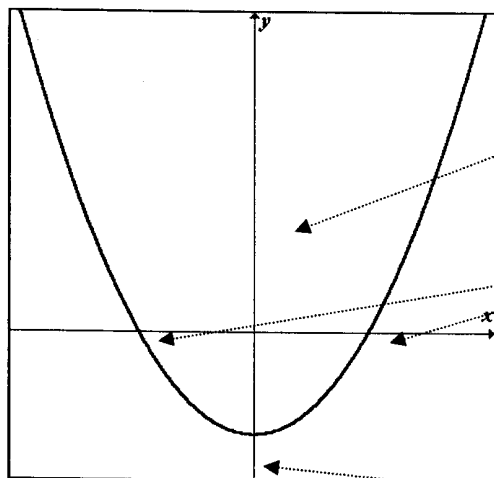


The graph of a quadratic relationship is called a ***parabola***.

The general shape of a quadratic function is shown in the sketches below:

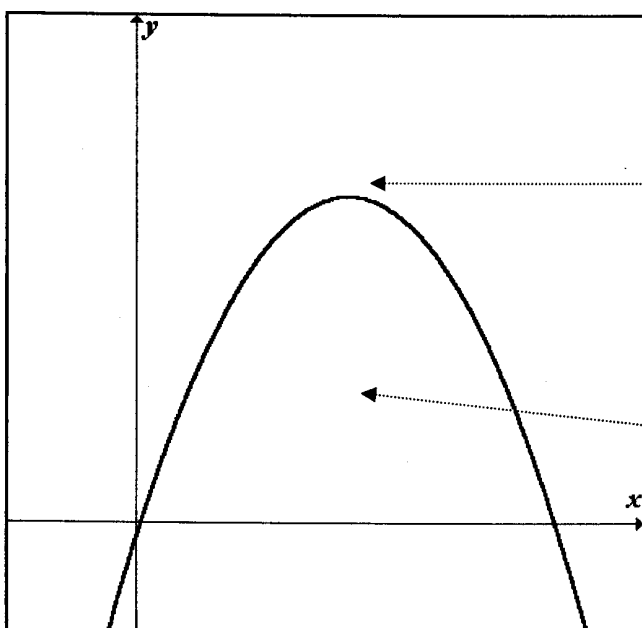


direction of opening –
this parabola ***opens upwards***

the ***x-intercepts*** or the
zeros of the function.
These values may not
exist.

the ***vertex*** – the point where
the graph “changes direction”

when a parabola opens
upwards, the ***y co-ordinate*** of
the vertex represents the
minimum value of the
function. It is the lowest point
on the graph.



the y co-ordinate of this vertex
would represent the ***maximum value***
of this function. It is the
highest point on this graph.

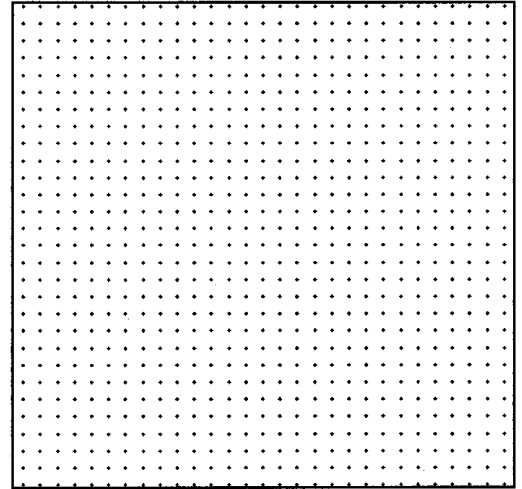
this parabola ***opens downwards***

Date:

For each of the following questions, complete the table by calculating the first and second differences. Use the calculator to create a scatter plot. Sketch the scatter plot in the space provided.

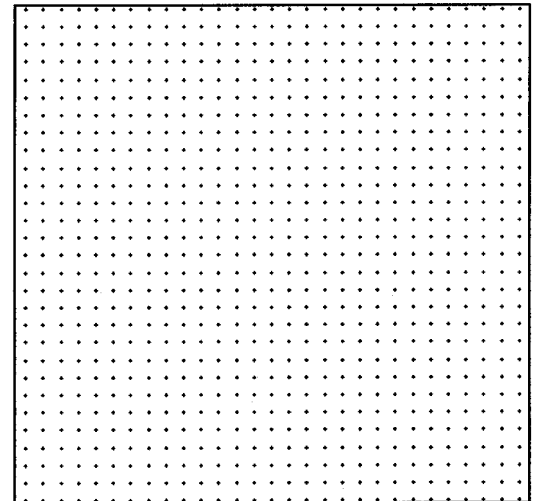
a) the height of a rocket

| time | height | first difference | second difference |
|------|--------|------------------|-------------------|
| 0 | 0 | | |
| 1 | 25 | | |
| 2 | 40 | | |
| 3 | 45 | | |
| 4 | 40 | | |
| 5 | 25 | | |
| 6 | 0 | | |



b) the cost of gas

| speed car is driven | cost of gas in cents/km | first difference | second difference |
|---------------------|-------------------------|------------------|-------------------|
| 20 | 9.1 | | |
| 40 | 7.8 | | |
| 60 | 7.1 | | |
| 80 | 7.1 | | |
| 100 | 7.8 | | |
| 120 | 9.1 | | |



How can the direction of opening be determined from the table of values without drawing the graph?

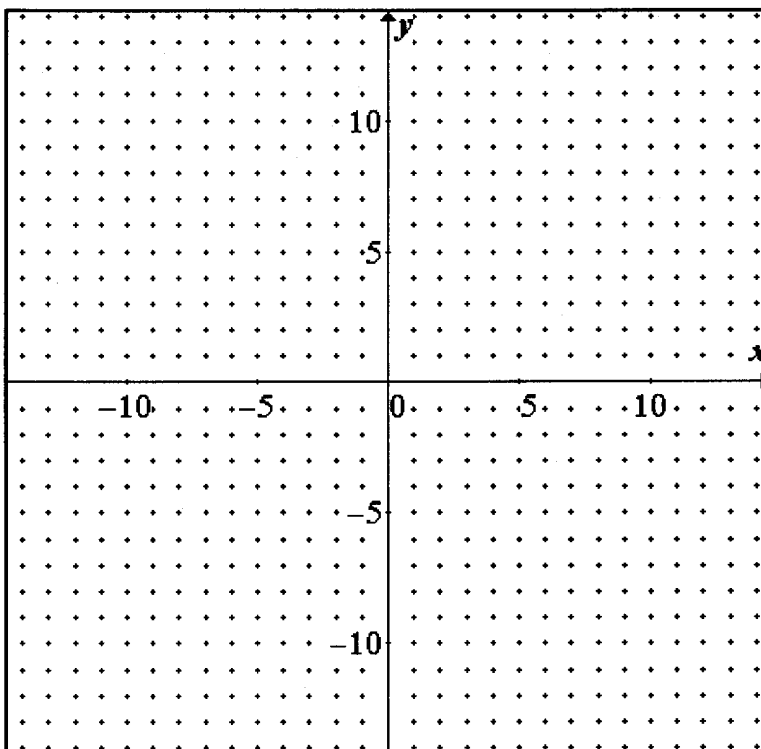
Date: _____

For each of the following, complete the table of values for the given equation. Use the “y =” menu on the graphing calculators to draw a graph of each. Copy the graphs onto the graph paper shown. Draw all graphs on the same set of axes.

| x | $y = x^2$ |
|-----|-----------|
| -3 | |
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |
| 3 | |

| x | $y = \frac{1}{2}x^2$ |
|-----|----------------------|
| -3 | |
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |
| 3 | |

| x | $y = -2x^2$ |
|-----|-------------|
| -3 | |
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |
| 3 | |

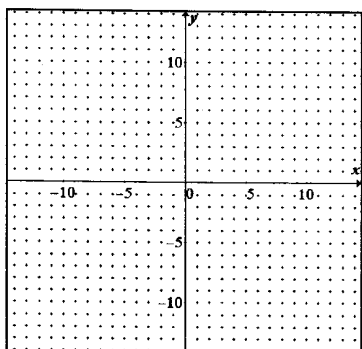


How can the direction of opening be determined from the equation?

Date: _____

For each of the following equations, use the graphing calculator to help you draw a sketch. It is important that you set the "WINDOW" to match the axes shown in the graph paper. Try to determine the co-ordinates of the vertex and the values of the x-intercepts from the graphs.

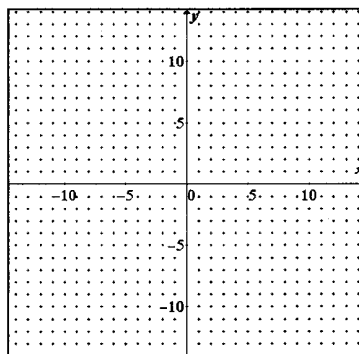
1. $y = x^2 - 4$



vertex _____

x-intercepts _____

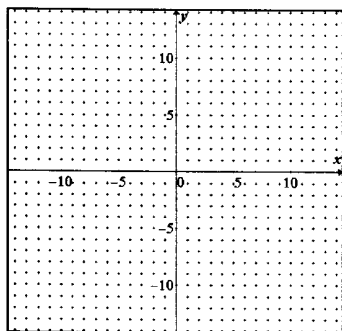
2. $y = x^2 - 9$



vertex _____

x-intercepts _____

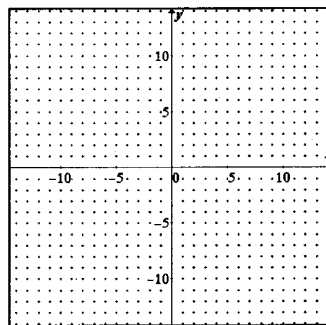
3. $y = 8 - 2x^2$



vertex _____

x-intercepts _____

4. $y = 1 - x^2$



vertex _____

x-intercepts _____