Topic: Sum of functions

Question: Find $(g + h)(4)$.

$$g(x) = x^2 - 3x + 1$$

$$h(x) = x + 3$$

Answer choices:

A $(g + h)(4) = 6$

B $(g + h)(4) = 8$

C $(g + h)(4) = 10$

D $(g + h)(4) = 12$

Solution: D

We need to evaluate each of the functions at $x = 4$, and then add the results. For $g(4)$, we get

$$g(x) = x^2 - 3x + 1$$

$$g(4) = (4)^2 - 3(4) + 1$$

$$g(4) = 16 - 12 + 1$$

$$g(4) = 4 + 1$$

$$g(4) = 5$$

And for $h(4)$, we get

$$h(x) = x + 3$$

$$h(4) = 4 + 3$$

$$h(4) = 7$$

Now we can add the result to find $(g + h)(4)$.

$$(g + h)(4) = g(4) + h(4)$$

$$(g + h)(4) = 5 + 7$$

$$(g + h)(4) = 12$$

We could also have added the expressions for the functions, and then plugged in $x = 4$ to get the answer.

$$(g+h)(x) = (x^2 - 3x + 1) + (x + 3)$$

$$(g+h)(x) = x^2 - 3x + 1 + x + 3$$

$$(g+h)(x) = x^2 - 2x + 4$$

$$(g+h)(4) = 4^2 - 2(4) + 4$$

$$(g+h)(4) = 16 - 8 + 4$$

$$(g+h)(4) = 8 + 4$$

$$(g+h)(4) = 12$$

Topic: Sum of functions

Question: Find $(f+g)(4)$.

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

$$g(x) = -x + 2$$

Answer choices:

A $(f+g)(4) = 26$

B $(f+g)(4) = 30$

C $(f+g)(4) = 34$

D $(f+g)(4) = 38$

Solution: B

We know that

$$(f+g)(x) = f(x) + g(x)$$

Substituting the given expression for each function gives

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

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

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

Substituting $x = 4$ gives

$$(f+g)(4) = 4^2 + 3(4) + 2$$

$$(f+g)(4) = 16 + 12 + 2$$

$$(f+g)(4) = 28 + 2$$

$$(f+g)(4) = 30$$

Topic: Sum of functions

Question: Find $(h+j)(3)$.

$$h(x) = (x-3)^2$$

$$j(x) = \sqrt{x^2+16}$$

Answer choices:

A $(h+j)(3) = 5$

B $(h+j)(3) = 18$

C $(h+j)(3) = 31$

D $(h+j)(3) = 36$

Solution: A

We know that

$$(h+j)(x) = h(x) + j(x)$$

Substituting the given expression for each function gives

$$(h+j)(x) = (x-3)^2 + \sqrt{x^2+16}$$

$$(h+j)(x) = x^2 - 3x - 3x + 9 + \sqrt{x^2+16}$$

$$(h+j)(x) = x^2 - 6x + 9 + \sqrt{x^2+16}$$

Substitute $x = 3$.

$$(h+j)(3) = 3^2 - 6(3) + 9 + \sqrt{3^2+16}$$

$$(h+j)(3) = 9 - 18 + 9 + \sqrt{9+16}$$

$$(h+j)(3) = 0 + \sqrt{25}$$

$$(h+j)(3) = 5$$