

## Evaluating Functions

**Evaluating a function at a value**, just replace  $x$  with the given value wherever the  $x$  occurs in the equation. I recommend using parentheses around the value being inserted so that it is easier to remember all the operations needed to be performed.

### Example 1:

$f(x) = 3x + 7$  evaluate at  $x = 2$

$$f(2) = 3(2) + 7 \quad \text{Plug in, then multiply}$$

$$f(2) = 6 + 7 \quad \text{Add}$$

$$f(2) = 13$$

### Example 2:

$f(x) = 4x^3 + 2x^2 - 1$  evaluate at  $x = 3$

$$f(3) = 4(3)^3 + 2(3)^2 - 1 \quad \text{Plug in, Follow the Order of Operations!}$$

$$f(3) = 4 \cdot 27 + 2 \cdot 9 - 1$$

$$f(3) = 108 + 18 - 1$$

$$f(3) = 125$$

### Example 3:

$f(x) = x^2 - 2$  evaluate at  $x = h + 3$

$f(h + 3) = (h + 3)^2 - 2$ , remember  $x^2$  means  $x \cdot x$ , so  $(h + 3)^2$  means  $(h + 3) \cdot (h + 3)$  (more detail on this in the Polynomial Multiplication area.

$$f(h + 3) = (h + 3)^2 - 2 \quad \text{Plug in}$$

$$f(h + 3) = (h + 3) \cdot (h + 3) - 2 \quad \text{Distribute/Rules for Multiplying Polynomials}$$

$$f(h + 3) = h(h + 3) + 3(h + 3) - 2 \quad \text{Distribute!}$$

$$f(h + 3) = h^2 + 3h + 3h + 9 - 2 \quad \text{Simplify!}$$

$$f(h + 3) = h^2 + 6h + 7$$