Sum, Difference, Product, Quotient of Functions

For two functions f and g, the sum, difference, product, and quotient of functions

$f+g,\ f-g,\ f\bullet g,$ and $\frac{f}{g}$ are defined as follows:

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

$$(f-g)(x)=f(x)-g(x)$$

$$(f\bullet g)(x)=f(x)\bullet g(x)$$

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

Examples:

$f(x)=3\sqrt{x}-2$ and $g(x)=x^2+5$ All examples below use x = 4.

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1) Find $f+g$

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

$$(f+g)(x)=3\sqrt{x}-2+x^2+5$$

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

$$(f+g)(4)=3\sqrt{4}-2+4^2+5$$

$$(f+g)(4)=6-2+16+5=25$$

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2) Find $f-g$

$$(f-g)(x)=f(x)-g(x)$$

$$(f-g)(x)=3\sqrt{x}-2-(x^2+5)$$

2) $(f-g)(4)=f(4)-g(4)$

$$(f-g)(4)=3\sqrt{4}-2-(4^2+5)$$

$$(f-g)(4)=6-2-16-5=-17$$

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3) Find $f\bullet g$

$$(f\bullet g)(x)=f(x)\bullet g(x)$$

$$(f\bullet g)(x)=(3\sqrt{x}-2)\bullet(x^2+5)$$

3) $(f\bullet g)(4)=f(4)\bullet g(4)$

$$(f\bullet g)(4)=(3\sqrt{4}-2)\bullet(4^2+5)$$

$$(f\bullet g)(4)=(6-2)\bullet(16+5)=4(21)=84$$

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4) Find $\frac{f}{g}$

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

$$\left(\frac{f}{g}\right)(x)=\frac{(3\sqrt{x}-2)}{(x^2+5)}$$

4) $\left(\frac{f}{g}\right)(4)=\frac{(3\sqrt{4}-2)}{(4^2+5)}$

$$\left(\frac{f}{g}\right)(4)=\frac{(6-2)}{(16+5)}=\frac{4}{21}$$