10 Pythagoras' Theorem and Irrational Numbers

This exercise covers the following Basic Competency Descriptors for new KS3 curriculum.

New	NA04-1	Calculate the value of x in the expressions $\sqrt{x}=a$, $\sqrt[3]{x}=a$, $\sqrt{a}=x$ and $\sqrt[3]{a}=x$, where a is a positive integer.
New	NA04-2	Demonstrate recognition of the concepts of rational and irrational numbers.
	NA04-3	Represent rational and irrational numbers on the number line.
	MSS25-1	Use Pythagoras' theorem to find unknowns.
	MSS25-2	Use the converse of Pythagoras' theorem to identify right-angled triangles.

Section A: Write your answers in the spaces provided. Working need not be shown.

NA04-1

1. Evaluate $\sqrt{196}$.

Answer: _____

NA04-1

2. Evaluate $\sqrt[3]{216}$.

Answer: _____

NA04-1

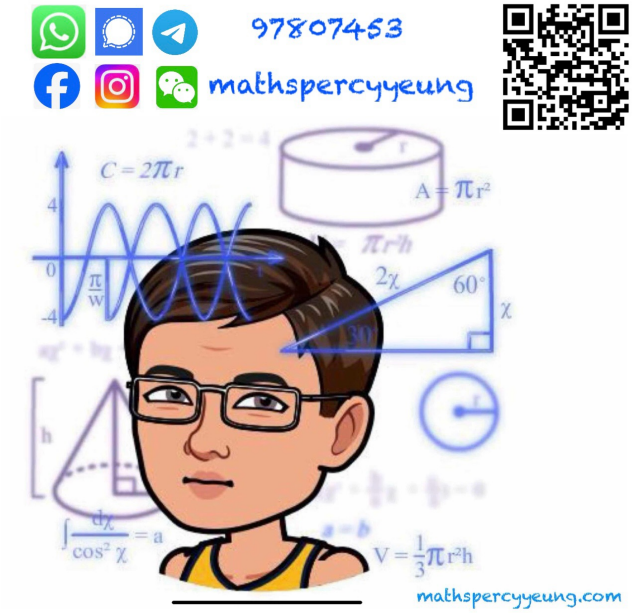
3. If $\sqrt{x}=12$, find x.

Answer: $x=$ _____

NA04-1

4. If $\sqrt[3]{y}=8$, find y.

Answer: $y=$ _____



NA04-2

5. State which of the following are rational numbers.

0.003, $2.\dot{3}$, $\sqrt{55}$, -7π, $\sqrt[3]{-216}$

Answer: _____

NA04-2

6. State which of the following are irrational numbers.

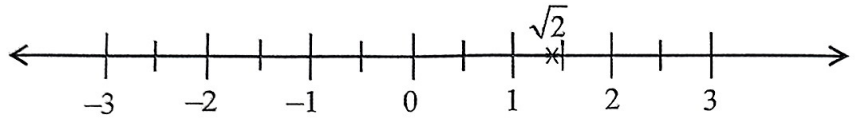
$$-4.0444,\ -1.\dot{2}\dot{3},\ \sqrt{1000},\ \frac{\pi}{2},\ \sqrt[4]{1234}$$

Answer: _____

NA04-3

7. Use the symbol 'x' to mark the number $-\sqrt{8}$ on the following number line.

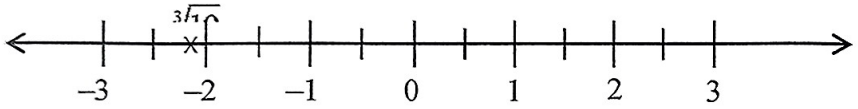
Example: $\sqrt{2}$ is marked on the number line below.



NA04-3

8. Use the symbol 'x' to mark the number $\sqrt[3]{22}$ on the following number line.

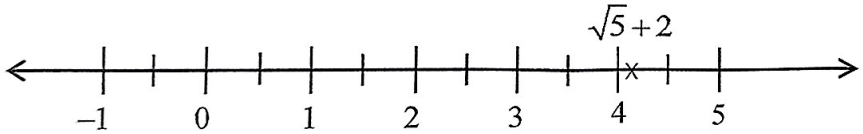
Example: $-\sqrt[3]{10}$ is marked on the number line below.



NA04-3

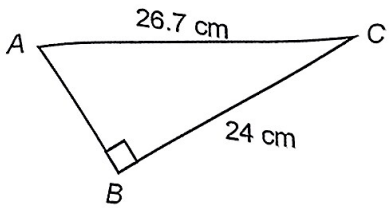
9. Use the symbol 'x' to mark the number $\sqrt{5}$ on the following number line.

Example: $\sqrt{5}+2$ is marked on the number line below.



MSS25-1

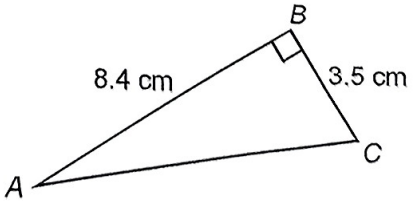
10. In the figure, $\angle ABC = 90°$, $BC = 24$ cm and $AC = 26.7$ cm. Find AB.



Answer: AB = _____ cm

MSS25-1

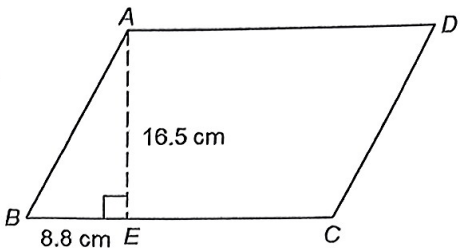
11. In the figure, $\angle ABC = 90°$, $AB = 8.4$ cm and $BC = 3.5$ cm. Find AC.



Answer: AC = _____ cm

MSS25-1

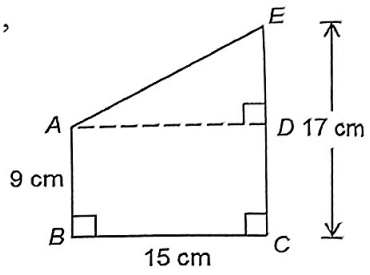
12. In the figure, $ABCD$ is a parallelogram. AE is the height of the parallelogram. $AE = 16.5$ cm and $BE = 8.8$ cm. Find AB.



Answer: $AB =$ _____ cm

MSS25-1

13. In the figure, CDE is a straight line. $\angle ABC = \angle BCD = \angle ADE = 90°$, $AB = 9$ cm, $BC = 15$ cm and $CE = 17$ cm. Find AE.

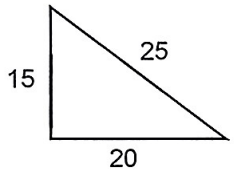


Answer: $AE =$ _____ cm

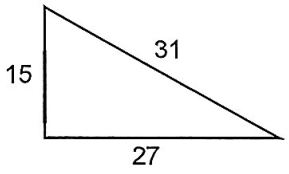
MSS25-2

14. Which of the following must be right-angled triangle(s)?
(May be more than one answer)

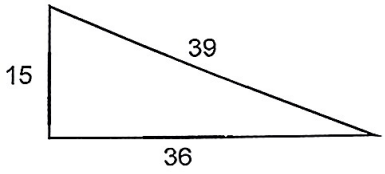
Triangle A



Triangle B



Triangle C

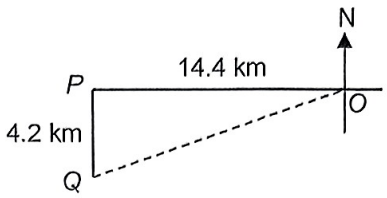


Answer: _____

Section B: Answer in the spaces provided. All working and conclusions must be clearly shown.

MSS25-1

15. At point O, Peter rides a bicycle due west for 14.4 km to point P and then rides due south for 4.2 km to point Q. Find the distance between O and Q.



MSS25-1

16. A ship sails 18 km due east from point A to point B. Then it sails due north to point C. If point C is 20.4 km away from point A, find the distance between B and C.