

**Homework 3 Part 1      Foundations      2/27/06**

- ▶ A function  $f: \mathbb{R} \rightarrow \mathbb{R}$  is even iff  $f(-x) = f(x)$  for all  $x \in \mathbb{R}$ .
- ▶ A function  $f: \mathbb{R} \rightarrow \mathbb{R}$  is odd iff  $f(-x) = -f(x)$  for all  $x \in \mathbb{R}$ .

1. The sum of two even functions is \_\_\_\_\_.
2. The sum of two odd functions is \_\_\_\_\_.
3. The sum of an even function with an odd function is \_\_\_\_\_.
4. The product of two even functions is \_\_\_\_\_.
5. The product of two odd functions is \_\_\_\_\_.
6. The product of an even function with an odd function is \_\_\_\_\_.
7. The composition of two even functions is \_\_\_\_\_.
8. The composition of two odd functions is \_\_\_\_\_.
9. The composition of an even function with an odd function is \_\_\_\_\_.
10. The derivative of an even function is \_\_\_\_\_.
11. The derivative of an odd function is \_\_\_\_\_.

**Homework 3 Part 2      Foundations      2/27/06**

- ▶ A function  $f: \mathbb{R} \rightarrow \mathbb{R}$  is increasing iff whenever  $x > y$ ,  $f(x) > f(y)$ .
- ▶ A function  $f: \mathbb{R} \rightarrow \mathbb{R}$  is decreasing iff whenever  $x > y$ ,  $f(x) < f(y)$ .

12. The sum of two increasing functions is \_\_\_\_\_.
13. The sum of two decreasing functions is \_\_\_\_\_.
14. The sum of an increasing function with a decreasing function is \_\_\_\_\_.
15. The product of two increasing functions is \_\_\_\_\_.
16. The product of two decreasing functions is \_\_\_\_\_.
17. The product of an increasing function with a decreasing function is \_\_\_\_\_.
18. The composition of two increasing functions is \_\_\_\_\_.
19. The composition of two decreasing functions is \_\_\_\_\_.
20. The composition of an increasing function with a decreasing function is \_\_\_\_\_.
21. The derivative of a decreasing function is \_\_\_\_\_.
22. The derivative of an increasing function is \_\_\_\_\_.