

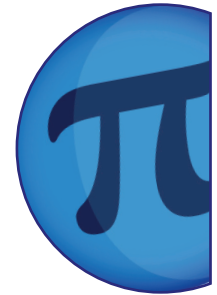


# Irrational Numbers: Pythagoras

NAME: .....

CLASS: .....

DATE: .....



## Basic

1) Which of the following are surds?

a)  $\sqrt{2}$

b)  $\sqrt{49}$

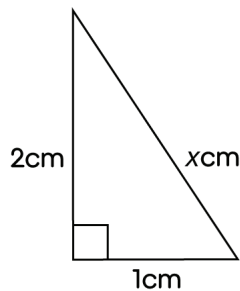
c)  $\sqrt{121}$

d)  $\sqrt{5}$

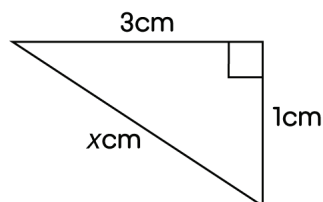
e)  $\sqrt{3}$

2) Express the side marked with  $x$  as a surd:

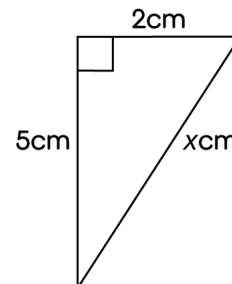
a)



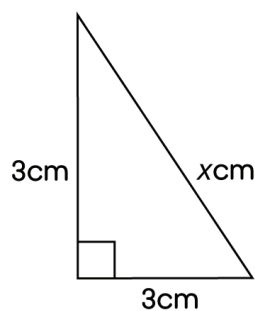
b)



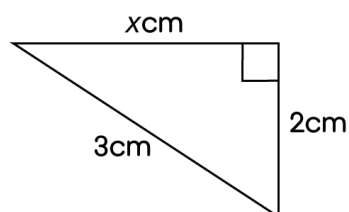
c)



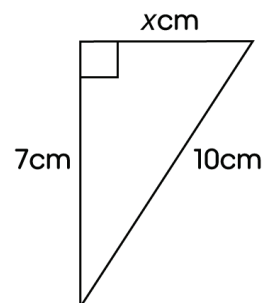
d)



e)



f)



3) Solve the following equations, giving each answer in surd form:

a)  $x^2 - 1 = 1$

b)  $x^2 - 3 = 2$

c)  $2x^2 + 7 = 11$

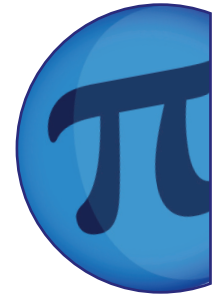


# Irrational Numbers: Pythagoras

NAME: .....

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## Core

1) Which of the following are surds?

a)  $\sqrt{2}$

b)  $\sqrt{49}$

c)  $\sqrt{121}$

d)  $\sqrt{5}$

e)  $\sqrt{3}$

2) Express each as a surd in its simplest form:

a)  $\sqrt{18}$

b)  $\sqrt{75}$

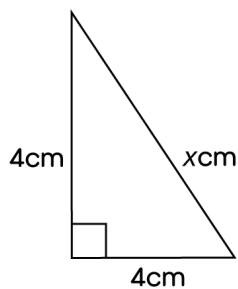
c)  $\sqrt{20}$

d)  $\sqrt{112}$

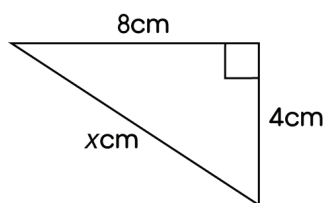
e)  $\sqrt{128}$

3) Express the side marked with x as a surd:

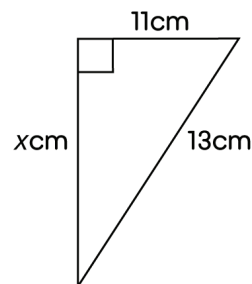
a)



b)



c)



4) Add or subtract the following surds:

a)  $4\sqrt{2} + 5\sqrt{2}$

b)  $7\sqrt{2} - 4\sqrt{2}$



# Irrational Numbers: Pythagoras

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## Advanced

1) Simplify the following:

a)  $\sqrt{12}$

b)  $\sqrt{44}$

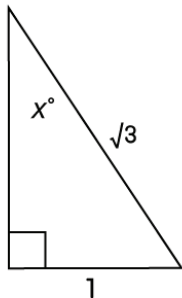
c)  $\sqrt{50}$

d)  $\sqrt{300}$

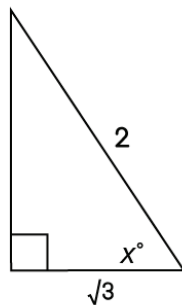
e)  $\sqrt{72}$

2) Write the exact value of each trigonometric ratio in surd form:

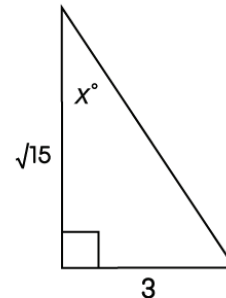
a)  $\sin x^\circ$



b)  $\cos x^\circ$



c)  $\tan x^\circ$



3) Add or subtract the following surds:

a)  $12\sqrt{2} - 11\sqrt{2}$

b)  $6\sqrt{3} + 7\sqrt{3}$

c)  $5\sqrt{5} + 3\sqrt{5} + 4\sqrt{5} - 6\sqrt{5}$

4) Rationalise the denominator:

a)  $\frac{4}{\sqrt{3}}$

b)  $\frac{5}{\sqrt{2}}$

c)  $\frac{4}{3\sqrt{5}}$

d)  $\frac{16}{5\sqrt{8}}$



# Irrational Numbers: Pythagoras

## ANSWERS

### Basic

1)  $\sqrt{2}$ ,  $\sqrt{5}$ ,  $\sqrt{3}$  are surds;  $\sqrt{49}$ ,  $\sqrt{121}$  are not surds.

2) a)  $\sqrt{5}$       b)  $\sqrt{10}$       c)  $\sqrt{29}$       d)  $\sqrt{18}$       e)  $\sqrt{5}$       f)  $\sqrt{51}$

3) a)  $x = \sqrt{2}$       b)  $x = \sqrt{5}$       c)  $x = \sqrt{2}$

### Core

1)  $\sqrt{2}$ ,  $\sqrt{5}$ ,  $\sqrt{3}$  are surds;  $\sqrt{49}$ ,  $\sqrt{121}$  are not surds.

2) a)  $3\sqrt{2}$       b)  $5\sqrt{3}$       c)  $2\sqrt{5}$       d)  $4\sqrt{7}$       e)  $8\sqrt{2}$

3) a)  $x = 4\sqrt{2}$       b)  $x = 4\sqrt{5}$       c)  $x = 4\sqrt{3}$

4) a)  $9\sqrt{2}$       b)  $3\sqrt{2}$

### Advanced

1) a)  $2\sqrt{3}$       b)  $2\sqrt{11}$       c)  $5\sqrt{2}$       d)  $10\sqrt{3}$       e)  $6\sqrt{2}$

2) a)  $\sin x = \frac{1}{\sqrt{3}}$       b)  $\cos x = \frac{\sqrt{3}}{2}$       c)  $\tan x = \frac{3}{\sqrt{15}}$

3) a)  $\sqrt{2}$       b)  $13\sqrt{3}$       c)  $6\sqrt{5}$

4) a)  $\frac{4\sqrt{3}}{3}$       b)  $\frac{5\sqrt{2}}{2}$       c)  $\frac{4\sqrt{5}}{15}$       d)  $\frac{4\sqrt{2}}{5}$