

Grade 8 · Rational and Irrational Numbers · Test Answer Key

Common Core 8.NS.A.1, 8.NS.A.2 · mathovore.fr

Use this key to score the test out of 20 points. Each solution shows the expected work, and the scoring note shows how the points are earned. Give partial credit where a correct method has a small arithmetic slip.

Grade 8 Common Core: 8.NS.A.1 · 8.NS.A.2

Question 1: Classify and justify (2 points)

- a. $\sqrt{64} = 8$, an integer, so **rational**.
- b. 27 is not a perfect square ($5^2 = 25$, $6^2 = 36$), so $\sqrt{27}$ is **irrational**.

Scoring: 1 point per part for the correct label with a valid reason.

Question 2: Fractions as decimals (2 points)

- a. $9 \div 16 = 0.5625$.
- b. $4 \div 15 = 0.2\bar{6}$ (the digit 6 repeats).

Scoring: 1 point per part. Accept 0.2667 only if the repeat is shown with a bar or dots.

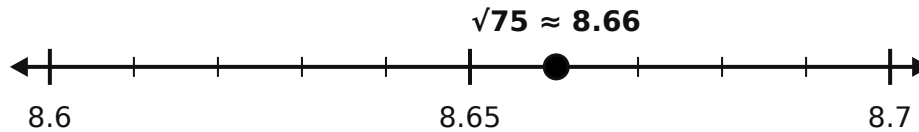
Question 3: Repeating decimals to fractions (3 points)

- a. $100x = 18.1818\dots$ and $x = 0.1818\dots$, so $99x = 18$ and $x = \frac{18}{99} = \frac{2}{11}$.
- b. $100x = 43.33\dots$ and $10x = 4.33\dots$. Subtract: $90x = 39$. So $x = \frac{39}{90} = \frac{13}{30}$.

Scoring: (a) 1 point. (b) 1 point for a correct subtraction setup, 1 point for the simplified fraction.

Question 4: Square root of 75 (3 points)

- a. $8^2 = 64$ and $9^2 = 81$, so **between 8 and 9**.
- b. $8.6^2 = 73.96$ and $8.7^2 = 75.69$. 75 is closer to 75.69, so $\sqrt{75} \approx 8.7$.

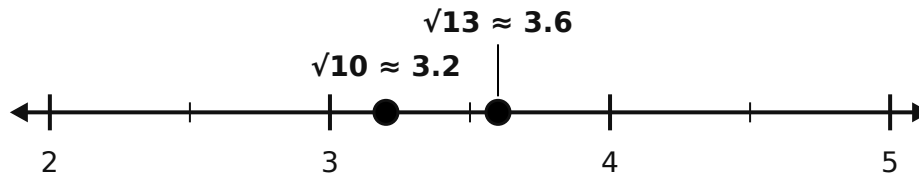


The root of 75 is nearer 8.7 than 8.6.

Scoring: (a) 1 point. (b) 1 point for testing 8.6 and 8.7, 1 point for 8.7.

Question 5: Match points on a number line (2 points)

- a. $3^2=9$ and $4^2=16$, and $3.2^2=10.24$. So $\sqrt{10} \approx 3.2$: **point B**.
 b. $3.6^2=12.96$ is close to 13, so $\sqrt{13} \approx 3.6$: **point C**.



Matching roots to points.

Scoring: 1 point per part for the correct point with a reasonable estimate.

Question 6: Compare numbers (2 points)

- a. $4.5^2=20.25$, which is greater than 20, so $\sqrt{20}<4.5$.
 b. $\frac{22}{7} \approx 3.1429$ and $\pi \approx 3.1416$, so $\pi < \frac{22}{7}$.

Scoring: 1 point per part for the correct symbol with supporting work.

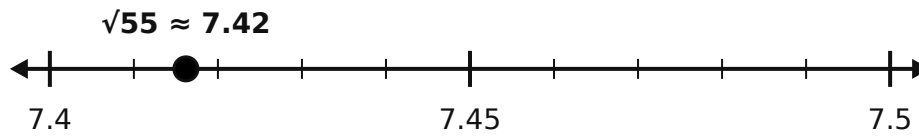
Question 7: Order from least to greatest (2 points)

$\sqrt{5} \approx 2.236$, $\frac{9}{4}=2.25$, $2.\bar{3}=2.333\dots$. Order: $2.2 < \sqrt{5} < \frac{9}{4} < 2.\bar{3}$.

Scoring: 1 point for correct decimal values, 1 point for the correct order.

Question 8: Patio side length (2 points)

The side is $\sqrt{55}$. $7^2=49$ and $8^2=64$. Then $7.4^2=54.76$ and $7.5^2=56.25$. 55 is closer to 54.76, so the side is about 7.4 ft.



Nearest tenth is 7.4.

Scoring: 1 point for bracketing the root between two decimals, 1 point for 7.4 feet.

Question 9: Pattern decimal (2 points)

The digits do not repeat a fixed block, because the number of 2s keeps growing. The decimal never ends and never repeats, so it is **irrational**. Sofia is not correct.

Scoring: 1 point for saying irrational, 1 point for the reason (no repeating block).

Total
20 points