



CAMI Mathematics: Grade 12

12.5 Cubic polynomial functions

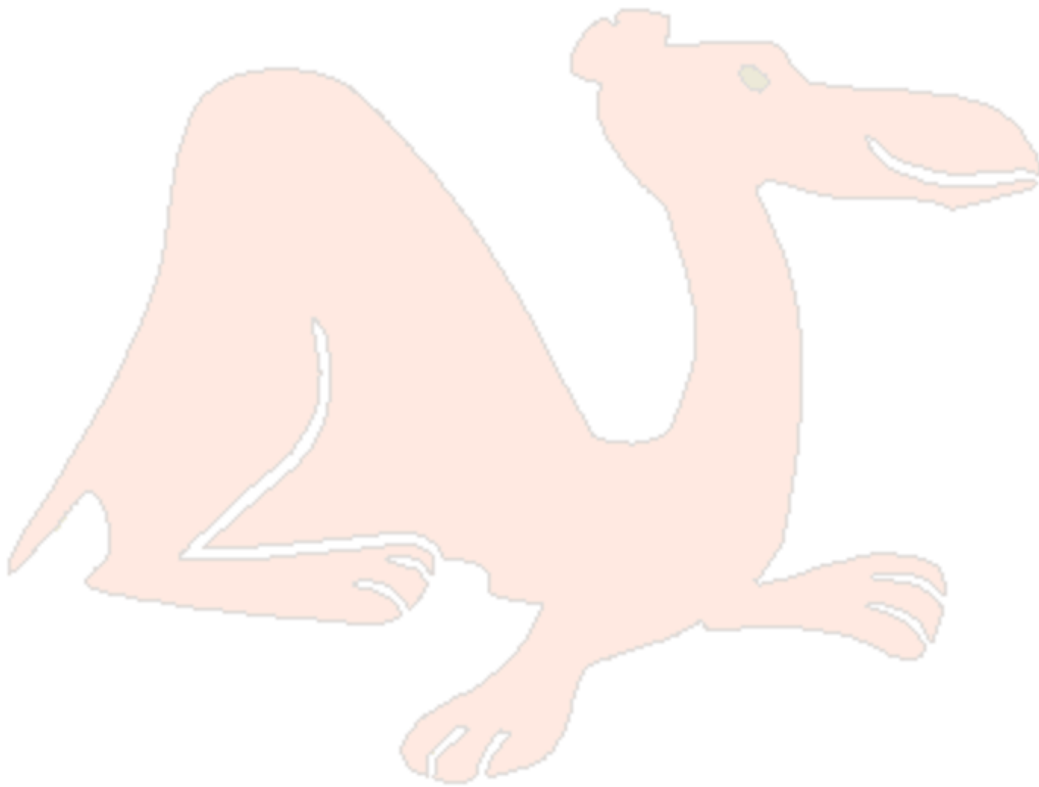
12.5 Graphs of cubic polynomial graphs

1. Calculate the stationary points and x- and y- intercepts of each function.

(a) $f(x) = x^3 - 9x^2 - 120x + 700$

(b) $f(x) = 2x^3 + 6x^2 - 18x - 54$

(c) $f(x) = -x^3 + 12x^2 - 36x + 32$





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MEMO

Cubic graphs [5.7.4.2]

(a) $f(x) = x^3 - 9x^2 - 120x + 700$

y -intercept: $x = 0$

$(0; 700)$

x -intercept: $y = 0$

$0 = x^3 - 9x^2 - 120x + 700$

$0 = (x + 10)(x - 5)(x - 14)$

$x = -10$

$x = 5$

$x = 14$

$f(x) = x^3 - 9x^2 - 120x + 700$

$f'(x) = 3x^2 - 18x - 120$

$0 = 3x^2 - 18x - 120$

$0 = x^2 - 6x - 40$

$0 = (x + 4)(x - 10)$

$x = -4; f(-4) = 972$

maximum: $(-4; 972)$

$x = 10; f(10) = -400$

minimum: $(10; -400)$

(b) $f(x) = 2x^3 + 6x^2 - 18x - 54$

y -intercept: $x = 0$

$(0; -54)$

x -intercept: $y = 0$

$0 = 2x^3 + 6x^2 - 18x - 54$

$0 = x^3 + 3x^2 - 9x - 27$

$0 = (x + 3)(x + 3)(x - 3)$

$x = -3$

$x = 3$

$f'(x) = 6x^2 + 12x - 18$

$0 = 6x^2 + 12x - 18$

$0 = x^2 + 2x - 3$

$0 = (x + 3)(x - 1)$

$x = -3; f(-3) = 0$

maximum: $(-3; 0)$

$x = 1; f(1) = -64$

minimum: $(1; -64)$



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(c) $f(x) = -x^3 + 12x^2 - 36x + 32$

y -int *ercept* : $x = 0$

$(0;32)$

x -int *ercept* : $y = 0$

$0 = -x^3 + 12x^2 - 36x + 32$

$0 = x^3 - 12x^2 + 36x - 32$

$0 = (x-2)(x-2)(x-8)$

$x = 2$

$x = 8$

$f'(x) = -3x^2 + 24x - 36$

$0 = x^2 - 8x + 12$

$0 = (x-6)(x-2)$

$x = 6; f(6) = 32$

maximun : $(6;32)$

$x = 2; f(2) = 0$

minimun : $(2;0)$

