



Name

Score

Solve and show all steps.

<p>Consider the quadratic function $f(x)=2(x-3)^2+5$.</p> <ul style="list-style-type: none"> • What are the coordinates of the vertex? • Does the parabola open upwards or downwards? • What is the axis of symmetry? • What is the minimum or maximum value of the function? 	<p>Show all steps here</p>
<p>Given the quadratic function $g(x)=-x^2-4x+12$.</p> <ul style="list-style-type: none"> • Does the parabola open upwards or downwards? How do you know? • Find the y-intercept. • Find the x-intercepts (roots) of the function. 	<p>Show all steps here</p>
<p>A quadratic function has its vertex at $(-2,1)$ and its parabola opens downwards.</p> <ul style="list-style-type: none"> • Is the leading coefficient (a) positive or negative? • Does the function have a maximum or a minimum value? What is that value? • Write a possible equation for this quadratic function in vertex form. (Assume $a =1$ for simplicity if you need to choose a value for 'a'). 	<p>Show all steps here</p>
<p>The path of a projectile can be modeled by the quadratic function $h(t)=-16t^2+64t+80$, where $h(t)$ is the height in feet after t seconds.</p> <ul style="list-style-type: none"> • What is the initial height of the projectile? • How high does the projectile go (what is its maximum height)? • How long does it take for the projectile to reach its maximum height? 	<p>Show all steps here</p>
<p>Compare the graphs of $y=x^2$, $y=3x^2$, and $y=1/2x^2$.</p> <ul style="list-style-type: none"> • How does the value of the leading coefficient 'a' affect the width (or stretch/compression) of the parabola? • Do all three parabolas have the same vertex? If so, what is it? 	<p>Show all steps here</p>



Solve and show all steps.

- Coordinates of the vertex: $(h,k)=(3,5)$.
- The leading coefficient $a=2$ is positive, so the parabola opens upwards.
- The axis of symmetry is the vertical line $x=h$, so it is $x=3$.
- Since the parabola opens upwards, it has a minimum value, which is the y -coordinate of the vertex. The minimum value is 5.

- The leading coefficient $a=-1$ is negative, so the parabola opens downwards.
- The y -intercept is 12
- The x -intercepts are $(-6,0)$ and $(2,0)$.

- The leading coefficient 'a' must be negative.
- The maximum value is 1.
- A possible equation is $y=-(x+2)^2+1$.

- 80 feet.
- 2 seconds.
- 144 feet.

- If $|a|>1$ (like $a=3$), the parabola is **narrower** (vertically stretched) compared to $y=x^2$.
- If $0<|a|<1$ (like $a=21$), the parabola is **wider** (vertically compressed) compared to $y=x^2$.
- The larger the absolute value of 'a', the narrower the parabola.
- Yes, all three parabolas have their vertex at the origin, $(0,0)$. This is because none of them have an $(x-h)^2$ or $+k$ term, meaning $h=0$ and $k=0$.