8.NS.2 Use rational number 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.

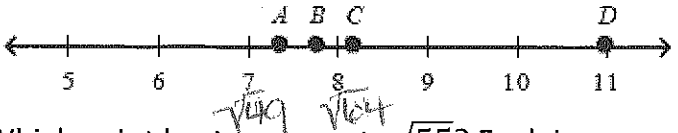
What is the best approximation for $\sqrt{118}$?

A. 11 $11 \times 11 = 121$

B. 10.7 $10.7 \times 10.7 = 114.49$

C. 10.9 $10.9 \times 10.9 = 118.81$

D. 10.8 $10.8 \times 10.8 = 116.64$



Which point best represents $\sqrt{55}$? Explain your answer.

A. *A* because it is about halway between 7 and 8.

B. *B* because it is a little less than 8.

C. *C* because it is greater than 8.

D. *D* because it is exactly 11.

Which of the following shows these numbers listed from LEAST to GREATEST?

$\sqrt{64} = 8$ $\pi \approx 3.14$ $\sqrt{8} \approx 2.8$ 1.4 $\frac{1}{2} = .5$

A. $\sqrt{64}, \pi, \sqrt{8}, 1.4, \frac{1}{2}$

B. $\sqrt{64}, \sqrt{8}, \frac{1}{2}, \pi, 1.4$

C. $\frac{1}{2}, \sqrt{8}, \sqrt{64}, 1.4, \pi$

D. $\frac{1}{2}, 1.4, \sqrt{8}, \pi, \sqrt{64}$

Which range contains the value of $\sqrt{(16 + 9 + 20)}$?

$\sqrt{45}$ $6 = \sqrt{36}$ $7 = \sqrt{49}$

A. between 6 and 7

B. between 7 and 8

C. between 16 and 17

D. between 22 and 23

One of Sierra's homework problems is to evaluate the expression shown below.

$$\sqrt{19} - 3$$

Part A

Anna knows $\sqrt{19}$ is irrational. Should she expect the expression $\sqrt{19} - 3$ to be rational or irrational? Explain your answer.

Irrational $\sqrt{19} \approx 4.358\ldots$

-3

1.358

The answer would still be a non terminating non repeating decimal.

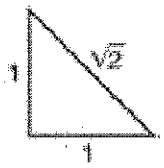
Part B

Show a sequence of steps Anna could use to determine the two consecutive numbers, counting by tenths, that the value of $\sqrt{19} - 3$ falls between. Show your work or explain your answer.

$\sqrt{19}$ is approximately 4.3. If I subtract 3, I get ≈ 1.3 which is between 1 & 2.

8.NS.2 Use rational number 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.

The figure below is a right triangle.



$\sqrt{2}$ $\sqrt{1}=1$ $\sqrt{4}=2$ $1<\sqrt{2}<2$

Which is the best approximation of the hypotenuse of the right triangle?

A. 1.21
B. 1.41
C. 1.73
D. 2.24

1.21 × 1.21 = 1.4641

1.41 × 1.41 = 1.9881

A coaster in the shape of a square covers an area of 36 square centimeters. What is the length of one side of the coaster?

A. 3 centimeters
B. 6 centimeters
C. 12 centimeters
D. 18 centimeters

36 $\sqrt{36}=6$

Which is equivalent to $\sqrt[3]{216}$?

A. 6
B. 8
C. 72
D. 108

Which of the following is 4.58 when approximated to the nearest hundredth?

A. $\sqrt{20}$
B. $\sqrt{21}$
C. $\sqrt{22}$
D. $4\sqrt{58}$

4.58 × 4.58 = 20.9764 ≈ 21

In an art class, Jorge constructs a 2 feet by 4 feet rectangular frame for a painting he just finished. He uses the Pythagorean Theorem to find the diagonal of the frame, which is $\sqrt{20}$ feet. He then concludes that the diagonal must be at least 5 feet. Is he correct in his conclusion?

A. Yes, because $2 + 4 \leq 6$.
B. No, because $4^2 = 16$ and $5^2 = 25$, so $\sqrt{20}$ must be between 4 and 5.
C. Yes, because $\sqrt{20} \approx 5.48$
D. No, because $\sqrt{20} = 2^2 + 3^2$, so $\sqrt{20}$ must be between 2 and 3.

Omar has been practicing swimming in his public pool for a swimming race. The farthest he can swim without resting is the diagonal of the pool, which is $\sqrt{200}$ meters. The three races available are the 10-meter, the 15-meter, and the 20-meter swim.

Part A: Between which two races is the length of the pool diagonal that Omar can swim? Explain your reasoning.

10 $\sqrt{100}$ 15 $\sqrt{225}$ 20 $\sqrt{400}$

$\sqrt{200}$ is between 10 & 15.

Part B: In which race would Omar compete if he cannot rest during the race?

10 meters because $\sqrt{225} > \sqrt{200}$

Part C: If, in the future, Omar can swim the length of a pool diagonal that measures $\sqrt{400}$ meters, what is the longest race he can swim without resting?

20 meters because $\sqrt{400} = 20$