(a) Find the first four terms, in ascending powers of x, of the binomial expansion $(2 + kx)^6$

Given that the coefficient of the x^3 term in the expansion is -20

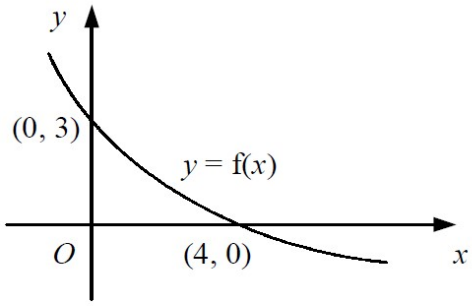
(b) Find the value of k

(a) Find the first 3 terms in ascending powers of x of the binomial expansion of $\left(2-\frac{x}{8}\right)^7$

$f(x) = (ax + b)\left(2-\frac{x}{8}\right)^7$ where a and b are constants

Given that the first two terms, in ascending powers of x, in the series expansion of $f(x)$ are 384 and $-104x$

(b) Find the values of a and b



The diagram shows the curve with equation $y = f(x)$ which crosses the coordinate axes at the points (0, 3) and (4, 0).

Showing the coordinates of any points of intersection with the axes, sketch on separate diagrams the graphs of

a $y = 3f(x)$ **b** $y = f(x + 4)$ **c** $y = -f(x)$ **d** $y = f(\frac{1}{2}x)$

$$f(x) = (x + 3)(x - 1)^2$$

(a) Sketch the curve $y = f(x)$, showing the points of intersection with the coordinate axis.

(b) Find the equation of $y = f(x + 2)$ in the form $y = (x + a)(x + b)^2$

The coefficient of x^2 in the binomial expansion of $(1 + \frac{2}{5}x)^n$, where n is a positive integer, is 1.6

a Find the value of n.

b Use your value of n to find the coefficient of x^4 in the expansion.

Find the first 3 terms in ascending powers of x of the binomial expansion of $\left(2+\frac{x}{2}\right)^6$

$$f(x) = x^2 + 4x + 5$$

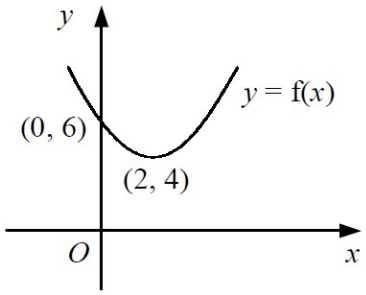
(a) Express $f(x)$ in the form $(x + a)^2 + b$, and state the coordinates of the minimum point of $y = f(x)$. **(3)**

(b) Sketch the graph of $y = f(x)$ showing the coordinates of intersection with the coordinate axis. **(3)**

(c) Find the minimum points of these curves

(i) $y = 2f(x)$ **(2)**

(ii) $y = f(2x)$ **(2)**



The diagram shows the curve with equation $y = f(x)$ which has a turning point at (2, 4) and crosses the y-axis at the point (0, 6).

Showing the coordinates of the turning point and of any points of intersection with the axes, sketch on separate diagrams the graphs of

a $y = f(x) - 3$ **b** $y = f(x + 2)$ **c** $y = f(2x)$ **d** $y = \frac{1}{2} f(x)$

The coefficient of x^2 in the expansion of $(1 + ax)^4$ in ascending powers of x is 24, where a is a constant and $a < 0$. Find

a the value of a,

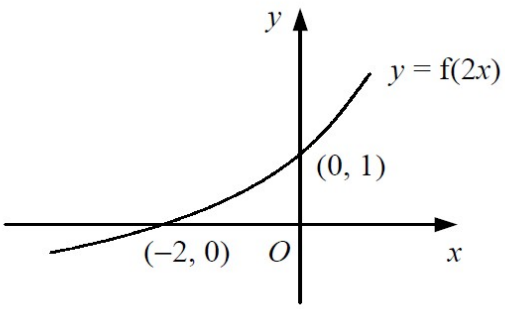
b the value of the coefficient of x^3 in the expansion.

In the binomial expansion of $(1 + px)^q$, where p and q are constants and q is a positive integer, the coefficient of x is -12 and the coefficient of x^2 is 60.

Find

a the value of p and the value of q,

b the value of the coefficient of x^3 in the expansion.

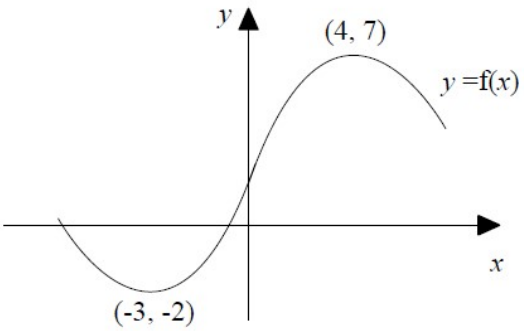


The diagram shows the curve with equation $y = f(2x)$ which crosses the coordinate axes at the points $(-2, 0)$ and $(0, 1)$.

Showing the coordinates of any points of intersection with the coordinate axes, sketch on separate diagrams the curves

a $y = 3f(2x)$

b $y = f(x)$



The sketch shows the graph of y = f(x). The curve has a minimum at (-3,-2) and a maximum at (4,7).

Showing the coordinates of the points of intersection with the coordinate axis, sketch on separate diagrams the curves

(i) $y = f(x) + 2$ **(2)**

(ii) $y = -f(x)$ **(2)**