

WA8MNAUN2

Understanding number

Core + Challenge

Ordering Rational and Irrational Numbers

I can locate, order and compare rational and irrational numbers on a number line using $<$, $>$, $\leq$ and $\geq$.

Name: _____ Date: _____ Score: _____ / 58

Key idea

Estimate square roots with perfect squares: $25 < 30 < 36$, so $5 < \sqrt{30} < 6$ (nearer to 5: $\sqrt{30} \approx 5.48$).

Compare by writing decimals: $-\frac{3}{4} = -0.75$, $\pi \approx 3.142$, $\sqrt{10} \approx 3.162$, so $\pi < \sqrt{10}$.

Number line: values increase to the right, so $-2.5 < -\frac{9}{4}$ (-2.5 is further left).

Symbols: $<$, $>$, $\leq$ (less than or equal to), $\geq$ (greater than or equal to). $x \geq -2$ includes -2 ; $x > -2$ does not.

A Fluency *practise the skill*

/ 16 marks

Q1–4 use the number line. Q10–15: write $<$ or $>$ in the box. 1 mark each.



- | | |
|---|---|
| 1. Value of point A _____ | 9. Nearest integer to $\sqrt{90}$ _____ |
| 2. Value of C as a fraction _____ | 10. -3 <input type="text"/> -5 |
| 3. Which point is $\sqrt{2}$? _____ | 11. $\frac{2}{3}$ <input type="text"/> 0.6 |
| 4. Which point is π ? _____ | 12. π <input type="text"/> 3.14 |
| 5. $\sqrt{30}$ lies between _____ | 13. -0.3 <input type="text"/> $-\frac{1}{4}$ |
| 6. $\sqrt{70}$ lies between _____ | 14. $\sqrt{15}$ <input type="text"/> 3.9 |
| 7. $\sqrt{3}$ lies between _____ | 15. -1.5 <input type="text"/> $-\sqrt{2}$ |
| 8. Nearest integer to $\sqrt{50}$ _____ | 16. Largest: $1.7, \sqrt{3}, \frac{7}{4}$ _____ |

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B

Core *apply the skill to problems*

/ 22 marks

- 1 Mark and label each number on the number line: $-1\frac{3}{4}$, $-\sqrt{2}$, 0.4 , $\sqrt{3}$, $\frac{9}{4}$. [3 marks]



- 2 Write in order from smallest to largest: $\sqrt{8}$, 2.9 , $\frac{17}{6}$, $2\frac{4}{5}$. [3 marks]

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Answer: _____

- 3 Overnight minimum temperatures in York one week were: Mon -1.2°C , Tue 0.5°C , Wed $-1\frac{1}{4}^{\circ}\text{C}$, Thu -0.9°C , Fri 0°C . Order the days from coldest to warmest. [2 marks]

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Answer: _____

- 4 A square picnic rug has an area of 40 m^2 , so its side is $\sqrt{40}\text{ m}$. Between which two whole numbers is $\sqrt{40}$? Estimate $\sqrt{40}$ to 1 decimal place by squaring. [2 marks]

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Answer: _____

- 5 Write (a) an irrational number between 2.4 and 2.5 (b) a rational number between $\sqrt{2}$ and $\sqrt{3}$. [2 marks]

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Answer: _____

- 6 True or false? (a) $-4 \leq -4$ (b) $\sqrt{20} > 4.5$ (c) $-\frac{2}{5} \geq -0.35$ (d) $\pi < \frac{22}{7}$ [2 marks]

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Answer: _____

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- 7 List all the integers x that satisfy $-2.5 < x \leq \sqrt{10}$. [2 marks]

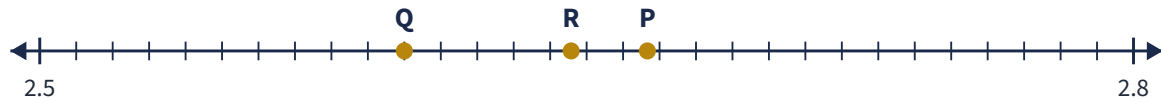
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Answer: _____

- 8 Points P, Q and R show the numbers 2.6, $\sqrt{7}$ and $\frac{8}{3}$, in some order. Which point is which? [2 marks]
Show your working.



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Answer: _____

- 9 Write in order from smallest to largest: $-\pi$, -3.1 , $-\sqrt{10}$, $-\frac{19}{6}$. [2 marks]

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Answer: _____

- 10 Write each statement using a symbol. (a) The temperature t was at least -3°C . (b) Mia's SmartRider balance b is less than \$5. [2 marks]

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Answer: _____

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C

Reasoning *explain, justify and check*

/ 9 marks

- 1 Sam says “ $-0.5 > -0.25$ because $0.5 > 0.25$.” Explain Sam's error, using a number line. [2 marks]

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- 2 Without a calculator, explain why $\sqrt{45}$ is closer to 7 than to 6. [3 marks]

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- 3 True or false: between any two different rational numbers there is always another rational number. Explain with an example. [2 marks]

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- 4 Ahmed says “ $x \leq 3$ and $x < 3$ mean the same thing for integers x .” Is he correct? Explain. [2 marks]

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D

Challenge *multi-step and problem-solving*

/ 11 marks

- 1 How many whole numbers n make $4 < \sqrt{n} < 7$ true? [2 marks]

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Answer: _____

- 2 Write in order from smallest to largest: $\frac{5}{7}$, $\frac{7}{10}$, $\sqrt{0.5}$, 0.71. (Hint: $\sqrt{0.5} = \sqrt{50 \div 10}$.) [3 marks]

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Answer: _____

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- 3 How many integers lie strictly between $-\sqrt{30}$ and $\sqrt{70}$? What is their sum? [3 marks]

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Answer: _____

- 4 Find the fraction with the smallest denominator that lies between $\sqrt{2}$ ($\approx 1.41421\dots$) and 1.42. [3 marks]

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Answer: _____

How did I go?

Fluency ____ / 16 Core ____ / 22 Reasoning ____ / 9 Challenge ____ / 11 **Total ____ / 58**

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