Quadratics

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1 Quadratic Functions

Vertex Form: $y = a(x - h)^2 + k$, V(h,k)
Standard Form: $y = ax^2 + bx + c$, (0, c) = y-int
Factored Form: $y = a(x - s)(x - t)$, (s,0),(t,0) = x-ints

First differences - if the first diffs are the same, the function is linear
Second differences - if the second diffs are the same, the function is quadratic

2 Properties of Quadratics

Complete the Square

1. Factor a out of the first two terms
2. Take the coefficient of the second term, divide by 2 and square it
3. Take the answer from 2. and add/sub inside the brackets
4. Factor the trinomial, move the negative outside and simplify

Changing Form

factored to standard : expand
standard to factored : factor it
vertex to standard : expand
standard to vertex : complete the square

Terminology

(R) Revenue - total amount of income (R = pQ)
(C) Cost - cost to produce items sold
(p) price - how much you sell it for
(P) Profit - amount made after costs deducted (P = R - C)
(Q) Quantity - how many sold (usually x)

3 Inverse of a Quadratic

Inverting Functions

1) Given a graph: Select key points, flip the coordinates, regraph OR reflection over y = x

2) Given an equation: let y = ... (remove func notation), switch x and y variables, solve for y, go back to function notation

*** To restict, set x to be greater than the axis of symmetry

4 Radicals

Radical - a square, cube, or higher root ($\sqrt{}$ - called the radical symbol)

Properties

1. $\sqrt{a}\sqrt{b} = \sqrt{ab}$
2. $a\sqrt{b} + c\sqrt{d} = ac\sqrt{bd}$
3. $a\sqrt{b} + c\sqrt{b} = (a + c)\sqrt{b}$
4. $\sqrt{a}\sqrt{a} = a$
5. $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

5 Solving Quadratic Equations

3.5 and 3.6

The Quadratic Formula

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

The Discriminant

$D = b^2 - 4ac$

If D is positive - 2 real roots
If D is zero - 1 real root
If D is negative - no real roots
If D is perfect square - factorable

6 Families of Quadratics

Quadratics that share a common property.

7 Linear Quadratic Systems

The intersection of a line and a parabola

Secant - 2 solutions
Tangent - 1 solution

Question wording: a) Find the POI (use sub/elim)
b) If there is only one POI then what is... (solve this by setting D to 0)

8 WORD PROBLEMS (extra section)

https://dnsva.github.io/REVIEWS/MATH/math.html