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| **Unit 10: Exponents, Roots, and the Pythagorean Theorem** |
| **Learning Goals** | 801: Use rational approximations to compare and estimate expressions with irrational numbers. 802: Work with radicals and integer exponents.812: Understand and apply the Pythagorean Theorem. |
| **Math Florida Standard** | **Points Earned Out of Total Available** | **Mastery** |
| **8.NS.1.1** | Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number. | \_\_\_/4 |  |
| **8.NS.1.2** | Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π2). | \_\_\_/4 |  |
| **8.EE.1.1** | Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 32 x 3-5 = 3-3 = 1/33 = 1/27. | \_\_\_/4 |  |
| **8.EE.1.2** | Use square roots and cube root symbols to represent solutions to equations of the form *x2 = p* and *x3 = p*, where *p* is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know $\sqrt{2} $that is irrational. | \_\_\_/4 |  |
| **8.G.2.6** | Explain a proof of the Pythagorean Theorem and its converse. | \_\_\_/4 |  |
| **8.G.2.7** | Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. | \_\_\_/4 |  |
| **8.G.2.8** | Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.  | \_\_\_/4 |  |

**Score** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Unit 10: Exponents, Roots, and the Pythagorean Theorem**

**LG 801:** Use rational approximations to compare and estimate expressions with irrational numbers.

1. James wants to sort a set of numbers into two groups. Write each value in the correct column to show which numbers are rational numbers and which are irrational numbers?

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| * 7.3
* $0.\overbar{6}$
* $\sqrt{9}$
* $\sqrt{3}$
* $\sqrt[3]{8}$
* $\sqrt[3]{9}$
* $π$
 | Rational Numbers | Irrational Numbers |
|  |  |

1. Select all of that statements that are true about$ \frac{22}{7}$.
* It is a rational number.
* It is an irrational number.
* When it is written as a decimal, it terminates.
* When it is written as a decimal, it repeats.
* It is an approximate value of pi.
* When it is written as a decimal, it is equivalent to 3.10.
1. Consider a fraction with the following characteristics:
	* It represents a repeating decimal.
	* The denominator is less than 10.
	* It is less than 0.2.

What could this fraction be?

1. Which number would be considered rational?
2. $\sqrt{7}$
3. $\sqrt{0}$
4. $\sqrt{5}$
5. $\sqrt{3}$
6. Find the negative square root of 64 and then identify the point on the number line that represents that answer.



1. Point A
2. Point B
3. Point C
4. Point D
5. Approximate the solution to $\sqrt{58}$ to the nearest hundredth.
6. 7
7. 7.60
8. 7.62
9. 7.70
10. Given the number line below, which letter would represent the best approximation for$ \sqrt{57}$?



1. Point A
2. Point B
3. Point C
4. Point D
5. Which of the following numbers is represented by Point P on the number line below?



1. $\sqrt{33}$
2. $\sqrt{28}$
3. $\sqrt{25}$
4. $\sqrt{11}$

**LG 802:** Work with radicals and integer exponents.

1. Which number is equivalent to$ \frac{3^{4}}{3^{2}}$?
2. 2
3. 9
4. 81
5. 729
6. Write an expression that is equivalent to$ 4^{7}×4^{-5}$?
7. Simplify the expression$ \frac{4^{8}}{4^{-4}}$ . Explain how you found your answer.
8. Which expressions are equivalent to$ \frac{6^{3}}{6^{6}}$? Select all that apply.
* $\frac{1}{6^{2}}$
* $6^{-3}$
* $\frac{1}{216}$
* $\frac{1}{6^{3}}$
* $6^{9}$
1. Find$ \sqrt{\frac{169}{16}}$.
2. $\frac{13}{4}$
3. $\frac{17}{4}$
4. $\frac{23}{4}$
5. $10\frac{9}{16}$
6. What number would be next in the following pattern?

1, 8, 27, 64, 125, \_\_\_\_\_\_\_\_\_

1. Solve the equation$ x^{2}=136$.
2. $2\sqrt{34}$
3. $4\sqrt{17}$
4. $4\sqrt{34}$
5. $34\sqrt{2}$
6. Is 15 the square root of 30?
7. No, 15 × 15 = 225
8. Yes, 15 × 2 = 30
9. No, 5 × 6 = 30
10. Yes, 5 × 6 = 30

**LG 812:** Understand and apply the Pythagorean Theorem.

1. The slide lengths of a triangle are given.

3, 4, 5

Explain how you know which side will be opposite the right angle.

1. Select three side lengths, in centimeters (cm), that can form a right triangle.
* 5 cm
* 6 cm
* 8 cm
* 10 cm
* 11 cm
* 12 cm
1. Which set of numbers forms a right triangle?
2. 1, 2, 3
3. 3.2, 7, 8
4. 3.6, 4.7, 5.2
5. 6, 8, 10
6. Which of the following statements about the Pythagorean Theorem and its converse are true?
7. If a triangle is a right triangle with leg lengths *a*, *b* and a hypotenuse of length *c*,

then *a*2 + *b*2 = *c*2

1. If a triangle has side lengths *a*, *b*, and *c* such that *a*2 + *b*2 = *c*2, then the triangle is a right triangle.
2. Both answers A and B are true.
3. Both answers A and B are NOT true.
4. Triangle *ABC* is a right triangle. The length of one leg is 80 cm, and the hypotenuse is 120 cm.

What is the length, in centimeters, of the other leg?

1. Two boats start from position O. After some time they reach their respective positions. What is the distance between the two boats?



1. A right square pyramid is shown.



The base has a side length, *b*, of 30 cm. The height, *h*, is 10 cm. What is the length, in centimeters, of *l*?

1. Micah is using the formula $c= \sqrt{a^{2}+b^{2}}$ to find the value of *c*. He know that *a* = 10 and *b* =24. What is the value for *c*?
2. A triangle has *K* = (3, 1), *L* = (-5, -3), and *M* = (-8, 3) for its vertices. Verify that the lengths of the sides of triangle *KLM* fit the Pythagorean equation *a*2 + *b*2 = *c*2.
3. How far is the point (5, 5) from the origin?
4. Given two points as shown in the diagram below:

*a*: (1, 4)

*b*: (3, -3)



Find another two points that allow you to use Pythagorean Theorem to find the distance between the two given points.

Point 1 (in first quadrant): ( \_\_\_\_\_\_ , \_\_\_\_\_\_ )

Point 2 (in fourth quadrant): ( \_\_\_\_\_\_ , \_\_\_\_\_\_ )

What is the distance between points *a* and *b*? *ab* = $\sqrt{\\_\\_\\_\\_\\_\\_\\_}$