

49. Express the area of an equilateral triangle as a function of the length of a side.

Handwritten work on a whiteboard showing the derivation of the area function for an equilateral triangle.

Let  $x$  = side length  
Let  $h$  = height

Pythagorean Theorem:

$$\left(\frac{x}{2}\right)^2 + h^2 = x^2$$

$$\frac{x^2}{4} + h^2 = x^2$$

$$h^2 = x^2 - \frac{x^2}{4}$$

$$\sqrt{h^2} = \sqrt{\frac{3x^2}{4}}$$

$$h = \frac{\sqrt{3}}{2}x$$

Area formulas:

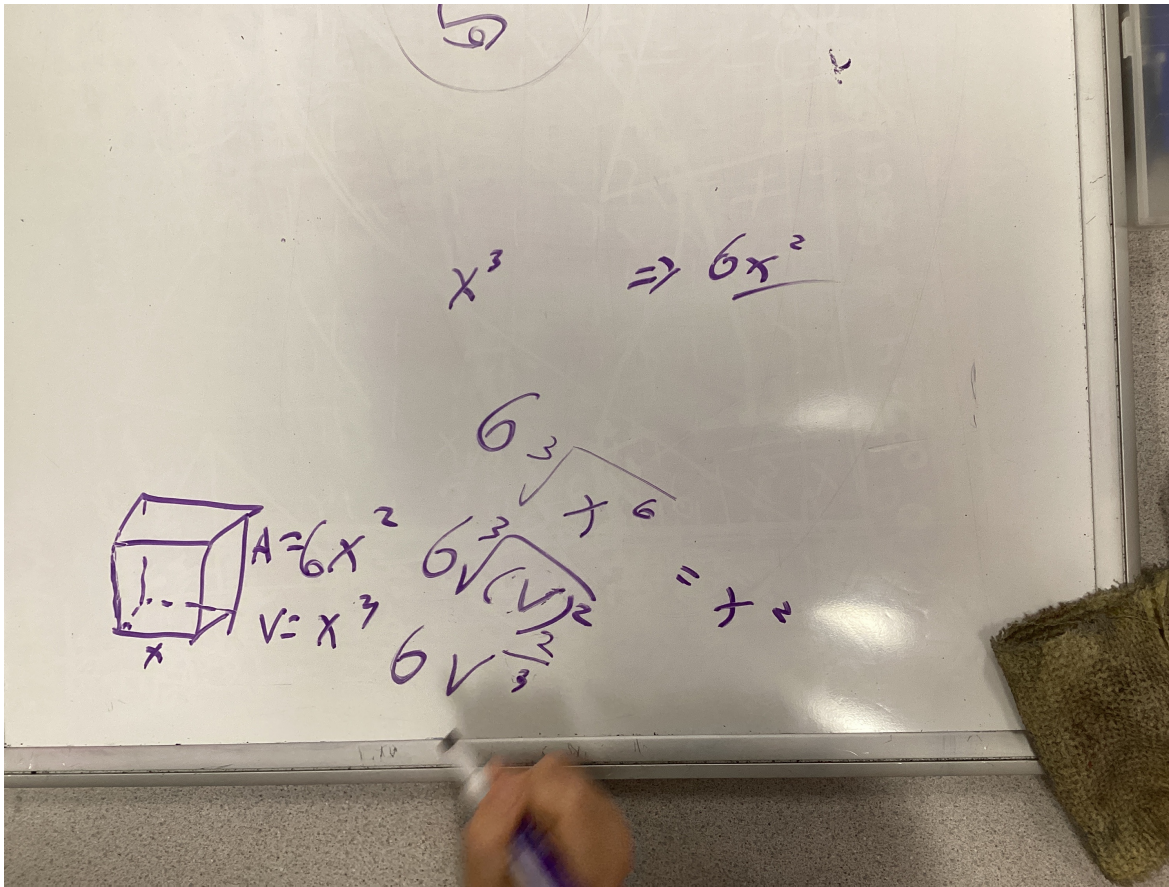
$$A = \frac{1}{2}xh$$

$$A = \frac{1}{2}x\left(\frac{\sqrt{3}}{2}x\right)$$

$$A(x) = \frac{\sqrt{3}}{4}x^2$$

Additional handwritten notes:  $-0.5$ ,  $+0.7$ ,  $+9/0$ ,  $3^2 = 3^2$ , and a diagram of a circle with a shaded sector.

50. Express the surface area of a cube as a function of its volume.





54. A taxi company charges two dollars for the first mile (or part of a mile) and 20 cents for each succeeding tenth of a mile (or part). Express the cost  $C$  (in dollars) of a ride as a function of the distance  $x$  traveled (in miles) for  $0 < x < 2$ , and sketch the graph of this function.

