Functions and Formulas

Example 1: A square wooden board has a circular hole cut out of it.

a) Create a formula for the area of the remaining wood.

Let w be the width of the square; let r be the radius of the circle.

$A = w^2 - \pi r^2$

b) Determine the area of the board if $w = 10$ and $r = 2$.

$A = 10^2 - \pi(2)^2$

$A = 100 - 4\pi$

$A \approx 87.4$

c) Determine the radius of the hole if the $w = 12$ and the area of the board is 50.

$50 = 12^2 - \pi r^2$

$50 = 144 - \pi r^2$

$-94 = -\pi r^2$

$\frac{-94}{-\pi} = r^2$

$\sqrt{29.92} \approx r$

$5.47 \approx r$

Example 2: The formula for the surface area of a square based pyramid is $A = b^2 + 2bs$.

a) If b is held constant at 4 units, what kind of function is A?

$A = 4^2 + 2(4)s$

$A = 16 + 8s$

This is a linear function.

b) If s is held constant at 8 units, what kind of function is A?

$A = b^2 + 2b(8)$

$A = b^2 + 16b$

This is a quadratic function.

c) Solve both (a) and (b) if the surface area is 132 units².

$132 = 16 + 8s$

$116 = 8s$

$14.5 = s$

The slant height is 14.5

$132 = b^2 + 16b$

$0 = b^2 + 16b - 132$

$0 = (b + 22)(b - 6)$

$b = -22, 6$

The base width is 6.

Practice: pg. 121 #1-7, 10