

ANSWER SHEET

1. Evaluate the difference quotient $\frac{f(x+h)-f(x)}{h}$ for the function $f(x) = 5x^2$.

Answer: The only really common mistake was not realizing what $f(x+h)$ is. The function f takes whatever we apply it to, squares it, and multiplies it by 2, so

$$f(x+h) = 5(x+h)^2 = 5(x^2 + 2xh + h^2) = 5x^2 + 10xh + 5h^2.$$

Now we have

$$\begin{aligned}\frac{f(x+h) - f(x)}{h} &= \frac{(5x^2 + 10xh + 5h^2) - (5x^2)}{h} \\ &= \frac{10xh + 5h^2}{h} \\ &= 10x + 5h.\end{aligned}$$

2. Is the function $|x + x^3|$ even, odd, or neither?

Answer: Remember that $f(x)$ is even if $f(-x) = f(x)$ for all x , and odd if $f(-x) = -f(x)$. *The only connection between this notion and even/odd numbers is that x^n is an even function if n is even and odd if n is odd.*

So, if you are asked if a function is even or odd, you plug in $-x$. In this case we have

$$\begin{aligned}|(-x) + (-x)^3| &= |-x - x^3| \\ &= |-(x + x^3)| \\ &= |x + x^3|,\end{aligned}$$

so the function we were given is even.