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Thank you for using BF Maths for your maths revision!

4.1 Cubic graphs

1a. $y = (x+1)(x-2)(x+3)$

x intercept set $y = 0$

$x = -1 \quad x = 2 \quad x = -3$

y intercept set $x = 0$

$y = (0+1)(0-2)(0+3)$

$y = -6$

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

x intercept set $y = 0$

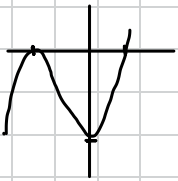
$x = 0 \quad x = 1/2 \quad x = -1/2$

y intercept set $x = 0$

$y = 0(2(0)-1)(2(0)+1)$

$y = 0$

c. $y = (x-2)(x+4)(x+4)$



x intercept set $y = 0$

$x = 2 \quad x = -4 \quad x = -4$

y intercept set $x = 0$

$y = (0-2)(0+4)(0+4)$

$y = -32$

2a. $y = x^3 + 2x^2 + 3x$

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

x intercept set $y = 0$

$x = 0 \quad x = 1 \quad x = -3$

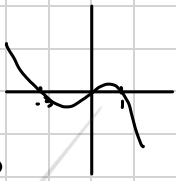
y intercept set $x = 0$

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

$y = 0$

2b. $y = -x^3 - 2x^2 + 3x$

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



x intercept set $y = 0$

$x = 0 \quad x = 1 \quad x = -3$

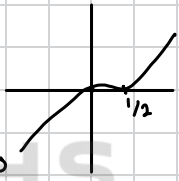
y intercept set $x = 0$

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

$y = 0$

2c. $y = 6x^3 - 3x^2$

$3x^2(2x-1)$



x intercept set $y = 0$

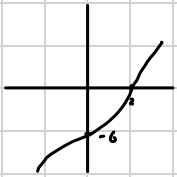
$x = 0 \quad x = 1/2$

y intercept set $x = 0$

$3(0)^2(2(0)-1)$

$y = 0$

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



x intercept set $y = 0$

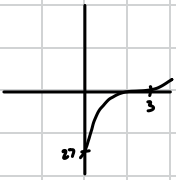
$x = 2$

y intercept set $x = 0$

$y = (0-2)(0^2+0+3)$

$y = -6$

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



x intercept set $y = 0$

$x = 3$

y intercept set $x = 0$

$(0-3)^3$

$y = -27$

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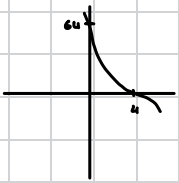
3c. $y = -(x-4)^3$



x intercept set $y = 0$

$x = 4$

y intercept set $x = 0$

$y = -(0-4)^3$

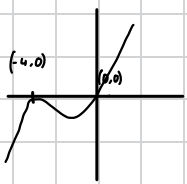
$y = 64$

4a. $x^3 + 8x^2 + 16x$

$x(x+4)(x+4)$

b. x intercept set $y = 0$

$x = 0 \quad x = -4 \quad x = -4$



y intercept set $x = 0$

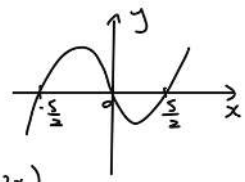
$0(0+4)(0+4)$

$y = 0$

5a. $y = 25x - 4x^3$

$y = x(25-4x^2)$

$y = x(5-2x)(5+2x)$



5b. When $x = 0$, $y = 0$

When $y = 0$, $0 = x(5-2x)(5+2x)$

$x = 0$ or $\frac{5}{2}$ or $-\frac{5}{2}$

6a. assume the coefficient of x^3 is 1

6b. $y = a(x+6)(x-6)^2$

Sub $(-2, 32)$

$32 = a(-2+6)(-2-6)^2$

$32 = a(4)(-8)^2$

$32 = 256a$

$a = 1/8$

7a. $(x-1)^2(x-4)$

$(x-1)(x-1)(x-4)$

$(x^2 - x - x + 1)(x-4)$

$x^3 - 4x^2 - x^2 + 4x - x^2 + 4x + x - 4$

$x^3 - 6x^2 + 9x - 4$

$a = 1 \quad b = 6 \quad c = 9$

b. y intercept set $x = 0$

$(0-1)^2(0-4)$

$y = -4 \quad (0, -4)$

8. $y = a(x+1)(x-2)(x-5)$

When $x = 0$, $y = 30$

$30 = a(1)(-2)(-5)$

$a = 3$

$y = 3(x+1)(x-2)(x-5)$

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

$y = 3(x^3 - 6x^2 + 3x + 10)$

$y = 3x^3 - 18x^2 + 9x + 30$