Find Value of Operations and Get Domain and Range

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

① Domain: I can input any x values for this function. There are no restrictions. $(-\infty, \infty)$

$g(x) = x + 1$

Domain: I can input any x values for this function. There are no restrictions. $(-\infty, \infty)$

② $(f+g)(x)$

$(x^2 + 3x + 2) + (x + 1)$

$x^2 + 3x + 2 + x + 1$

$x^2 + 3x + x + 2 + 1$

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

③ Get Range

$y = x^2 + 4x + 3$ (a, b, c)

$x = -\frac{b}{2a}$ — $a = 1$, $b = 4$

$x = -\left(\frac{4}{2(1)}\right) = -\left(\frac{4}{2}\right) = -2$

$y = (-2)^2 + 4(-2) + 3$

$4 + (-8) + 3$

$-4 + 3$

-1

Range: $[-1, \infty)$

Domain: $(-\infty, \infty)$ Range: $[-1, \infty)$

for

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

$f = \{(0,1), (1,2), (2,3), (3,4)\}$

$g = \{(-1,1), (0,2), (1,3), (2,4)\}$

Find domain and range of f/g

Domain of f/g $f \cap g$

$\{0, 1, 2\}$

$$\frac{f}{g}(x) = \frac{f(x)}{g(x)}$$

$$\frac{f}{g}(0) = \frac{f(0)}{g(0)} = \frac{1}{2}, \quad (0, 1/2)$$

$$\frac{f}{g}(1) = \frac{f(1)}{g(1)} = \frac{2}{3}, \quad (1, 2/3)$$

$$\frac{f}{g}(2) = \frac{f(2)}{g(2)} = \frac{3}{4}, \quad (2, 3/4)$$

Domain $\{0, 1, 2\}$

Range $\{1/2, 2/3, 3/4\}$

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

$g(x) = x + 1$

$(f \cdot g)(x)$

Domain of f and g is $(-\infty, \infty)$

$y = mx + b$

$g(x) = x + 1$

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

$\downarrow$

$x^2 + 3x + 2 - x - 1$

$\downarrow$

$x^2 + 3x - x + 2 - 1$

$\downarrow$

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

Range : $\overset{a}{x^2} + \overset{b}{2}x + \overset{c}{1}$

$x = -\frac{b}{2a} = -\left(\frac{2}{2(1)}\right) = -\left(\frac{2}{2}\right) = -1$

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

$1 - 2 + 1$

$-1 + 1$

$y = 0$

Range of $(f-g)(x) = x^2 + 2x + 1$

$[0, \infty)$

$(f \cdot g)(x)$

$(x^2 + 3x + 2)(x + 1)$

$\downarrow$

$x^3 + 3x^2 + 2x + x^2 + 3x + 2$

$\downarrow$

$x^3 + 3x^2 + x^2 + 2x + 3x + 2$

$\downarrow$

$x^3 + 4x^2 + 5x + 2$

Domain for f and g : $(-\infty, \infty)$

I don't know too much of $y = x^3$ yet but telling by the graph the range is $(-\infty, \infty)$.

$f(x) = x^2 + 3x + 2$ $\quad$ $g(x) = x + 1$

Domain have no restrictions $(-\infty, \infty)$

$$\frac{f}{g}(x) = \frac{f(x)}{g(x)} = \frac{x^2 + 3x + 2}{x + 1}$$

We can't divide by 0 here.

$x + 1 = 0$

$-1 \quad -1$

$x = -1$

$$= \frac{(x+1)(x+2)}{x+1}$$

Domain: $(-\infty, -1) \cup (-1, \infty)$

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

$=$

Get Range

$y = x + 2$

No restrictions

Range: $(-\infty, \infty)$