WARMUP - THEORY

→) what does a quadratic standard form look like?

$$y = ax^2 + bx + c$$

→) what does the quadratic vertex form look like?

$$y = d(x-p)^2 + h \quad , \text{where vertex} = (p, h)$$

→) list what elements of quadratic concepts should be used in graphing

→ roots (or x-intercept)
→ label the axis
→ y-intercept
→ vertex & axis of symmetry through it
→ $a > 0 \Rightarrow$ arms up, $a < 0 \Rightarrow$ arms down $\left(y = ax^2 + bx + c, \ a \neq 0\right)$

→) $y = ax^2 + bx + c$; what can we use to determine the direction of the arms?

$a > 0 \Rightarrow$ arms up , $a < 0 \Rightarrow$ arms down

→) $y = ax^2 + bx + c$; what can we use to determine if there are roots? Test $\Delta = b^2 - 4ac$; if $\Delta < 0 \Rightarrow$ no real roots
$\Delta = 0 \Rightarrow$ one root
$\Delta > 0 \Rightarrow$ two roots

→) what methods can we use to find the roots?

I) factor and equate each factor to zero to find one root
II) $x_{1,2} = \frac{-b \pm \sqrt{\Delta}}{4a}$; $\Delta = b^2 - 4ac$ formulas use.

→) how can we find the vertex?

I) $x_{vertex} = -b/2a$ then substitute in $f(x) = ax^2 + bx + c$ to find y_{vertex}
II) format as $d(x-p)^2 + h$ "vertex-form" by complete-the-square method.

→) what is the difference between a quadratic equation and a quadratic function?

The equation $= \varnothing$, the function is dynamic and equals a whole range of points.

→) what is the difference between the roots of a function and the zeroes of that function

Nothing. They are the same thing.

→) when is a quadratic function tangent to the horizontal axis?

$y=ax^2+bx+c$; $\Delta=b^2-4ac$; $\Delta=0 \Rightarrow$ the function becomes tangent to the x-axis.

→) what is the quadratic's x-intercept?

The root, or zeros

For ex. 

where $y=0$ or $f(x)=\emptyset$.

It is the intersection of the parabola with the horizontal axis.

→) what is the quadratic's y-intercept?

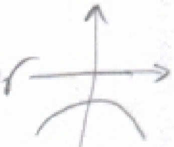
where $x=0$, or where the parabola intersect the vertical axis. For ex.  $\equiv$ the $y=f(\emptyset)$

→) what is a DISCRIMINANT and its formula? what uses does it have?

The name given to this formula $\Delta=b^2-4ac$ for $y=ax^2+bx+c$

It is used to calculate roots via: $x_{1,2}=\dfrac{-b\pm\sqrt{\Delta}}{4a}$ and to draw conclusions about the existance of roots.

→) what does it mean "no real roots to the quadratic"? Plot a few examples of how they may look like.

Means no intersection w/ the horizontal axis. For ex.  or 

→) I claim the function $y=3x^2-x+2$ is the same as the function $g=3x^2-x$ but elevated by 2 units. Explain....

Giving values to x affects y only in the "$3x^2-x$" area of this function. +2 is not affected by the changes in x. This is = to g(x) but alway add a +2 to the $y=g(x)$, thus the elevation.

→) what are INTEGRAL ROOTS ?

whole value

→) correlate roots, quadratic equations & the sum & product of the roots.

$S = \alpha + \beta$

$P = \alpha \cdot \beta$

$y = ax^2 + bx + c$

$= x^2 - Sx + p$

$= (x - \alpha)(x - \beta)$