

Graphing Cubic Functions

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Cubic functions can be found in different forms

Standard form	$f(x) = ax^3 + bx^2 + cx + d$
Factorised form	$f(x) = (x - h)^3$, $f(x) = (x - a)(x - b)(x - c)$

where coefficients a , b and c are real numbers, d is a constant, the variable x takes real values and $a \neq 0$.

x-intercepts (roots)	Each function has 1-3 roots
y-intercept	Equal to the value of d
Zero or two extrema	Refers to maximum or minimums
Point of inflection (POI)	Point of symmetry (x found with derivatives)

Basic cubic function $f(x) = x^3$
Basic cubic function with no transformations

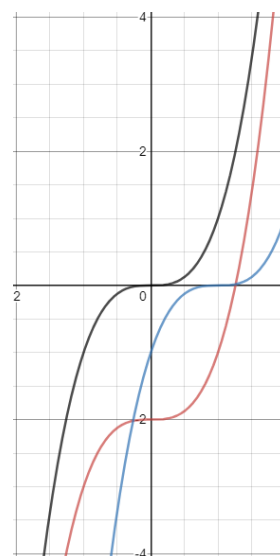
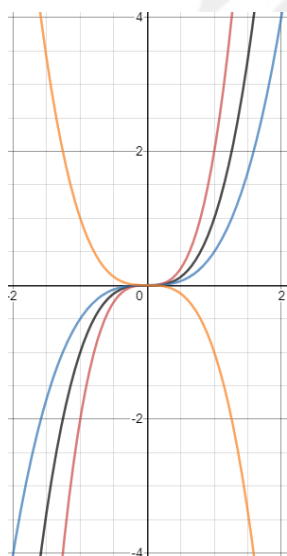
Large a co-efficient $f(x) = 2x^3$
Function becomes steeper

Small a co-efficient $f(x) = \frac{1}{2}x^3$
Function becomes flatter

Negative a co-efficient $f(x) = -x^3$
Function is inverted

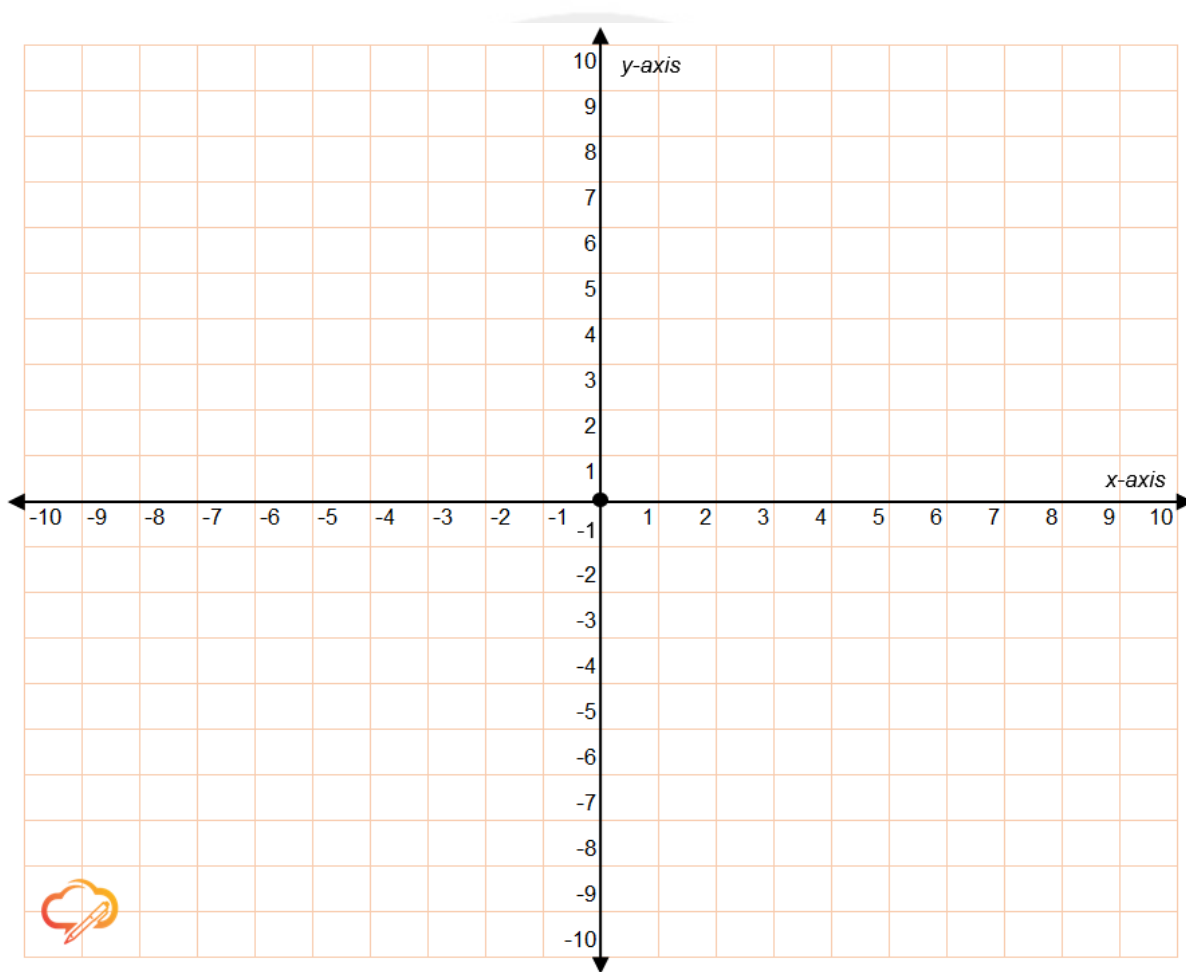
Shift in y -axis (d) $f(x) = x^3 - 2$
Function is shifted vertically

Shift in x -axis (h) $f(x) = (x - 1)^3$
Function is shifted horizontally.
Please note $f(x) = (x - h)^3$
where h is negative



Instructions: Sketch and label the cubic functions below.

1	$f(x) = x^3$	4	$f(x) = 1/3 x^3$
2	$f(x) = x^3 - 3$	5	$f(x) = (x + 5)^3$
3	$f(x) = 4x^3$	6	$f(x) = 2(x - 5)^3$





Instructions: Sketch and label the cubic functions below.

1	$f(x) = x^3$	4	$f(x) = (x + 5)(x - 1)(x - 4)$
2	$f(x) = (x - 2)(x + 3)(x - 1)$	5	$f(x) = 5x^3 - 3$
3	$f(x) = (x - 4)^3 + 1$	6	$f(x) = -(x - 5)(x - 8)(x + 1)$

