

Homework 4 Foundations 2/18/09

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

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