

Chapter 10 Function Operations

10.1/10.2 Sum and Differences of Functions
Product and Quotients of Functions

Just as we can add, subtract, multiply and divide numbers, so too, functions can be combined using the same operations.

Ex.1 If $f(x) = 3x - 2$ and $g(x) = x^2$, find the following :

a) $f(5) + g(2)$

$$= [3(5) - 2] + [(2)^2]$$

$$= 13 + 4$$

$$= 17$$

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

$$= [(-4)^2] - [3(-2) - 2]$$
$$= 16 - [-8] = 24$$

$$c) f(3) \cdot g(10)$$

$$= [3(3) - 2] \cdot [(10)^2]$$
$$= [7] [100]$$
$$= 700$$

$$d) \frac{f\left(\frac{1}{2}\right)}{g\left(\frac{1}{2}\right)} = \frac{3\left(\frac{1}{2}\right) - 2}{\left(\frac{1}{2}\right)^2}$$

$$= \frac{\frac{3}{2} - \frac{4}{2}}{\left(\frac{1}{4}\right)} = \frac{\left(-\frac{1}{2}\right)}{\left(\frac{1}{4}\right)} = -2$$

$$e) f(x) + g(x)$$

$$= 3x - 2 + x^2$$

$$= x^2 + 3x - 2$$

$$f) f(x) \cdot g(x)$$

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

$$3x^3 - 2x^2$$

$$\begin{aligned} g) \frac{2f(3)}{3g(4)} &= \frac{2(3(3)-2)}{3(4)^2} \\ &= \frac{2(7)}{3(16)} = \frac{14}{48} = \frac{7}{24} \end{aligned}$$

Application of Function Operations

Math Kangaroo is an international mathematics competition that is held in over 40 countries, including Canada. Suppose the cost of preparing booklets for the Canadian version of the contest includes \$675 in fixed costs and \$3.50 per booklet. The booklets are sold for \$30 each.

Write an equation to represent

- the total cost, C , as a function of the number, n , of booklets produced
- the revenue, R , as a function of the number, n , of booklets sold
- the profit, P , the difference between revenue and total cost

How many booklets do they have to sell to break even?

How many booklets must they sell to make a profit of \$2505?

let $n = \#$ books

$$C(n) = 675 + 3.50n$$

$$R(n) = 30n$$

$$P(n) = R(n) - C(n)$$

$$P(n) = 30n - (675 + 3.50n)$$

$$P(n) = 30n - 675 - 3.50n$$

$$P(n) = 26.5n - 675$$

To break even means $P(n) = 0$

$$0 = 26.5n - 675$$

$$675 = 26.5n$$

$$25.47 = n$$

$$26 = n$$

$$P(n) = 26.5n - 675$$

$$2505 = 26.5n - 675$$

$$3180 = 26.5n$$

$$120 = n$$

Assignment

Handout #'s 1 a-h, 3 a-d

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#'s 13 a,d,c,e (do in this order!)