

# Unit 2: Rationals and Irrationals Pretest

Math 9 Principles

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

Block: \_\_\_\_\_

Please initial this box to indicate you carefully read over your test and checked your work for simple mistakes.

	What I can do in this unit	Level
2-1	I can convert rational numbers among their two main forms, fractions and decimals (terminating or repeating).	
2-2	I can convert between percent, fraction, and decimal form for rational numbers.	
2-3	I can identify a real number as rational or irrational and, if rational, write it as a reduced fraction or integer.	
2-4	I can prime factor natural numbers, determine whether they are perfect squares, and if they are evaluate their square root.	
2-5	I can evaluate areas and circumferences of circles using radius, diameter, and $\pi$ .	

Code	Value	Description
N	Not Yet Meeting Expectations	I just don't get it.
MM	Minimally Meeting Expectations	Barely got it, I need some prompting to help solve the question.
M	Meeting Expectations	Got it, I understand the concept without help or prompting.
E	Exceeding Expectations	Wow, nailed it! I can use this concept to solve problems I may have not seen in practice. I also get little details that may not be directly related to this target correct.

**2-1: I can convert rational numbers among their two main forms, fractions and decimals (terminating or repeating).**

Write the decimal equivalent of each:

1) $\frac{3}{4} = 0.75$	2) $\frac{2}{3} = 0.\overline{6}$	3) $\frac{4}{5} = 0.8$
4) $\frac{3}{8} = 0.375$	5) $\frac{1}{3} = 0.\overline{3}$	6) $\frac{7}{8} = 0.875$

Write the fractional equivalent of each:

7) $0.125 = \frac{1}{8}$	8) $0.5 = \frac{1}{2}$	9) $0.\overline{5} = \frac{5}{9}$
10) $0.65 = \frac{65}{100} = \frac{13}{20}$	11) $0.\overline{18} = \frac{18}{99} = \frac{2}{11}$	12) $1.625 = 1\frac{5}{8} = \frac{13}{8}$
13) $0.66666... = \frac{2}{3}$	14) $0.055 = \frac{55}{1000} = \frac{11}{200}$	15) $0.\overline{12} = \frac{12}{99} = \frac{4}{33}$

**2-2: I can convert between percent, fraction, and decimal form for rational numbers.**

Write the following percentages as fractions in lowest terms

16) 80% = $0.8 = \frac{4}{5}$	17) 25% = $0.25 = \frac{1}{4}$	18) 50% = $0.5 = \frac{1}{2}$
19) $33.\bar{3}\% = 0.33\bar{3} = 0.\bar{3} = \frac{1}{3}$	20) 12.5% = $0.125 = \frac{1}{8}$	21) $55.\bar{5}\% = 0.55\bar{5} = 0.\bar{5} = \frac{5}{9}$

Write the following decimals as fractions in lowest terms.

22) 0.6 = $\frac{3}{5}$	23) 0.625 = $\frac{5}{8}$	24) 2.4 = $2\frac{2}{5} = \frac{12}{5}$
25) $0.\bar{4} = \frac{4}{9}$	26) $1.\bar{3} = 1\frac{1}{3} = \frac{4}{3}$	27) $1.\bar{45} = 1\frac{45}{99} = 1\frac{5}{11} = \frac{16}{11}$

Fill in the missing portions of the chart with equivalent answers. All fractions must be in lowest terms. Use improper fractions if appropriate.

#	Percent	Decimal	Fraction
28)	$55.\bar{5}\%$	$0.\bar{5}$	$\frac{5}{9}$
29)	$40\%$	0.4	$\frac{2}{5}$
30)	$66\frac{2}{3}\%$	$0.\bar{6}$	$\frac{2}{3}$
31)	$137.5\%$	1.375	$1\frac{3}{8} = \frac{11}{8}$
32)	$255.\bar{5}\%$	$2.55\bar{5} = 2.\bar{5}$	$2\frac{5}{9} = \frac{23}{9}$

2-3: I can identify a real number as rational or irrational and, if rational, write it as a reduced fraction or integer.

If the number is rational, write it as an integer or fraction in lowest terms. Otherwise write irrational.

33) $\sqrt{144}$ $= 12$	34) $0.\bar{5}$ $= \frac{5}{9}$	35) $\sqrt{0.\bar{4}}$ $= \sqrt{\frac{4}{9}} = \frac{2}{3}$
36) $\sqrt{24}$ irr	37) $\sqrt{625}$ $= 25$	38) $0.\bar{3}$ $= \frac{1}{3}$
39) $\sqrt{\frac{16}{25}}$ $= \frac{4}{5}$	40) $\sqrt{\frac{64}{15}} = \frac{8}{\text{irr}}$ irr	41) $\sqrt{0.16}$ $= \sqrt{\frac{16}{100}} = \frac{4}{10}$ $\neq \frac{2}{5}$
42) $\sqrt{1\frac{7}{9}} = \sqrt{\frac{16}{9}}$ $= \frac{4}{3}$	43) $\sqrt{0.004}$ $= \sqrt{\frac{4}{1000}} = \frac{2}{\text{irr}}$ irr	44) $\sqrt{5\frac{1}{3}} = \sqrt{\frac{16}{3}} = \frac{4}{\text{irr}}$ irr

2-4: I can prime factor natural numbers, determine whether they are perfect squares, and if they are evaluate their square root.

Test to see if each number below is divisible by any of 2, 3, 4, 5, 6, 9, or 10. Specify which ones are factors for each number.

45) 1440 $2, 3, 4, 5, 6, 9, 10$	46) 3723 $(3)$	47) 2610 $2, 3, 5, 6, 9, 10$
48) 155 $5$	49) 10056 $2, 3, 4, 6$	50) 2832 $2, 3, 4, 6$

Prime factor each number and determine whether it is a perfect square. If it is, state the square root. No Calculators!

51) 336 $  \begin{array}{c}  336 \\  \swarrow \quad \searrow \\  4 \quad 84 \\  \swarrow \searrow \quad \swarrow \searrow \\  (2)(2) \quad 21 \quad 4 \\  \quad \swarrow \searrow \quad \swarrow \searrow \\  \quad (3)(7) \quad (2)(2)  \end{array}  $ $= 2^4 \cdot 3 \cdot 7 \text{ Not a P.S.}$	52) 900 $  \begin{array}{c}  900 \\  \swarrow \quad \searrow \\  9 \quad 100 \\  (3)(3) \quad \swarrow \searrow \\  \quad 10 \quad 10 \\  \quad \swarrow \searrow \quad \swarrow \searrow \\  \quad (2)(5) \quad (2)(5)  \end{array}  $ $= 2^2 \cdot 3^2 \cdot 5^2 \therefore \sqrt{900} = 2 \cdot 3 \cdot 5 = 30$
53) 5184 $  \begin{array}{c}  5184 \\  \swarrow \quad \searrow \\  9 \quad 576 \\  (3)(3) \quad \swarrow \searrow \\  \quad 9 \quad 64 \\  \quad (3)(3) \quad \swarrow \searrow \\  \quad \quad 8 \quad 8 \\  \quad \quad \swarrow \searrow \quad \swarrow \searrow \\  \quad \quad (2)(4) \quad (2)(4) \\  \quad \quad \swarrow \searrow \quad \swarrow \searrow \\  \quad \quad (2)(2) \quad (2)(2)  \end{array}  $ $= 2^6 \cdot 3^4$ $\sqrt{5184} = 2^3 \cdot 3^2 = 72$	54) 20736 $= 2^8 \cdot 3^4$ $  \begin{array}{c}  20736 \\  \swarrow \quad \searrow \\  9 \quad 2304 \\  (3)(3) \quad \swarrow \searrow \\  \quad 9 \quad 256 \\  \quad (3)(3) \quad \swarrow \searrow \\  \quad \quad 16 \quad 16 \\  \quad \quad \swarrow \searrow \quad \swarrow \searrow \\  \quad \quad 4 \quad 4 \quad 4 \quad 4 \\  \quad \quad \swarrow \searrow \quad \swarrow \searrow \\  \quad \quad (2)(2) \quad (2)(2) \quad (2)(2) \quad (2)(2)  \end{array}  $ $\sqrt{20736} = 2^4 \cdot 3^2 = 16 \cdot 9 = 144$

2-5: I can evaluate areas and circumferences of circles using radius, diameter, and  $\pi$

Complete each row of this chart for circles without using a calculator. No decimals, fractions only.

#	Radius	Diameter	Circumference	Area
55)	3	6	$6\pi$	$9\pi$
56)	4	8	$8\pi$	$16\pi$
57)	$\frac{5}{2}$	5	$5\pi$	$\frac{25}{4}\pi$
58)	9	18	$18\pi$	$81\pi$
59)	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{2\pi}{3}$	$\frac{1}{9}\pi = \frac{\pi}{9}$
60)	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{3}{4}\pi$	$\frac{9}{64}\pi$
61)	$\frac{5}{4}$	$\frac{5}{2}$	$\frac{5}{2}\pi$	$\frac{25}{16}\pi$
62)	$\frac{9}{5}$	$\frac{18}{5}$	$\frac{18}{5}\pi$	$\frac{81}{25}\pi$

63) What is the area of a Wagon Wheel with diameter 9cm?

$$r = \frac{9}{2} \quad A = \pi r^2 = \pi \left(\frac{9}{2}\right)^2 = \frac{81\pi}{4}$$

64) Find the circumference of a pie with area  $81\pi$ .

$$r^2 = 81 \quad C = 2\pi r = 2\pi 9 = 18\pi$$

$$r = \sqrt{81} = 9$$

65) A bicycle wheel is 75 cm in diameter. If it takes 8 revolutions to go the length of a driveway, how long is the driveway?

$$C = \pi d = 75\pi$$

$$l = 8(75\pi) = 600\pi \text{ cm}$$

Review

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66) Evaluate:  $|-15 - 2| - |12 - 20|$

$$= |-17| - |-8|$$
$$= 17 - 8 = \textcircled{9}$$

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67) Evaluate the expression  $|x - y| + |x - z|$  when  $x = 0$ ,  $y = 4$ , and  $z = -3$ .

$$|0 - 4| + |0 - (-3)|$$
$$= |-4| + |3|$$
$$= 4 + 3 = \textcircled{7}$$

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68) Evaluate:  $(5 - 9) - (3 - 9) =$

$$= (-4) - (-6)$$
$$= -4 + 6 = \textcircled{2}$$

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69) Evaluate:  $5(-3) + (-6)(-1) =$

$$= -15 + 6$$
$$= \textcircled{-9}$$

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70) Evaluate:  $-\frac{5}{6} + \frac{2}{15}$

$$= -\frac{25}{30} + \frac{4}{30} = -\frac{21}{30} = \textcircled{-\frac{7}{10}}$$

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71) Evaluate:  $\frac{12}{25} \div 1\frac{1}{5}$

$$= \frac{12}{25} \div \frac{6}{5}$$
$$= \frac{12}{25} \cdot \frac{5}{6} = \textcircled{\frac{2}{5}}$$