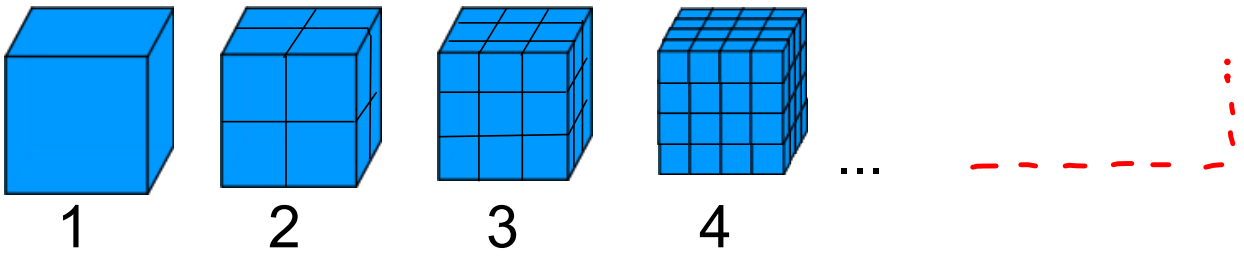
Example 1: The Surface Area of a Cube



1. Complete the table for cubes with side lengths from 1 cm to 6 cm.

Side Length (cm)	Surface Area (cm^2)
1	6
2	24
3	54
4	96
5	150
6	216

2. Use Desmos to determine a quadratic equation for the surface area with respect to side length.

$a = 6$
$h = 0$
$k = \frac{-6.974 \times 10^{-15}}{0}$

$y = a(x-h)^2 + k$
$y = 6(x-0)^2 + 0$

3. Use the equation from #2 to calculate the surface area for a cube of length 22 cm.

$y = 6(x)^2$
$y = 6(22)^2$
$y = 6(484)$
$y = 2904\ cm^2$

Example 2: Interpret the graph of a Quadratic Equation

The path of a ball that was thrown in the air is modelled by the graph below. The y-values represent the height of the ball in metres and the x-values represent the horizontal distance in metres that the ball has travelled.

(a) What was the maximum height that the ball reached?

9 m

(b) How far had the ball travelled horizontally to reach this maximum height?

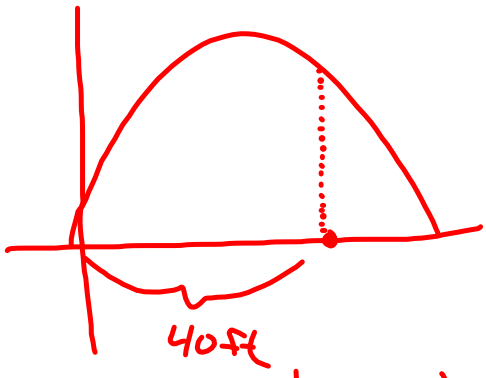
10 m

(c) What horizontal distance did the ball travel before it hit the ground?

21 m

Example 3: Find the height of a support post

The arched support of a bridge can be modelled by the quadratic relation $y=-0.024x^2+2.4x$, where y represents the height in feet, and x represents the horizontal distance in feet. A vertical support post is to be installed 40 feet from the base of the arch. How tall should the support post be?



$x = 40$

Method 1: Use the Equation

$y = -0.024x^2 + 2.4x$

$y = -0.024(40)^2 + 2.4(40)$

$y = -0.024(1600) + 96$

$y = -38.4 + 96$

$y = 57.6$

∴ the height of the post should be 57.6 ft

Method 2: Use the Graph.

Enter the equation into Desmos.....