FUNCTIONS

CUBIC FUNCTIONS (VII)

Contents include:
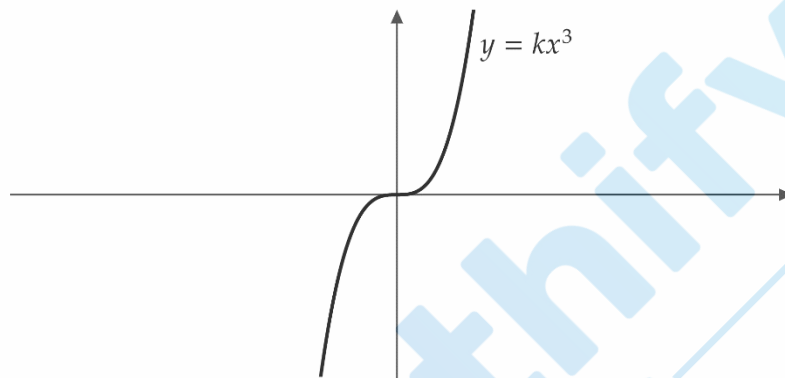- Basic Cubic Functions
- Further Cubic Functions
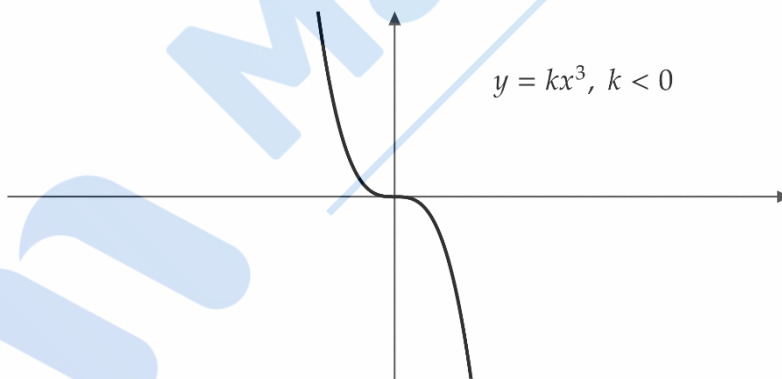- Factored Cubic Functions

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- **Basic Cubic Functions**

Cubic functions are equations where x^3 is the term with the highest index. Basic cubic functions resemble:

$$y = kx^3, where\ k\ is\ a\ constant$$

If $k > 0$, then the graph will resemble:

If $k < 0$, then the graph will resemble:

The larger the value of k, the steeper the graph $y = kx^3$ will be. We can always test this out by subbing in values

- **Further Cubic Functions**

When looking at the basic cubic functions drawn previously, the "flat looking area" of the graph occurs at the origin. However, this is not always the case.
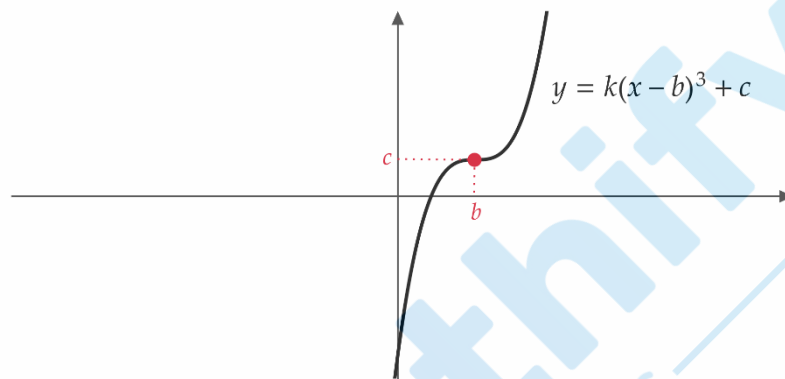
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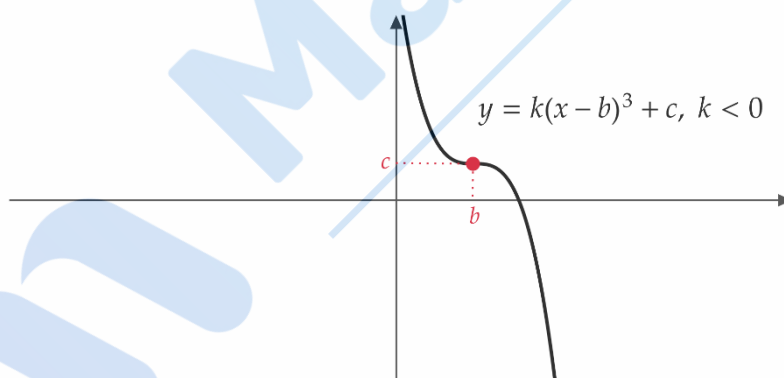A more general cubic function equation is given as:

$$y = k(x - b)^3 + c$$

Where k is a constant

The point (b, c) should also be plotted on the graph!

If $k > 0$, the graph will resemble:

If $k < 0$, the graph will resemble:

- Factored Cubic Functions

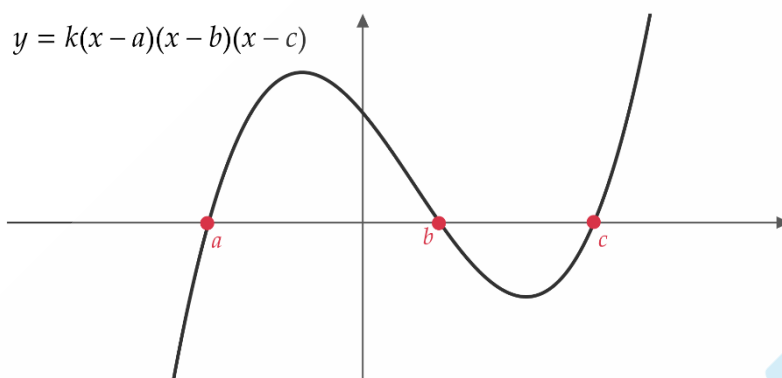A cubic function may also be given in factored form, which resembles the following form:
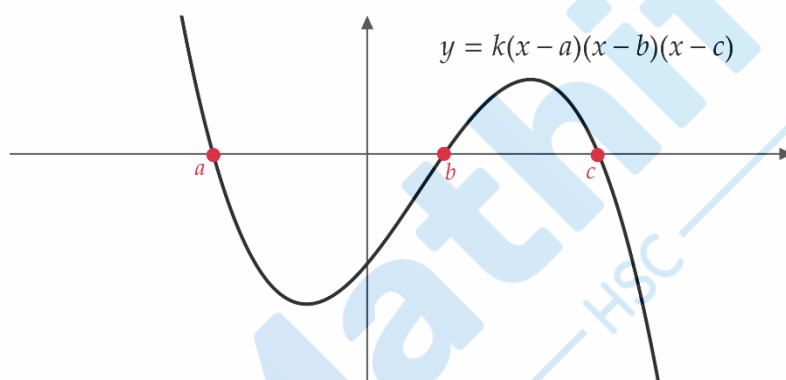
$$y = k(x - a)(x - b)(x - c)$$

Where:

k is a constant

a, b and c are the $x-$ intercepts of the graph

2

If $k > 0$, the graph will resemble:

$$y = k(x-a)(x-b)(x-c)$$

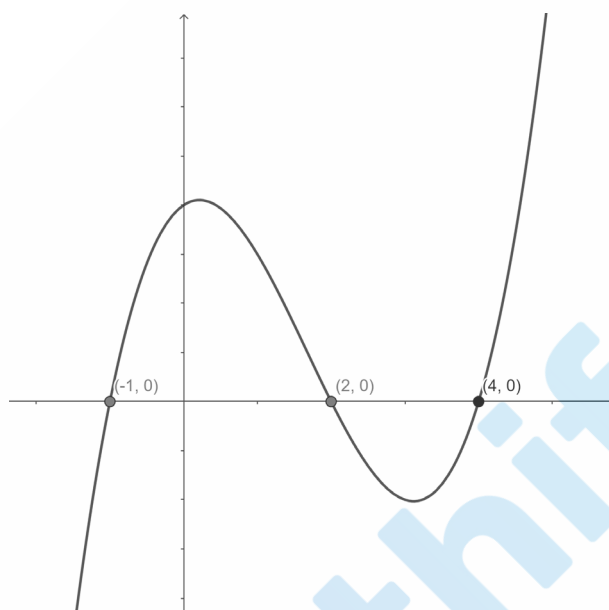If $k < 0$, the graph will resemble:

$$y = k(x-a)(x-b)(x-c)$$

Cubic Function Exercises

1. Write down the $x-$ intercepts of each of the following functions, then sketch the cubic:

a) $y = (x+1)(x-2)(x-4)$

b) $y = -(x+2)(x-1)(x-2)$

c) $y = 2(x^2-9)(x-5)$

d) $y = -3(x+2)x(x-1)$

2. Sketch each of the following functions, noting down any important points (you do not have to find the $x-$ intercepts):

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

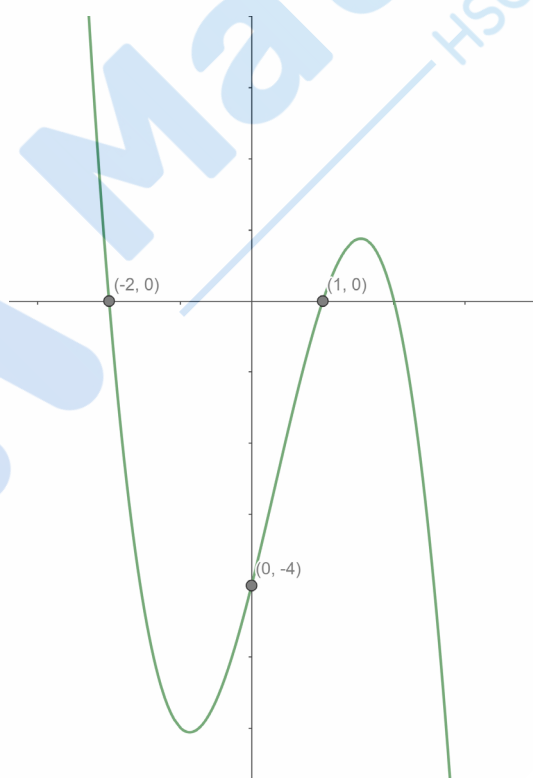b) $y = -(x+3)^3 - 3$

c) $y = 4\left(x - \frac{1}{2}\right)^3 - 2$

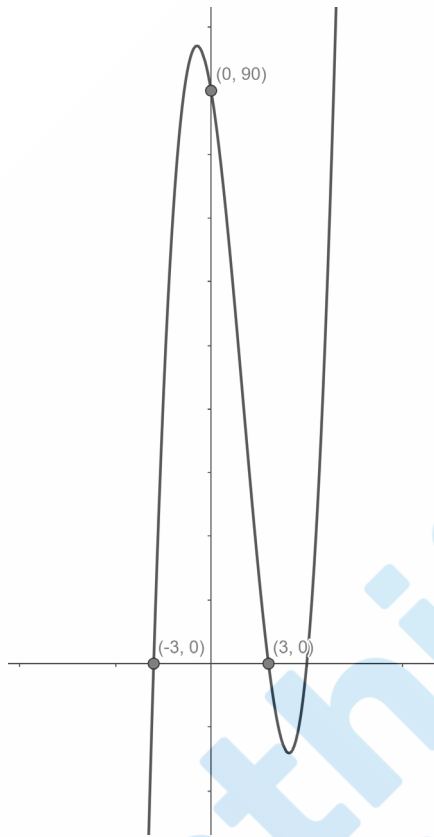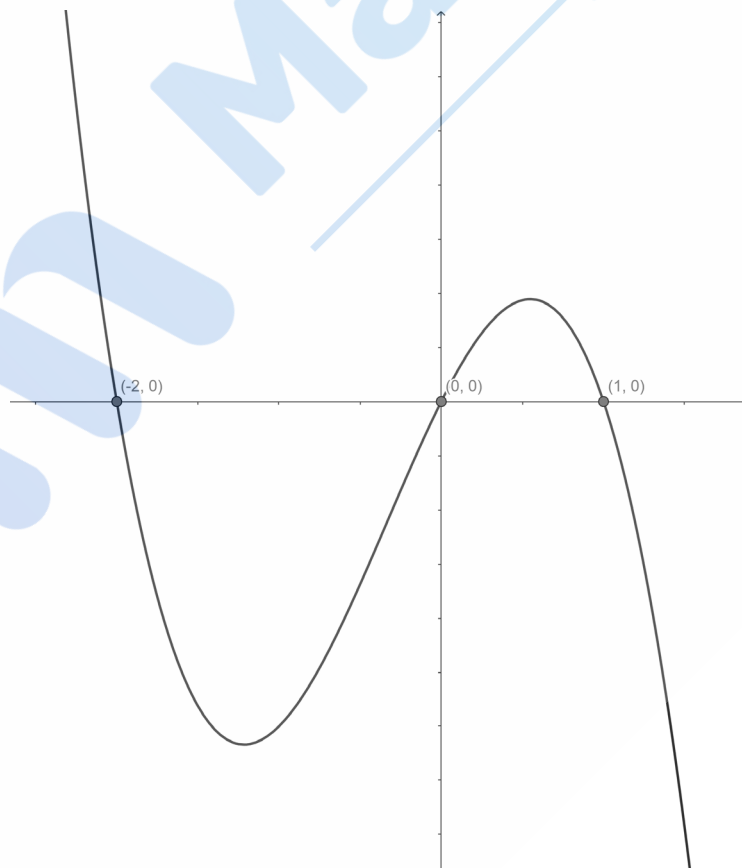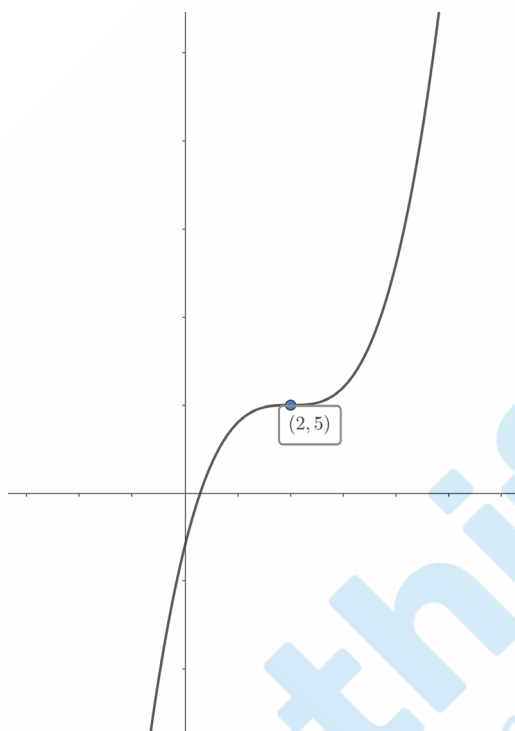d) $y = -6(x-4)^3 + 3$

Cubic Function Exercise Answers

1.

a)

b)

c)

(0, 90)
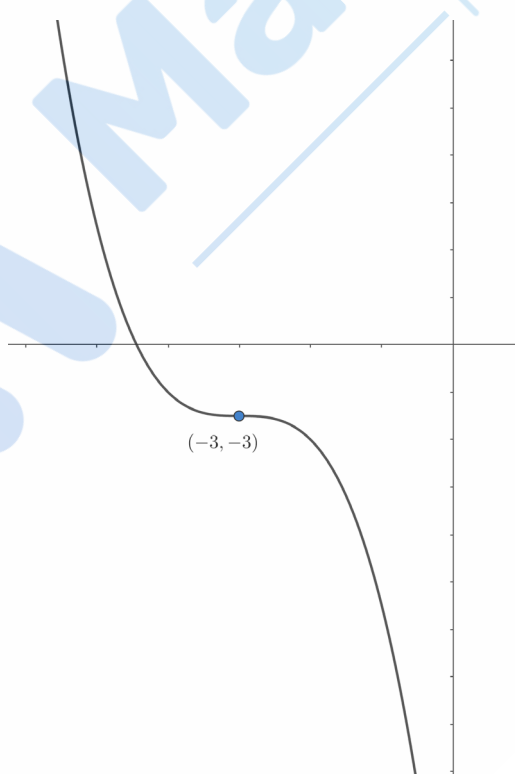
(-3, 0)   (3, 0)

d)

(-2, 0)   (0, 0)   (1, 0)

5

2.

a)

(2, 5)

b)

(−3, −3)

c)

$(\frac{1}{2}, -2)$

d)

$(4, 3)$