

Mixed Exercise - 4

1.

Given that a is a positive integer, show that

$$\sqrt{3a}(\sqrt{12a} + a\sqrt{3a})$$

is always a multiple of 3

2.

$$y = at^2 - 2at$$

$$x = 2a\sqrt{t}$$

Express y in terms of x and a .

Give your answer in the form

$$y = \frac{x^p}{ma^3} - \frac{x^q}{na}$$

where p , q , m and n are integers.

3.

Solve $2y + \frac{2-3y}{4} = \frac{1}{4}$

Show clear algebraic working.

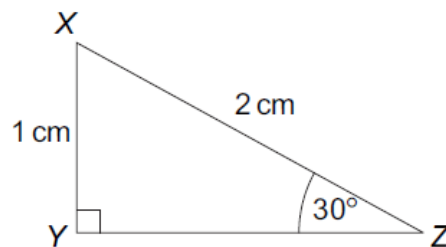
4.

Write this ratio in its simplest form

$$\sqrt{12} : \sqrt{48} : \sqrt{300}$$

5.

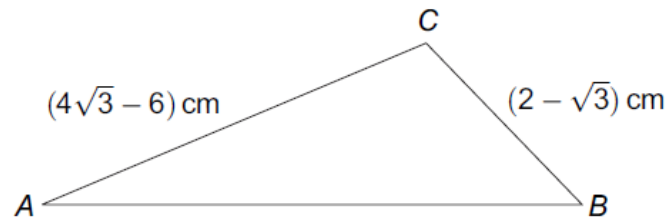
(a) XYZ is a right-angled triangle.



Not drawn
accurately

Use triangle XYZ to show that $\sin 60^\circ = \frac{\sqrt{3}}{2}$

- (b) Triangle ABC has an obtuse angle at C .



Not drawn accurately

Given that $\sin A = \frac{1}{4}$, use triangle ABC to show that angle $B = 60^\circ$

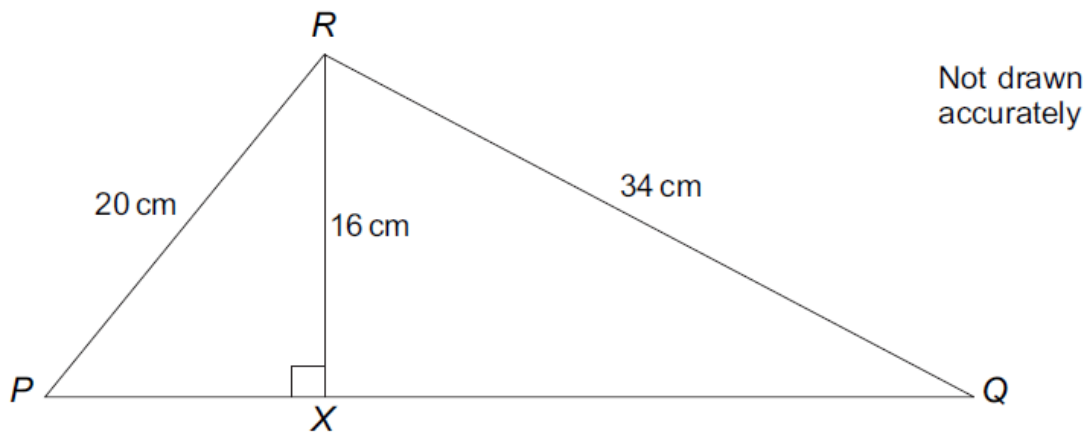
6.

Work out the ratio $(3x + 2y)(3x - 4y) : 3x(2x - 5y)$ when $y = 0$

Give your answer as simply as possible.

7.

In triangle PQR , X is a point on PQ .
 RX is perpendicular to PQ .



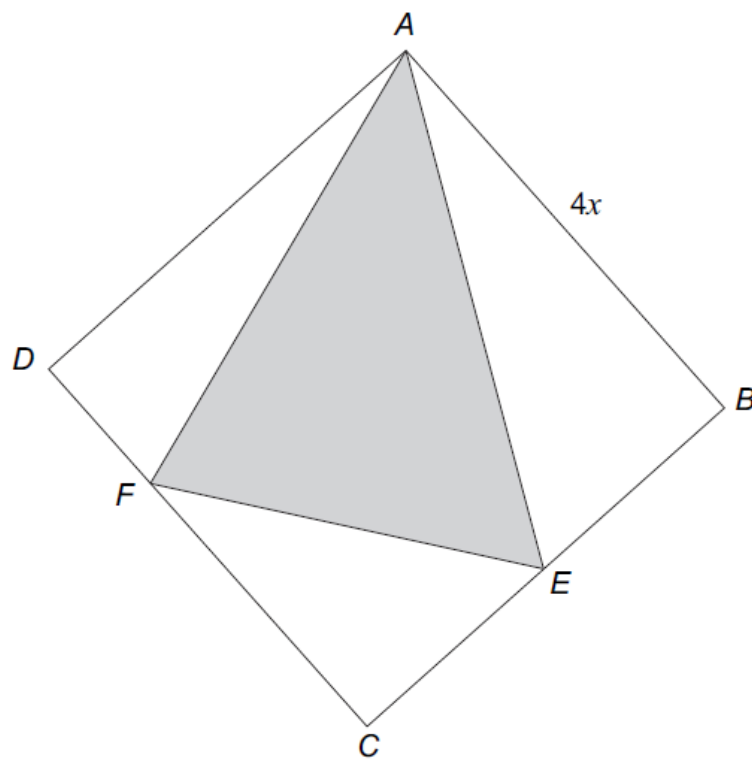
Work out the ratio $PX : XQ$
Give your answer in its simplest form.

8.

$ABCD$ is a square of side length $4x$.

E is the midpoint of BC .

$DF:FC = 1:3$



Not drawn
accurately

You are given that

$$\text{area of triangle } AEF = kx^2$$

Work out the value of k .

9.

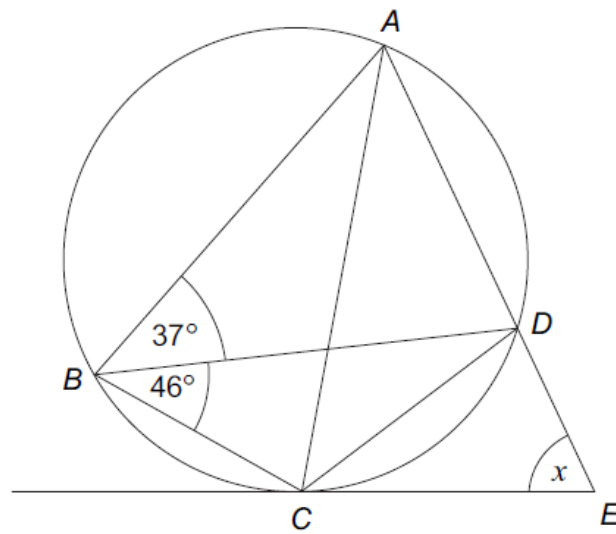
Factorise fully $(x + y)^2 + (x + y)(2x + 5y)$

10.

The diagram shows a cyclic quadrilateral $ABCD$.

ADE is a straight line.

CE is a tangent to the circle.



Not drawn
accurately

Work out the size of angle x .