Math 11: **Unit 2.1 (Chp 3 of the workbook) Quadratic Functions**

A. What is a function?

-in Math 10, a *function* is:

i)

ii)

Ex: ex:

B. What is a Quadratic Function?

-has a second-degree polynomial

ex: $y = x^2$ and $y = x^2-3x-4$ are second degree polynomials

-standard form of a <u>quadratic function</u>:

-stand form of <u>quadratic equation</u>:

C. Features of Parabolas:

i)Vertex:

ii) symmetry:

iii) Maximum or minimum value:

iv) domain and range:

v)Intercepts:

D. Question: $y=x^2$

E. Types of transformations

i) $Y = x^2+3$

ii) $y = x^2-3$

ii) What does $y=ax^2$ look like?

-let's compare:

$Y = x^2$ $y=$ $y = 2x^2$

-WB pg 27 #4, 5
-handout pg 109 #1-19, 32-34

F. What if given info and need to create the equation?

Ex: parabola with a vertex of (0, -2) passes through point (3, 1). Write the equation in form of: $y=ax^2 + q$

Try: parabola: vertex (0, -7); point (2, 5), equation?

-handout Pg 109 #36-41, 48-63
-quiz next day

Math 11: unit 2.2 A: Graphing $y=(x-p)^2$

A. Review: $y= \pm ax^2+q$

-so far, axis of symmetry has been $x=0$, and vertex $(0,q)$

B. Compare: $y=x^2$ and $y=(x-p)^2$

Ex: $y=x^2$ $y=(x-3)^2$ $y=(x+2)^2$

Therefore:

Other features: i) vertex:

ii) symmetry for:

c. Therefore, we know:

all together, look at standard form of quadratic function:

$y = \pm a (x-p)^2 + q$

So: $y=2(x-4)^2+3$

-WB pg 33 #1-3: pick 4 from each
-HO pg 118 #1-45: odds, and sketch

D. What if we need to find the standard form of the quadratic function:

Ex: parabola: vertex (-1,4); passes through (-2,2). Equation?

Try: parabola: vertex (6,4); passes through (0,6). Equation?

-pg 119: #46-69: odd…graph properly with x and y-intercepts!
-quiz next day: graphing, analyzing, find equation: $y=a(x-p)^2+q$

-WB pg 36 #4, 5: pick 3 from each

Math 11 2.2B: (chp 2.1 in Mickelson) Finding the equation of a parabola

A. How do we find the equation of a graph?

Re: standard form of quadratic function is $y=a(x-p)^2+q$

3 main types of questions:

i) given the graph, find the equation of the parabola

ex:

step 1) can I see a vertex?

-so: $y=a(x-p)^2+q$

becomes:

step 2: can I see any points (whole numbers)?

-I see:

-I can use any of these points to substitute 'x' and 'y' to solve for 'a', so:

so: equation of the parabola is:

ii) given the vertex and 1 point, find the equation of the parabola

ex: find the quadratic function of a graph given the vertex is (-2, -4) and the y-intercept: -3

step 1: can I see a vertex?

-yes! It is:

-so: $y=a(x-p)^2+q$ becomes:

step 2: I am given a point:

-I will use the point to substitute for 'x' and 'y' to solve for 'a'

-so:

-so the equation for the parabola is:

iii) given 3 points (2 of the points **must** be symmetric… ie: have the same 'y' value), find the equation of the parabola

ex: find the equation of the quadratic function whose graph passes through the given points: (-3, -1), (-2, 5), (1, -1).

step 1: do I have 2 symmetric points?

-yes! (-3, -1) and (1, -1)

-on a graph, it looks like:

-this means there must be axis of symmetry halfway between these 2 points.

-so:

step 2: given $y=a(x-p)^2+q$ and the axis of symmetry is _______, then we now have:

step 3: pick any point and substitute for 'x' and 'y' to find 'q':

step 4: pick any remaining point and substitute for 'x' and 'y' to solve for 'a':

-so the equation for the parabola is:

Do: WB pg 43 #1-3: left

Math 11: unit 2.3: Changing general form to Vertex (standard) Form

A. What do these forms look like?

general form: vertex (standard) form:

B. How to do the conversion?

ex: $y = x^2 + 6x + 8$

ex: $y = x^2 - 4x + 1$

ex: $y = 2x^2 + 28x - 19$

-WB pg 58 #3-5: left

-do handout pg 131 #1-16
#17-22,
24-43 (odd)
-quiz next day: graph/analyze/vertex form
-review, pretest, corrections, test

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