T-A2 Algebra 2 Week 22 2/21

Quadratic function: $ax^2 + bx + c$

Linear functions: $mx + b$ ← y-intercept

$f(x) = ax^2 + bx + c$

$x = 0 \quad f(0) = a(0)^2 + b(0) + c$

$f(0) = c$

$f(x) = x^2$

$f(0) = 0^2 = 0 \quad (0,0)$

$f(1) = 1^2 = 1 \quad (1,1)$

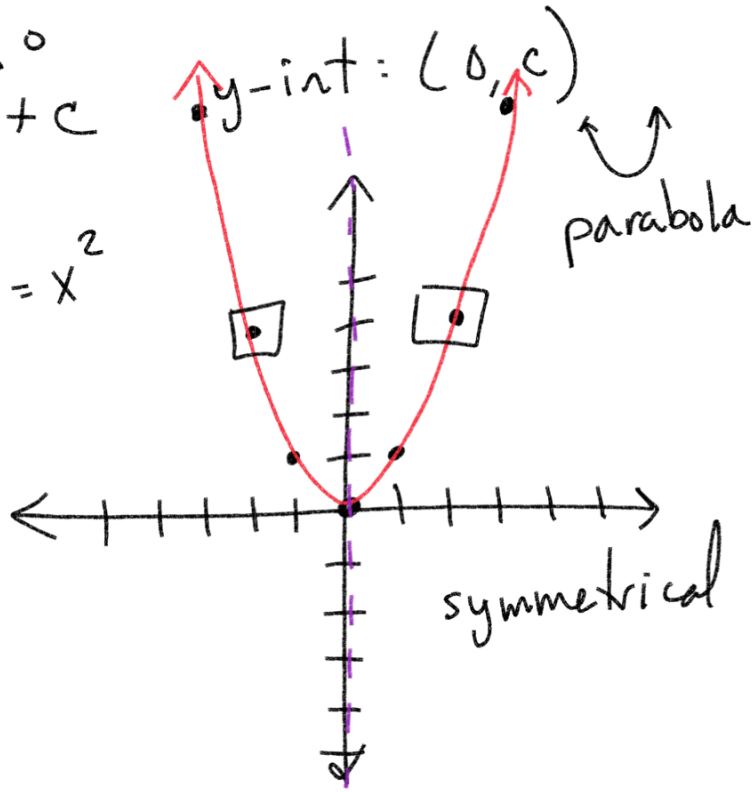
$f(2) = 2^2 = 4 \quad (2,4)$

$f(3) = 3^2 = 9 \quad (3,9)$

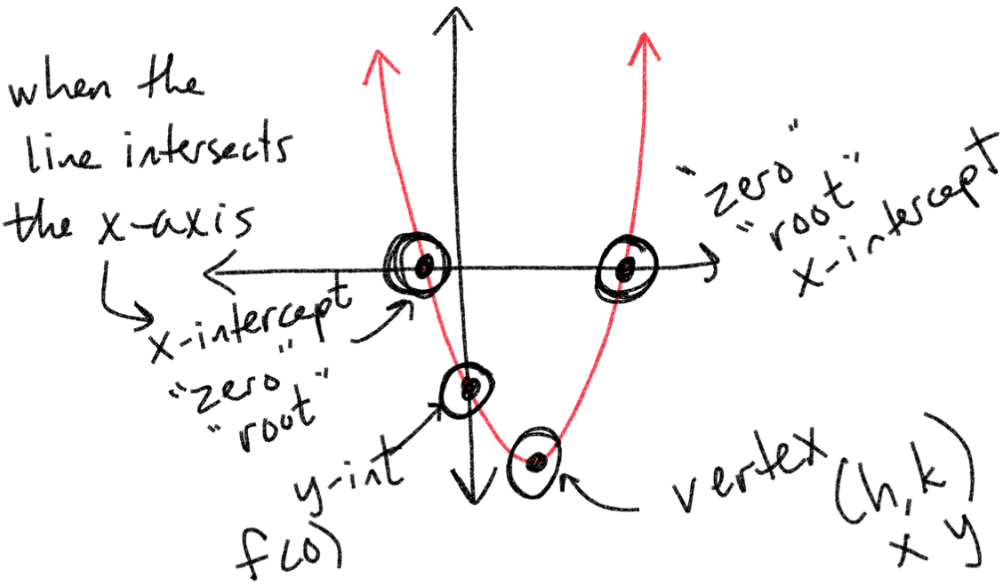
$f(-1) = (-1)^2 = 1 \quad (-1,1)$

$f(-2) = (-2)^2 = 4 \quad (-2,4)$

$f(-3) = (-3)^2 = 9 \quad (-3,9)$



$y = x^2$ $\quad y = -x^2$



$y = x^2$

$y = x$ → up to 7 zeros

Quadratic Functions.

1.) Must have a square as the highest exponent

$y = x^{2} + x + 3$ yes, quadratic

$y = x^{3} + x^{2} - 8$ no, not quadratic

$y = 3x - 7$ no, not quadratic
no x^2

2.) All exponents on variables must be whole numbers.

$y = x^{2} + x^{1/3}$ ← not whole number
not quadratic

$y = x^{-2}$ ← not whole number
not quadratic

Which of the following equations is a quadratic?

FOIL
First ✓
Outside ✓
Inside ✓
Last

1.) $y = (-5x-4)(-5x-4)$

$25x^2 + 20x + 20x + 16$

$25x^2 + 40x + 16$ yes, quadratic

$ax^2 + bx + c$

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

$3x - 3 + 3 = 3x$ not quadratic

3.) $y = x^2 - 11x + 24 - x^2 = -11x + 24$ not quadratic

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

↓↓↓↓ FOIL

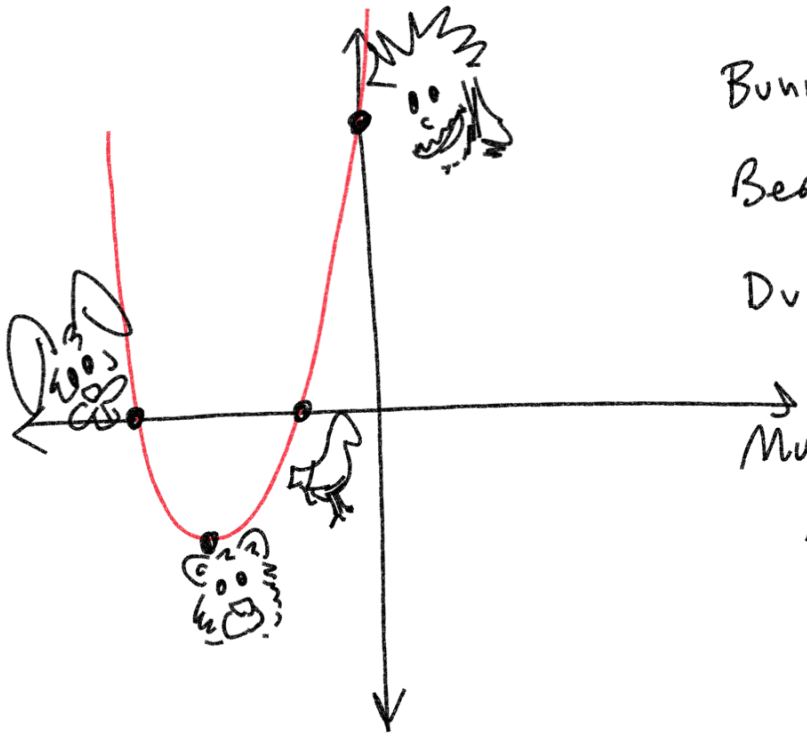
$2(x+2)(x+2) - 2x^2$

$2[x^2 + 2x + 2x + 4] - 2x^2$

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

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

not quadratic



Bunny → "zero" root

Bear → vertex

Duck → root zero

Mullet → y-int

Nate

Quadratic Function

$y = ax^2 + bx + c$

(-1, 1) (1, 1) (3, 9)

$y = ax^2 + bx + c$

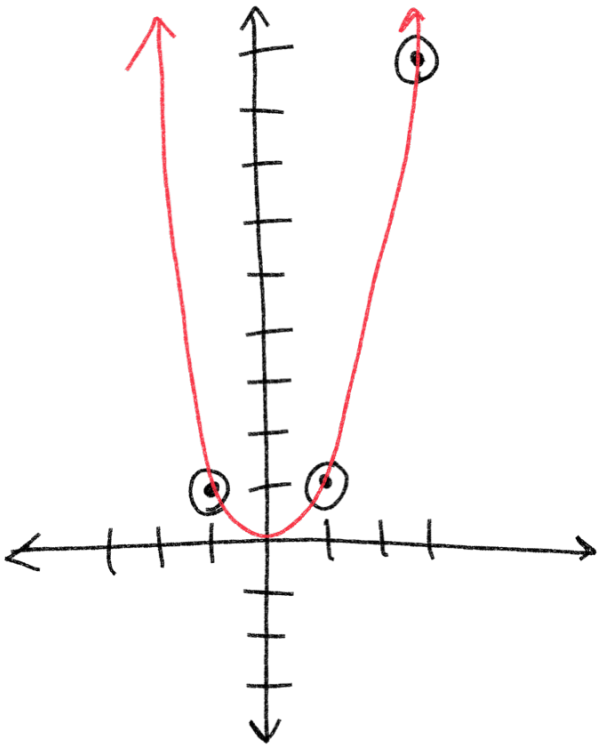
$1 = a(-1)^2 + b(-1) + c$

① $1 = a - b + c$

$y = ax^2 + bx + c$

$1 = a(1)^2 + b(1) + c$

② $1 = a + b + c$



$y = ax^2 + bx + c$

$9 = a(3)^2 + b(3) + c$

③ $9 = 9a + 3b + c$

① $a-b+c=1$

② $a+b+c=1$

③ $9a+3b+c=9$

$9a+3b+c=9$

$9a+3(0)+c=9$

$9a+c=9$

$a-b+c=1$

$a+c=1$

$a+b+c=1$

$1+0+c=1$

$1+c=1$

$-1 \quad -1$

$\boxed{c=0}$

① $a-b+c=1$

② $-1(a+b+c=1)$

$a-b+c=1$

$-a-b-c=-1$

$-2b=0$

$\frac{-2b}{-2}=\frac{0}{-2}$

$\boxed{b=0}$

$9a+c=9$

$-1(a+c=1)$

$9a+c=9$

$-a-c=-1$

$8a=8$

$\frac{8a}{8}=\frac{8}{8}$

$\boxed{a=1}$

$y=ax^2+bx+c$

$y=x^2+0x+0$

$\boxed{y=x^2}$