**QUESTION №18**

Assume $f(x) = -2x + 8$ and $g(x) = 3x$, what is the value of $(gof)(3)$ ?

$$A: \quad 6$$

$$B: \quad x + 8$$

$$C: \quad -10$$

$$D: \quad 23$$

**SOLUTION**

$$(gof)(x) = g\left(f(x)\right) = g(-2x + 8) = 3(-2x + 8) = -6x + 24$$

$$(gof)(3) = (-6x + 24)\big|_{x=3} = 24 - 6 * 3 = 24 - 18 = 6$$

**ANSWER**

$$(gof)(3) = 6$$

**A:6**

**QUESTION №20**

Let $h(x) = (gof)(x) = \dfrac{x^2}{x^2 + 1}$

Which of the following could be a possible decomposition of $h(x)$?

$$A: \quad f(x) = x^2;\ g(x) = \frac{x}{x + 1}$$

$$B: \quad f(x) = x + 1;\ g(x) = x^2$$

$$C: \quad f(x) = x + 1;\ g(x) = \frac{1}{x^2}$$

$$D: \quad f(x) = x;\ g(x) = \frac{x}{x + 1}$$

**SOLUTION**

$$h(x) = (gof)(x) = g\left(f(x)\right) = \frac{x^2}{x^2 + 1}$$

Iterate through all the options one by one

$$A: \quad f(x) = x^2;\ g(x) = \frac{x}{x + 1}$$

$$h(x) = g(f(x)) = g(x^2) = \frac{x^2}{x^2 + 1}$$

$$B: \quad f(x) = x + 1;\ g(x) = x^2$$

$$h(x) = g(f(x)) = g(x + 1) = (x + 1)^2$$

$$C: \quad f(x) = x + 1;\ g(x) = \frac{1}{x^2}$$

$$h(x) = g(f(x)) = g(x + 1) = \frac{1}{(x + 1)^2}$$

$$D: \quad f(x) = x;\ g(x) = \frac{x}{x + 1}$$

$$h(x) = g(f(x)) = g(x) = \frac{x}{x + 1}$$

**ANSWER**

$$A: \quad f(x) = x^2;\ g(x) = \frac{x}{x + 1}$$