

Given  $f(x) = x^2 - 3$  and  $g(x) = x - 5$ , find each of the following:

6)  $f(g(x)) \quad (x-5)^2 - 3 \rightarrow x^2 - 5x - 5x + 25 - 3$   
 $x^2 - 10x + 22$

7)  $g(f(x)) \quad x^2 - 3 - 5$   
 $x^2 - 8$

8)  $f(x) + g(x) \quad x^2 - 3 + x - 5$   
 $x^2 + x - 8$

9)  $f(x) - g(x) \quad x^2 - 3 - (x - 5)$   
 $x^2 - x + 2$

10)  $g(x) \cdot f(x) \quad (x^2 - 3)(x - 5) \rightarrow x^3 - 5x^2 - 3x + 15$

11)  $f(g(4)) \quad g(4) = 4 - 5 = -1$   
 $f(-1) = (-1)^2 - 3$   
 $= -2$

12)  $g(f(4)) \quad f(4) = 4^2 - 3 = 13$   
 $g(13) = 13 - 5 = 8$

13)  $\frac{f(x)}{g(x)} \quad \frac{x^2 - 3}{x - 5}$

Domain:  $\mathbb{R}$  except 5

14) You have a coupon for 15% off of an iPod. When you arrive at the store you see that the iPods are \$40 off. Let  $x$  represent the original cost of the iPod.

A. Represent the cost  $f(x)$  of the iPod if you use the 15% coupon then the \$40 off.

$15\% = x - .15x = .85x$   
 $\$40 = x - 40$   
 $f(x) = .85x - 40$

B. Represent the cost  $g(x)$  of the iPod if you take the \$40 off first then the 15% off coupon.

$g(x) = .85(x - 40)$   
 $g(x) = .85x - 34$

C. Which method is a better deal for the customer?

%. off first