1 *Let f be the function such that*

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

for every possible real number x. Evaluate or simplify the following. (Show at least one intermediate step for each.)

a $f(1)$

I replace x with -1 (in parentheses) and evaluate:

$$f(x) = 3x^2 + 2x - 4;$$
$$f(-1) = 3(-1)^2 + 2(-1) - 4 = -3.$$

b $f(2x)$

I replace x with $2x$ (in parentheses) and simplify:

$$f(x) = 3x^2 + 2x - 4;$$
$$f(2x) = 3(2x)^2 + 2(2x) - 4 = 12x^2 + 4x - 4.$$

2 **Extra credit.** *Let g be the function such that*

$$g(x) = \frac{x}{x^2 - 16}$$

for every possible real number x. What is the domain of g? (Show at least one intermediate step.)

I can't divide by zero, so

$$x^2 - 16 \neq 0,$$
$$x^2 \neq 16,$$
$$x \neq \pm 4.$$

Therefore, the domain is

$$\{x \mid x \neq 4,\ x \neq -4\} = (-\infty, -4) \cup (-4, 4) \cup (4, \infty).$$

3 *Let f be the function whose graph is shown in Exercise 3.2.9 of the textbook.*

a *What is $f(11)$?*

Since $(11, 1)$ is on the graph,

$$f(11) = 1.$$

b *Solve the equation $f(x) = 3$.*

Since $(0, 3)$ and $(4, 3)$ are on the graph but no other example of $(x, 3)$ is on the graph,

$$x = 0 \text{ or } x = 4.$$