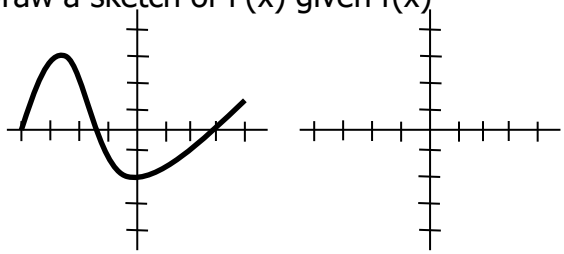
Name:_____

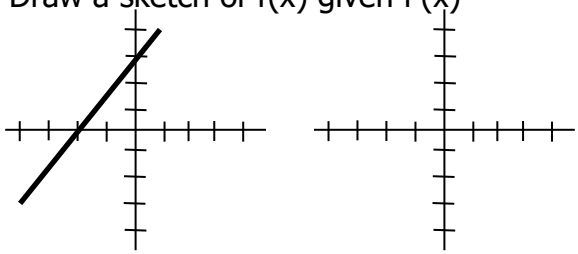
Derivative Review

1. What's the difference between average rate of change and instantaneous rate of change?

2. Draw a sketch of f'(x) given f(x)



3. Draw a sketch of f(x) given f'(x)



4. The position of an object is given by $s = 3t^2 - 4t + 6$. What is the average velocity over the interval [1, 4]?

5. Given the position of a function $F(x) = 2x^3 - 3x^2 + 7$, what is the instantaneous rate of change of F?

6. Given the position of a function $s = t^4 - 2t + 3$, what is the instantaneous rate of change at t=2?

For 7-8, use the formal (limit) definition of the derivative the find the derivative

7. $f(x) = \sqrt{3x - 1}$

8. $f(x) = 3x^2 - 4x$

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9. Find $\lim_{h \to 0} \frac{3(x+h)^3 - 3x^3}{h}$

10. Find $\lim_{h \to 0} \frac{\frac{3}{x+h} - \frac{3}{x}}{h}$

11. Find $\lim_{h \to 0} \frac{\sqrt{16+h} + \sqrt{16}}{h}$

12. Find f′(x) for $f(x)=\frac{3}{x}-8x+1$

13. If $f(x)=\sqrt[3]{x^2}$, find f′(8)

14. For $f(x)=x^4+3x^2-2$ find f′(x), f″(x), f‴(x) and $f^{IV}(x)$

15. Find the equation of the tangent line to $f(x)=2x(x-3)$ at x = 2

16. Find the equation of the tangent line to $f(x)=\sqrt{x-2}$ at x = 6

17. Knowing that f(-3) = 12, f′(-3) = 9, g(-3) = -4, g′(-3) = 7, h(-3) = -2 and h′(-3) = 5, determine

A. $(fg)'(-3)$

B. $(\frac{h}{g})'(-3)$

C. $(\frac{fg}{h})'(-3)$

Find the derivative of the function

18. $f(x)=(2-\sqrt{x})(3x-2x^3)$

19. $f(x)=4x^2\sin x$

20. $f(x)=(1+\sqrt{x^3})(\frac{1}{x^3}-2\sqrt[3]{x})$

21. $g(y)=\frac{y^2-1}{y^2+1}$

22. $h(z)=\frac{(1-4z)(2+z)}{3+9z}$

23. $h(x)=\frac{2x^3}{\cos x}$

24. $f(x)=\frac{2x-\sqrt{x}}{6}$

25. $f(x)=x(\frac{2}{x^3}-\frac{3x}{x-1})$

Find f′(1) for each function

26. $f(x)=(x^2-5x+1)(12+2x-x^3)$

27. $f(x)=\frac{\sqrt[3]{x}}{1+x^2}$