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4.2 quartic graph

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

x intercept set $y = 0$

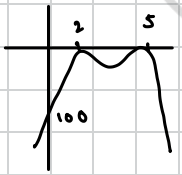
$x = -1 \quad x = -3 \quad x = 1 \quad x = 3$

y intercept set $x = 0$

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

$y = 9$

b. $y = -(x-2)^2(x-5)^2$



x intercept set $y = 0$

$x = 2 \quad x = 5$

bounce bounce

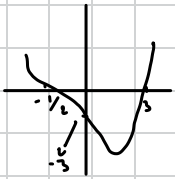
y intercept $x = 0$

$-(0-2)^2(0-5)^2$

$4 \times 25 = -100$

$y = -100$

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



x intercept set $y = 0$

$x = -\frac{1}{2} \quad x = 3$

y intercept set $x = 0$

$y = -3$

2a. $(x-2)(x+1)(x+4)(x-3)$

x intercept set $y = 0$

$x = 2 \quad x = -1 \quad x = -4 \quad x = 3$

y intercept set $x = 0$

$(0-2)(0+1)(0+4)(0-3)$

$y = 24$

b. $(x-5)^2(x-2)(x-1)$

x intercept set $y = 0$

$x = 5 \quad x = 2 \quad x = 1$

bounce

y intercept set $x = 0$

$(0-5)^2(0-2)(0-1)$

$y = -50$

c. $(2x+5)^4$

x intercept set $y = 0$

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

y intercept set $x = 0$

$y = (0+5)^4$

$y = 625$

3a. $(x+4)(x+2)(x-2)(x-3)$

y intercept set $x = 0$

$y = 48 \quad p = (0, 48)$

b. $(x+4)(x+2)$

$x^2 + 2x + 4x + 8$

$(x^2 + 6x + 8)(x-2)$

$x^3 - 2x^2 + 6x^2 - 12x + 8x - 16$

$(x^3 + 4x^2 - 4x - 16)(x-3)$

$x^4 - 3x^3 + 4x^3 - 12x^2 - 4x^2 + 12x - 16x + 48$

$x^4 + x^3 - 16x^2 - 4x + 48$

$c = 16 \quad d = 4 \quad e = 48$

4. $y = (x+3)(x-4)(x^2+7x+10)$

$y = (x+3)(x-4)(x+5)(x+2)$

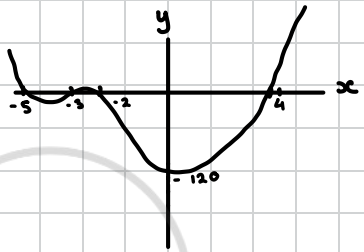
x intercept set $y = 0$

$x = -3 \quad x = 4 \quad x = -5 \quad x = -2$

y intercept set $x = 0$

$(0+3)(0-4)(0+5)(0+2)$

$y = -120$



5. $y = -(x+2)^2(x^2-4x+3)$

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

x intercept set $y = 0$

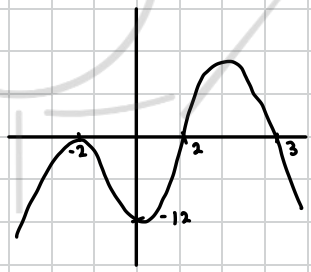
$x = -2 \quad x = -2 \quad x = 3 \quad x = 1$

y intercept set $x = 0$

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

$-(2)(2)(-3)(-1)$

$y = -12$



6a. use x co-ordinates

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

$(x+3) \quad (x+2) \quad (x-1) \quad (x-2)$

find y intercept set $x = 0$

$(0+3) \quad (0+2) \quad (0-1) \quad (0-2)$

$-(3) \times (2) \times (-1) \times (-2)$

$y = -12$

$p = (0, -12)$

6b. $-(x+3)(x+2)(x-1)(x-2)$

$(-x-3)(x+2)$

$= -x^2 - 2x - 3x - 6$

$(-x^2 - 5x - 6)(x-1)$

$= -x^3 + x^2 - 5x^2 + 5x - 6x + 6$

$(-x^3 - 4x^2 - x + 6)(x-2)$

$= -x^4 + 2x^3 - 4x^3 + 8x^2 - x^2 + 2x + 6x - 12$

$= -x^4 - 2x^3 + 7x^2 + 8x - 12$

$b = 2 \quad c = 7 \quad d = 8 \quad e = 12$

7a. use x co-ordinates

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

$(x+2)^2 \quad (x-3)^2$

y intercept set $x = 0$

$(0+2)^2 \quad (0-3)^2$

$(4) \quad (9)$

$y = 36$

$P = (0, 36)$

b. $(x+2)^2 \quad (x-3)^2$

$(x+2)(x+2)(x-3)(x-3)$

$x^2 + 2x + 2x + 4$

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

$x^3 - 3x^2 + 4x^2 - 12x + 4x - 12$

$(x^3 + x^2 - 8x - 12)(x-3)$

$x^4 - 3x^3 + x^3 - 3x^2 - 8x^2 + 24x - 12x + 36$

$x^4 - 2x^3 - 11x^2 + 12x + 36$

$b = 2 \quad c = 11 \quad d = 12 \quad e = 36$