## 3.2 Interpreting Meaningful Values Given Real world Quad Graphs

parabola: a quadratic graph

The highest or lowest point on a parabola is called the **VERTEX.**

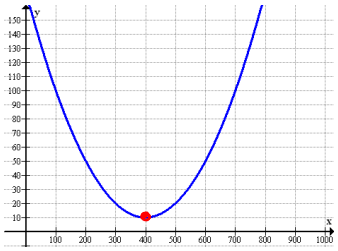
Maximum and Minimum Values
the highest or lowest value of "y".

if parabola opens down

if parabola opens up

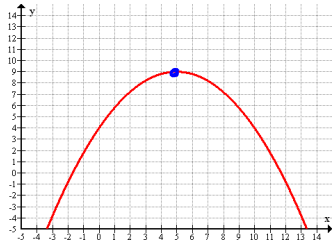
State: i) the coordinates of the vertex
ii) if it is a maximum/minimum value
iii) when does the max/min value occur

a)



i) vertex (400, 10)
ii) maximum/minimum value 10
iii) when max/min value occurs 400

b)



i) vertex (5, 9)
ii) maximum/minimum value 9
iii) when max/min value occurs 5

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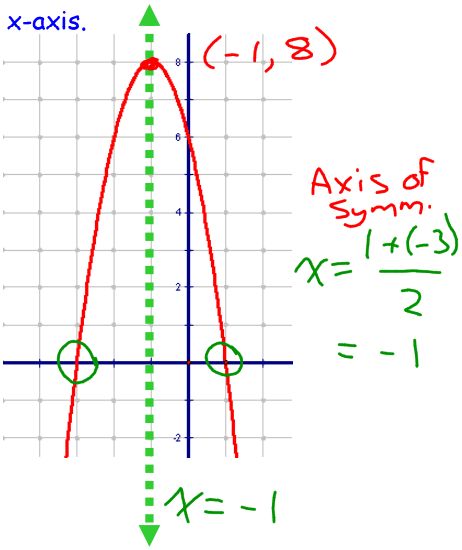
- The x-intercepts are where the graph crosses the x-axis.
- They are also called zeros.
- They are the points where the y=0.

- circle the zeros
- the zeros are: 1, -3

(1, 0) (-3, 0)




Notice:
The vertex occurs half way between the zeros because the graph is symmetrical

- label the vertex
- sketch and label the axis of symmetry

label with the equation

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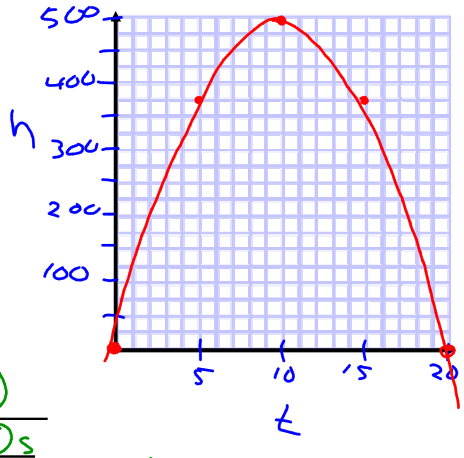
Ex A model rocket is launched from the ground.
The height of the rocket *h*, in metres, can be modeled by $h = -5t^2 + 100t$, where *t* is the elapsed time in seconds.

a) Graph the relation using a table of values.

| t | h |
|---|---|
| 0 | 0 |
| 5 | 375 |
| 10 | 500 |
| 15 | 375 |
| 20 | 0 |

$-5(0)^2+100(0)$
$-5(5)^2+100(5)$
$-5(10)^2+100(10)$
$-5(15)^2+100(15)$




b) At what height does the rocket start? 0
c) When does the rocket hit the ground? 20s
d) What is the maximum height the rocket reaches? 500m
e) When does the rocket reach the max height? 10s

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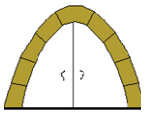
Ex The shape of the underside of an arched doorway can be modeled by the equation $h = \frac{-1}{3}d^2 + 4d$

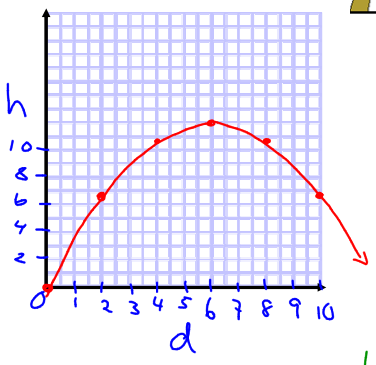
where h is the height, in feet, above the ground and d is the horizontal distance, in feet, from the edge of the arch.

a) Graph the relation using a table of values.



| d | h |
|---|---|
| 0 | 0 |
| 2 | 6.7 |
| 4 | 10.7 |
| 6 | 12 |
| 8 | 10.7 |
| 10 | 6.7 |

$-\frac{1}{3}(0)^2+4(0)$
$-\frac{1}{3}(2)^2+4(2)$
$-\frac{1}{3}(4)^2+4(4)$
$-\frac{1}{3}(6)^2+4(6)$
$-\frac{1}{3}(8)^2+4(8)$
$-\frac{1}{3}(10)+4(10)$




b) What is the height of the bridge 2m horizontally from the base? 6.7ft
c) What is the maximum height arch? 12 ft.
d) How wide is the bridge at the base? 12ft.

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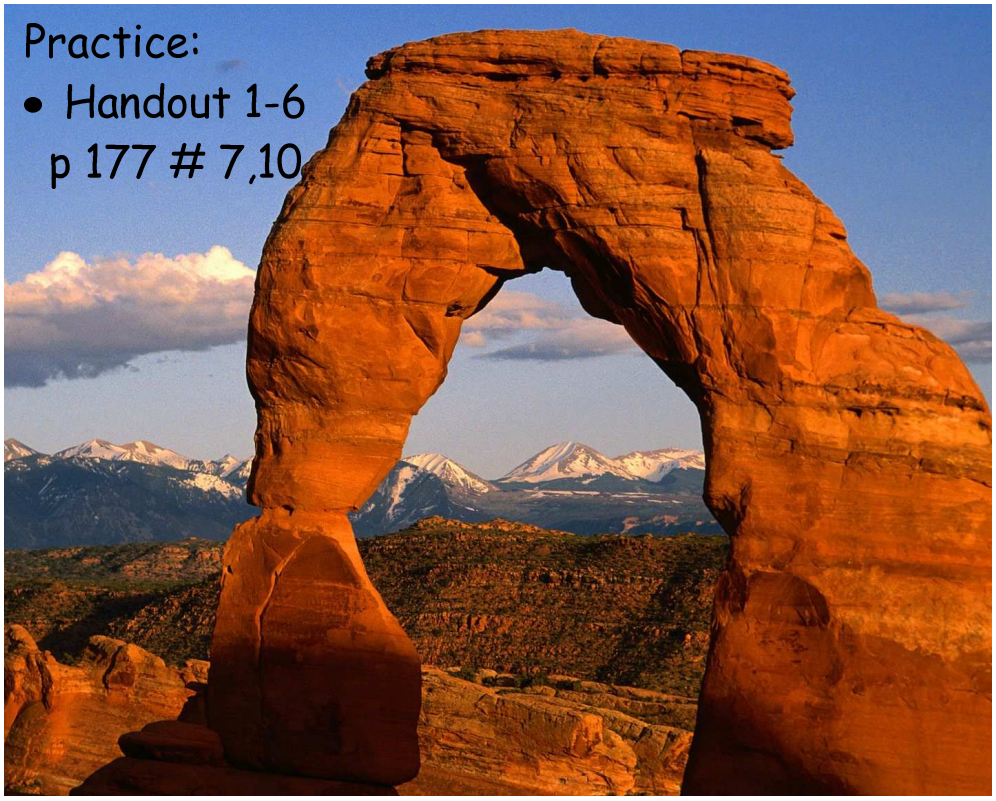


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