**Activity 1.4.1 Putting Functions Together Part Two**

In the previous activity you found the functions f + g, f – g, fg, and f ÷ g and found some relationships between the graphs of the original functions and the graphs of the sum, difference, product, and quotient of the functions. In investigation 3 you examined even and odd function behavior.

We will now look at the relationship when the two functions are both even or both odd or one is even and one is odd.

1. Given pairs of functions f(x) and g(x) symbolically find the functions f + g, f – g, fg, and f ÷ g. For each of the new functions you may sketch a graph of the new function, using technology as needed, or use your algebraic test developed in activity 1.3.5 to decide whether the sum, difference, product and quotient is even, odd or neither.

|  |  |  |
| --- | --- | --- |
| a.  Even, Odd or Neitherf(x) is \_\_\_\_\_\_g(x) is \_\_ \_\_$\left(f+g\right)\left(x\right)$ is \_\_\_\_\_\_$\left(f-g\right)\left(x\right)$ is \_\_\_\_\_\_$\left(fg\right)\left(x\right)$ is \_\_\_\_\_\_\_$\left(\frac{f}{g}\right)(x)$ is \_\_\_\_\_\_\_ |  | [image] |
| b. Even, Odd or Neither*f(x)* is \_\_\_\_*g(x)* is \_\_\_\_\_$\left(f+g\right)\left(x\right)$ is \_\_\_\_\_\_$\left(f-g\right)\left(x\right)$ is \_\_\_\_\_\_$\left(fg\right)\left(x\right)$ is \_\_\_\_\_\_\_\_\_$\left(\frac{f}{g}\right)(x)$ is \_\_\_\_\_\_\_ |  | [image] |
| ***c.*** Even, Odd or Neither*f(x)* is**\_\_**\_\_\_\_\_*g(x)* is **\_\_\_\_\_\_\_**$\left(f+g\right)\left(x\right)$is *\_\_\_\_\_\_* $\left(f-g\right)\left(x\right)$is\_\_\_\_\_\_$\left(fg\right)\left(x\right)$is *\_\_\_\_\_\_\_*$\left(\frac{f}{g}\right)(x)$is *\_\_\_\_\_\_\_* |  | [image] |
| d.  Even, Odd or Neitherf(x) is \_\_\_\_g(x) is \_\_\_\_\_$\left(f+g\right)\left(x\right)$is *\_\_\_\_\_* $\left(f-g\right)\left(x\right)$is \_\_\_\_\_\_$\left(fg\right)\left(x\right)$is *\_\_\_\_\_\_*$\left(\frac{f}{g}\right)(x)$is \_\_\_\_\_\_\_ |  | [image] |
| e.  Even, Odd or Neitherf(x) is \_\_\_\_\_g(x) is \_\_\_\_$\left(f+g\right)\left(x\right)$ is \_\_\_\_$\left(f-g\right)\left(x\right)$ is \_\_\_\_$\left(fg\right)\left(x\right)$ is \_\_\_\_\_\_$\left(\frac{f}{g}\right)(x)$ is \_\_\_\_\_\_ |  | [image] |
| f.  Even, Odd or Neitherf(x) is \_\_\_\_\_g(x) is \_\_\_\_$\left(f+g\right)\left(x\right)$ is \_\_\_\_\_\_ $\left(f-g\right)\left(x\right)$ is \_\_\_\_\_\_$\left(fg\right)\left(x\right)$ is \_\_\_\_\_\_$\left(\frac{f}{g}\right)(x)$ is \_\_\_\_\_\_ |  | [image] |
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|  |  |  |

Since subtraction is adding the opposite and division is multiplying by the reciprocal we will only use the words Sum and Product but keep in mind we are also relating this to subtraction and division examples.

2. Answer the following with **Even, Odd or Neither**:

a. The sum of two even functions is \_\_\_\_ \_\_\_\_

b. The product of two even functions is \_\_\_ \_\_\_

c. The sum of two odd functions is \_\_\_\_ \_\_\_\_\_\_

d. The product of two odd functions is \_\_\_\_\_\_

e. The sum of an odd and an even function is \_\_\_\_\_

f. The product of an odd and an even function is \_\_\_\_\_

3. Given the following functions, tell which function is Even: \_\_\_\_\_\_\_

 $f\left(x\right)= 2x^{2}-3 g\left(x\right)= -3x^{4}-x^{2}-1 h\left(x\right)=3x^{3}-2x$

 a) $(fh)(x)$ b)$ (fg)(x) + h(x)$ c) $(fg)(x)$ d) $(gh)(x)$

4. Given the following functions, tell which function is Odd: \_\_\_\_\_\_\_\_

 $f\left(x\right)= 2x^{2}-3 g\left(x\right)= -3x^{4}-x^{2}-1 h\left(x\right)=3x^{3}-2x$

 a) $\left(gh\right)\left(x\right)+f(x)$ b)$ (fg)(x) + h(x)$ c) $(fg)(x)$ d) $\left(gh\right)\left(x\right)+h(x)$

5. Find the Profit *P(x)* from selling x items if the item has a cost, in dollars

 $C\left(x\right)= 0.2x^{2}+6x+300$, and revenue$ R\left(x\right)=5.50x$.

Profit = Revenue – Cost

6. Find the revenue R, in dollars, if the profit P, from selling x items is modeled by the function

 $P\left(x\right)= -x^{2}+230x-2200$ and the cost of manufacturing x items is$ C\left(x\right)= 60x+2200.$

7. A farmer has a pig that weighs 200 pounds. If the hog gains 4 pounds per week, the equation for its weight, *W(x)*, as a function of *x* weeks can be expressed as *W(x)* = 200 + 4*x.*

 If she takes it to the market now she can sell it for $2.50 a pound. The market price keeps falling 3 cents per pound per week. The equation for the price, *P(x),* as a function of *x* weeks can be modeled by the function *P(x)* = 2.50 - .03*x*. Find the function for the total worth, *T(x)*, of the pig as a function of weeks.