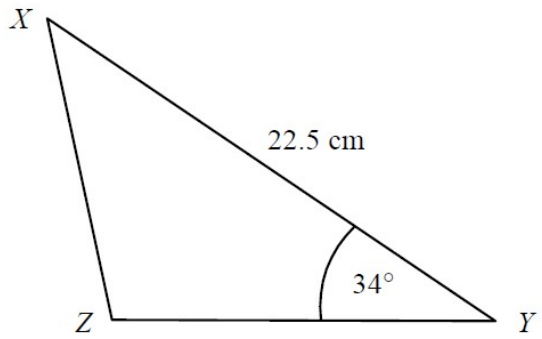
In the triangle ABC, $AB = 13$cm, $BC = 10$cm and angle $BAC = 30^\circ$

Find the two possible sizes of angle ABC, giving your answers to two decimal places.



The diagram shows triangle XYZ in which $XY = 22.5$ cm and $\angle XYZ = 34°$.
Given that the area of the triangle is 100 cm^2, find the length XZ.

$$f(x) = x^3 + 6x^2 + px + q$$

Given that f(4) = 0 and f(-5) = 36

(a) Find the values of p and q

(b) Factorise f(x) completely.

$$f(x) = 2x^3 - 13x^2 + 8x + 48$$

(a) Prove that $(x - 4)$ is a factor of $f(x)$.

(2)

(b) Hence, using algebra, show that the equation $f(x) = 0$ has only two distinct roots.

(4)

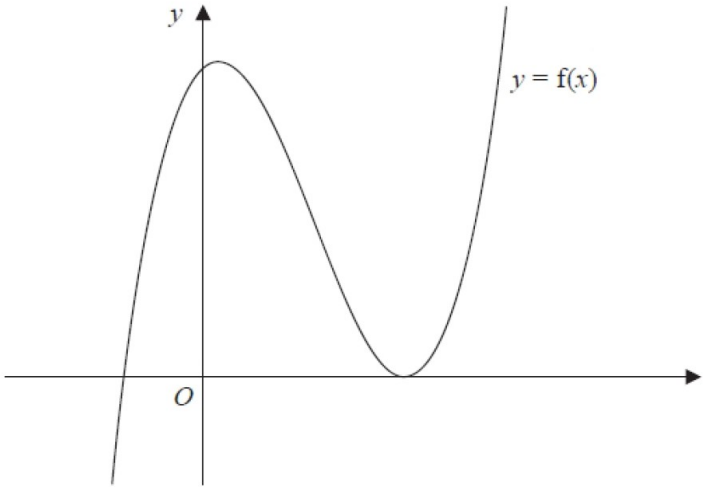


Figure 2

Figure 2 shows a sketch of part of the curve with equation $y = f(x)$.

(c) Deduce, giving reasons for your answer, the number of real roots of the equation

$$2x^3 - 13x^2 + 8x + 46 = 0$$

(2)

Given that k is a constant and the curve with equation $y = f(x + k)$ passes through the origin,

(d) find the two possible values of k.

(2)

In the triangle ABC, $AB = (x + 3)$cm, $BC = (x + 2)$ cm, $AC = x$ cm and angle $BAC = 60°$

Find the value of x.

A parallelogram $PQRS$ has area 50 cm^2

Given

- PQ has length 14 cm
- QR has length 7 cm
- angle SPQ is obtuse

find

(a) the size of angle SPQ, in degrees, to 2 decimal places,

(b) the length of the diagonal SQ, in cm, to one decimal place.

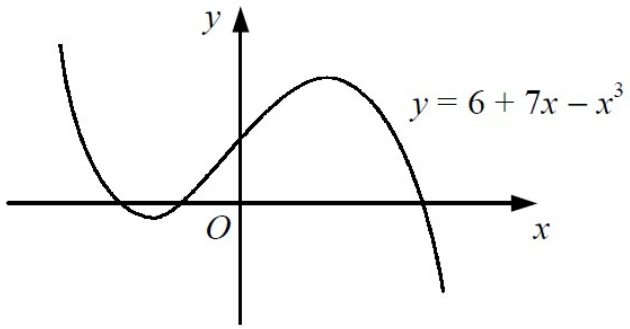
$$\mathrm{f}(x) \equiv px^3 + qx^2 + qx + 3.$$

Given that $(x + 1)$ is a factor of $\mathrm{f}(x)$,

a find the value of the constant p.

Given also that when $\mathrm{f}(x)$ is divided by $(x - 2)$ the remainder is 15,

b find the value of the constant q.



The diagram shows the curve with the equation $y = 6 + 7x - x^3$.

Find the coordinates of the points where the curve crosses the x-axis.

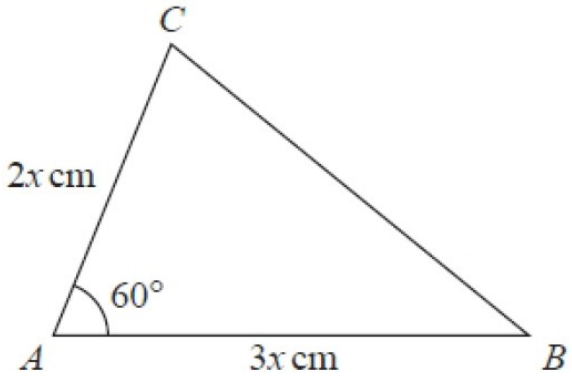


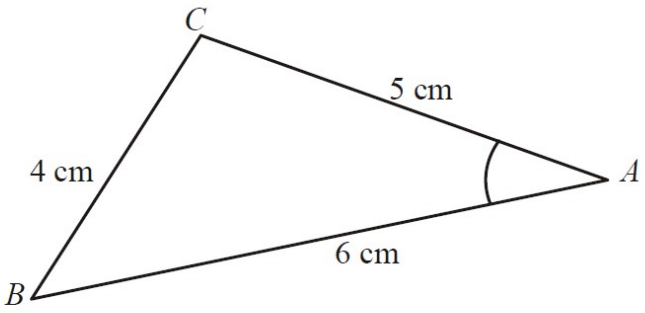
Figure 1

Figure 1 shows a sketch of a triangle ABC with $AB = 3x$ cm, $AC = 2x$ cm and angle $CAB = 60°$

Given that the area of triangle ABC is $18\sqrt{3}$ cm^2

(a) show that $x = 2\sqrt{3}$

(b) Hence find the exact length of BC, giving your answer as a simplified surd.



The diagram above shows the triangle ABC, with $AB = 6$ cm, $BC = 4$ cm and $CA = 5$ cm.

(a) Show that $\cos A = \frac{3}{4}$.

(b) Hence, or otherwise, find the exact value of $\sin A$.

$$g(x) = 4x^3 - 12x^2 - 15x + 50$$

(a) Use the factor theorem to show that $(x + 2)$ is a factor of $g(x)$.

(2)

(b) Hence show that $g(x)$ can be written in the form $g(x) = (x + 2)(ax + b)^2$, where a and b are integers to be found.

(4)

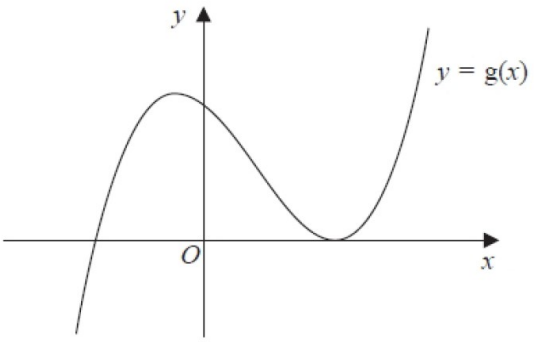


Figure 2

Figure 2 shows a sketch of part of the curve with equation $y = g(x)$

$$f(x) = 2x^3 - 5x^2 + ax + a$$

Given that $(x + 2)$ is a factor of $f(x)$, find the value of the constant a.