

# Unit 2: Rationals and Irrationals Practice 2

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) $\frac{2}{3} =$ $0.\overline{6}$	2) $\frac{3}{4} =$ $0.75$	3) $\frac{2}{5} =$ $0.4$
4) $\frac{3}{8} =$ $0.375$	5) $\frac{1}{3} =$ $0.\overline{3}$	6) $\frac{5}{8} =$ $0.625$

Write the fractional equivalent of each:

7) $0.125 =$ $\frac{1}{8}$	8) $0.65 =$ $\frac{65}{100} = \frac{13}{20}$	9) $0.\overline{5} =$ $\frac{5}{9}$
10) $0.5 =$ $\frac{1}{2}$	11) $0.\overline{18} =$ $= \frac{18}{99} = \frac{2}{11}$	12) $0.055 =$ $= \frac{55}{1000} = \frac{11}{200}$
13) $0.66666. . . .$ $= \frac{2}{3}$	14) $1.625 =$ $= 1\frac{5}{8} = \frac{13}{8}$	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) 60% = $= 0.6 = \frac{3}{5}$	17) 25% = $= \frac{1}{4}$	18) 50% = $= \frac{1}{2}$
19) $55.\bar{5}\%$ = $= \frac{5}{9}$	20) 12.5% = $= \frac{1}{8}$	21) $33.\bar{3}\%$ = $= \frac{1}{3}$

Write the following decimals as fractions in lowest terms.

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

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)	$22.\bar{2}\%$	$0.\bar{2}$	$\frac{2}{9}$
29)	$60\%$	0.6	$\frac{3}{5}$
30)	$66\frac{2}{3}\%$	$0.\bar{6}$	$\frac{2}{3}$
31)	$137.5\%$	1.375	$1\frac{3}{8} = \frac{11}{8}$
32)	$355.\bar{5}\%$	$3.\bar{5}$	$3\frac{5}{9} = \frac{32}{9}$

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) $\sqrt{121}$ $= 11$	34) $0.\bar{3}$ $= \frac{1}{3}$	35) $\sqrt{0.\bar{4}}$ $= \sqrt{\frac{4}{9}}$ $= \frac{2}{3}$
36) $\sqrt{24}$ $\text{irr}$	37) $\sqrt{625}$ $= 25$	38) $0.\bar{5}$ $= \frac{5}{9}$
39) $\sqrt{\frac{9}{16}}$ $= \frac{3}{4}$	40) $\sqrt{\frac{64}{15}}$ $= \text{irr}$	41) $\sqrt{0.16}$ $= \sqrt{\frac{16}{100}} = \frac{4}{10}$ $= \frac{2}{5}$
42) $\sqrt{1\frac{7}{9}}$ $= \sqrt{\frac{16}{9}}$ $= \frac{4}{3}$	43) $\sqrt{0.004}$ $= \sqrt{\frac{4}{1000}}$ $\text{irr}$	44) $\sqrt{5\frac{1}{3}}$ $= \sqrt{\frac{16}{3}}$ $\text{irr}$

**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) 10056 <b>2, 3, 4, 6</b>	46) 3723 <b>3</b>	47) 2510 <b>2, 5, 10</b>
48) 155 <b>5</b>	49) 1440 <b>2, 3, 4, 5, 6, 9, 10</b>	50) 1848 <b>2, 3, 4, 6</b>

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

<p>51) 5184</p> $  \begin{array}{c}  5184 \\  \swarrow \quad \searrow \\  9 \quad 576 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  3 \quad 3 \quad 9 \quad 64 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  3 \quad 3 \quad 8 \quad 8 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  4 \quad 2 \quad 4 \quad 2 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  2 \quad 2 \quad 2 \quad 2  \end{array}  $ <p> <math>= 2^6 \cdot 3^4</math>  <math>\sqrt{2^6 \cdot 3^4} = 2^3 \cdot 3^2</math>  <math>= 8 \cdot 9 = 72</math> </p>	<p>52) 1600</p> $  \begin{array}{c}  1600 \\  \swarrow \quad \searrow \\  16 \quad 100 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  4 \quad 4 \quad 10 \quad 10 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  2 \quad 2 \quad 2 \quad 2 \quad 5 \quad 5 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  2 \quad 2 \quad 5 \quad 5  \end{array}  $ <p> <math>= 2^6 \cdot 5^2</math>  <math>\sqrt{2^6 \cdot 5^2} = 2^3 \cdot 5 = 40</math> </p>
<p>53) 336</p> $  \begin{array}{c}  336 \\  \swarrow \quad \searrow \\  6 \quad 56 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  2 \quad 3 \quad 7 \quad 8 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  4 \quad 2 \\  \swarrow \quad \searrow \\  2 \quad 2  \end{array}  $ <p> <math>= 2^4 \cdot 3 \cdot 7</math> Not a P.S.         </p>	<p>54) 20736</p> $  \begin{array}{c}  20736 \\  \swarrow \quad \searrow \\  9 \quad 2304 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  3 \quad 3 \quad 9 \quad 256 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  3 \quad 3 \quad 16 \quad 16 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  4 \quad 4 \quad 4 \quad 4 \\  \swarrow \quad \searrow \quad \swarrow \quad \searrow \\  2 \quad 2 \quad 2 \quad 2 \quad 2 \quad 2  \end{array}  $ <p> <math>= 2^8 \cdot 3^4</math>  <math>\sqrt{2^8 \cdot 3^4} = 2^4 \cdot 3^2 = 16 \cdot 9 = 144</math> </p>

**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)	4	8	$8\pi$	$16\pi$
56)	3	6	$6\pi$	$9\pi$
57)	$\frac{5}{2}$	5	$5\pi$	$\frac{25\pi}{4}$
58)	8	16	$16\pi$	$64\pi$
59)	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{2\pi}{3}$	$\frac{\pi}{9}$
60)	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{\pi}{4}$	$\frac{\pi}{64}$
61)	$\frac{7}{4}$	$\frac{7}{2}$	$\frac{7\pi}{2}$	$\frac{49\pi}{16}$
62)	$\frac{9}{5}$	$\frac{18}{5}$	$\frac{18\pi}{5}$	$\frac{81}{25}\pi$

63) What is the area of a Wagon Wheel with diameter 11cm?

$$r = \frac{11}{2}$$

$$A = \left(\frac{11}{2}\right)^2 \pi = \frac{121\pi}{4}$$

64) Find the circumference of a pie with area  $100\pi$ .

$$r = 10$$

$$C = 2\pi r = 2\pi(10) = 20\pi$$

65) A bicycle wheel is 75 cm in diameter. If it takes 6 revolutions to go the length of a driveway, how long is the driveway?

$$C = 75\pi$$

$$L = 6 \cdot 75\pi$$

$$= 450\pi \text{ cm}$$

## Review

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66) Evaluate:  $|-16 - 2| - |11 - 20|$

$$\begin{aligned} &= |-18| - |-9| \\ &= 18 - 9 \\ &= \textcircled{9} \end{aligned}$$

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67) Evaluate the expression  $|x - y| + |x - z|$  when  $x = 2$ ,  $y = 0$ , and  $z = -4$

$$\begin{aligned} &= |2 - 0| + |2 - (-4)| \\ &= |2| + |6| \\ &= \textcircled{8} \end{aligned}$$

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68) Evaluate:  $(4 - 9) - (3 - 8) =$

$$\begin{aligned} &= -5 - -5 \\ &= \textcircled{0} \end{aligned}$$

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69) Evaluate:  $5(-4) + (-4)(-1) =$

$$\begin{aligned} &= -20 + 4 \\ &= \textcircled{-16} \end{aligned}$$

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70) Evaluate:  $-\frac{5}{6} + \frac{1}{18}$

$$\begin{aligned} &= -\frac{15}{18} + \frac{1}{18} \\ &= -\frac{14}{18} = \textcircled{-\frac{7}{9}} \end{aligned}$$

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71) Evaluate:  $\frac{12}{35} \div 1\frac{1}{5}$

$$\begin{aligned} &= \frac{12}{35} \div \frac{6}{5} \\ &= \frac{12}{35} \cdot \frac{5}{6} = \textcircled{\frac{2}{7}} \end{aligned}$$