ALBERT

Name _____ Date _____

Approximating Irrational Numbers Worksheet

Grade 8 · Common Core 8.NS.A.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., π^2). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.

Practice

Builds the skill step by step.

1. $\sqrt{20}$ is between which two consecutive whole numbers?

2. $\sqrt{50}$ is between which two consecutive whole numbers?

3. Which whole number is $\sqrt{30}$ closest to?

   A. 4

   B. 5

   C. 6

   D. 7

4. Which point on the number line best shows $\sqrt{20}$?



   A. A

   B. B

   C. C

   D. D

5. Round $\sqrt{10}$ to the nearest tenth.

6. Which is greater, $\sqrt{15}$ or 4?

   A. $\sqrt{15}$

   B. 4

   C. They are equal

   D. You cannot tell

7. Use $\pi \approx 3.14$ to estimate 2π to the nearest tenth.

8. $\sqrt{3}$ is between 1.7 and 1.8. Which of the two is it closer to?

9. $\sqrt{90}$ is between which two consecutive whole numbers?

10. Which list is in order from least to greatest?

    A. $\sqrt{8}$, 3, π

    B. 3, $\sqrt{8}$, π

    C. π, 3, $\sqrt{8}$

    D. $\sqrt{8}$, π, 3

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On Level

Grade-level practice.

1. $\sqrt{2}$ is between 1.4 and 1.5. Between which two hundredths is it?

2. Estimate $\sqrt{40}$ to the nearest tenth.

3. Which list orders $\sqrt{12}$, 3.5, $\frac{10}{3}$ and π from least to greatest?

   A. π, $\sqrt{12}$, $\frac{10}{3}$, 3.5

   B. π, $\frac{10}{3}$, $\sqrt{12}$, 3.5

   C. $\frac{10}{3}$, π, $\sqrt{12}$, 3.5

   D. π, $\frac{10}{3}$, 3.5, $\sqrt{12}$

4. Estimate π^2 to the nearest whole number.

5. Point P on the number line shows one of these numbers. Which one?



   A. √5

   B. √8

   C. √10

   D. √14

6. Which is greater, √26 or 5.1?

7. A square garden has an area of 60 square feet. Estimate its side length to the nearest tenth of a foot.

8. Estimate √2 + √3 to the nearest tenth.

9. Which number is between 7 and 8?

   A. √30

   B. √34

   C. √40

   D. √50

10. How many whole numbers are between √10 and √70?

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Challenge

Multi-step and word problems that stretch it.

1. √7 is between 2.6 and 2.7. Between which two hundredths is it?

2. Estimate $3\sqrt{5}$ to the nearest tenth.

3. Jae says √45 is between 22 and 23 because 45 ÷ 2 = 22.5. Which statement is correct?

   A. √45 is between 22 and 23

   B. √45 is between 4 and 5

   C. √45 is between 6 and 7

   D. √45 is between 7 and 8

4. A circle has a radius of 3 cm. Use π ≈ 3.14 to estimate its area to the nearest square centimeter.

5. Find the whole number n so that √n is between 8.1 and 8.15.

6. Order from greatest to least: π^2, 10, √99

7. Estimate $\sqrt{120}$ to the nearest tenth.

8. Lena knows $\sqrt{50} \approx 7.07$. She says $\sqrt{5000} \approx 70.7$. Is she right?

   A. Yes, because $\sqrt{5000} = \sqrt{50} \times \sqrt{100} = 10 \times \sqrt{50}$

   B. No, $\sqrt{5000} \approx 707$

   C. No, $\sqrt{5000} \approx 7.07$

   D. No, $\sqrt{5000} = 2500$

9. Which is closer to 4: $\sqrt{15}$ or $\sqrt{17}$?

10. $\pi^2 + \sqrt{2}$ is between which two consecutive whole numbers?