Funsheet 1 **Calc 1** **10/13/22**

Each problem is worth 0 points... this time...

1. Use the following table of values for $f(x)$ and $g(x)$ to find values for the following:

x	1	2	3	4	5	6
$f(x)$	6	3	5	1	4	2
$g(x)$	2	1	6	3	5	4
$f'(x)$	2	4	1	5	7	8
$g'(x)$	5	9	7	11	2	12

   (a) If $h(x) = f(x) \cdot g(x)$, what is $h'(1)$ and why?

   (b) If $h(x) = \frac{f(x)}{g(x)}$, what is $h'(2)$ and why?

   (c) If $h(x) = f(g(x))$, what is $h'(3)$ and why?

   (d) If $h(x) = (g(x))^2$, what is $h'(4)$ and why?

   (e) If $h(x) = f(x^2)$, what is $h'(2)$ and why?

2. Each side of a square is increasing at a rate of 6 cm / s. At what rate is the area of the square increasing when the area of the square is 16 cm^3?

3. Use a local linearization for $f(x) = x^4$ at $x = 2$ to approximate $(2.001)^4$.

4. Use a local linearization for $f(x) = x^4$ at $x = 2$ to approximate $(2.002)^4$.

5. Use a local linearization for $f(x) = x^4$ at $x = 2$ to approximate $(2.003)^4$.

6. Use a local linearization for $f(x) = x^4$ at $x = 2$ to approximate $(2.004)^4$.

7. Use a local linearization for $f(x) = x^4$ at $x = 2$ to approximate $(2.005)^4$.

8. How accurate is each of your approximations? Is there a pattern?

9. Find an equation for the line tangent to $y = \sqrt[5]{x}$ at the point (0,0).

10. Find equations of the lines tangent to $x + y = (x - y)^2$ at the points $(0, 1)$ and $(1, 0)$.

11. Find equations of the lines tangent to $x + y = (x - y)^2$ at the points $(3, 1)$ and $(1, 3)$. Is there a pattern?