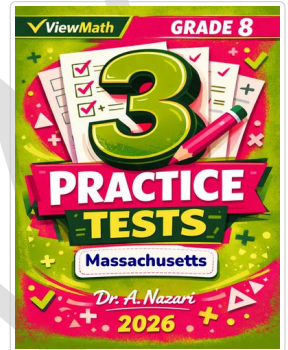
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Step-by-Step



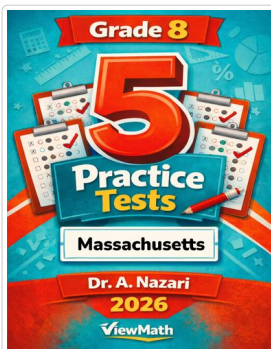
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3 Practice Tests



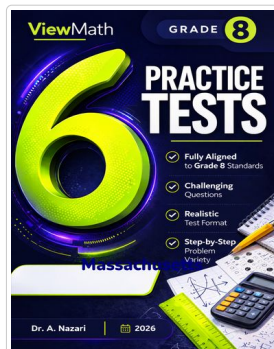
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5 Practice Tests



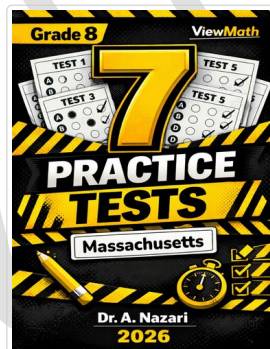
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6 Practice Tests



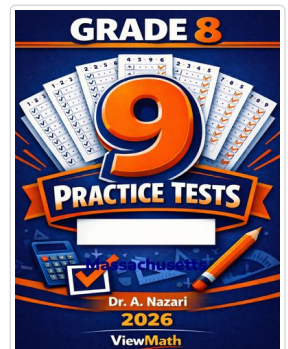
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7 Practice Tests



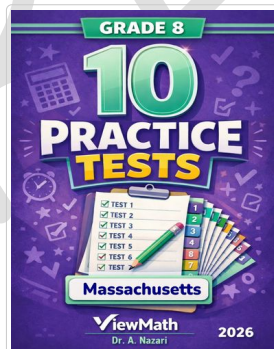
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9 Practice Tests



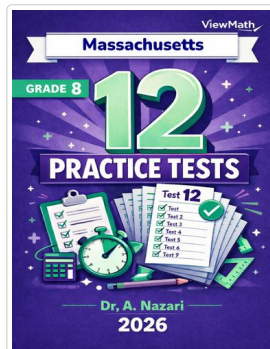
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10 Practice Tests



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12 Practice Tests



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