

2.1/2.2E Evaluating Functions with Variable Inputs

A. General Rule

To evaluate $f(\text{junk})$: plug "junk" into the output formula $f(x)$
wherever you see x
(on the inside)

B. Examples

Let $f(x) = 3x^2 + x + 2$

Find:

Example: Find $f(y+1)$ and simplify

Solution

Plug " $y+1$ " into " x " in $f(x) = 3x^2 + x + 2$

$$f(y+1) = 3(y+1)^2 + (y+1) + 2$$

$$= 3(y^2 + 2y + 1) + y + 1 + 2$$

$$= 3y^2 + 6y + 3 + y + 1 + 2$$

$$= \boxed{3y^2 + 7y + 6}$$

Ans

Example 2: Find $f(2x+3)$ and simplify

Solution

Plug " $2x+3$ " into " x " (inside) in $f(x) = 3x^2 + x + 2$

$$f(2x+3) = 3[2x+3]^2 + [2x+3] + 2$$

$$= 3(4x^2 + 12x + 9) + 2x + 3 + 2$$

$$= 12x^2 + 36x + 27 + 2x + 5$$

$$= \boxed{12x^2 + 38x + 32} \quad \underline{\text{Ans}}$$

Example 3: Find $f(x+h)$ and simplify

Solution

Plug " $x+h$ " into " x " (inside) in $f(x) = 3x^2 + x + 2$

$$f(x+h) = 3[x+h]^2 + [x+h] + 2$$

$$= 3(x^2 + 2xh + h^2) + x + h + 2$$

$$= \boxed{3x^2 + 6xh + 3h^2 + x + h + 2}$$

Ans