Period 1, Sept 20, 2024

$h(x) = F(x) \cdot g(x)$

$h'(x) = F'(x) \cdot g(x) + F(x) \cdot g'(x)$

$h(x) = a x^n$

$h'(x) = a \cdot n \cdot x^{n-1}$

$$h(x) = \frac{F(x)}{g(x)}$$

$$h'(x) = \frac{F'(x) \cdot g(x) - F(x) \cdot g'(x)}{(g(x))^2}$$

$h(x) = F(x) + g(x)$

$h'(x) = F'(x) + g'(x)$

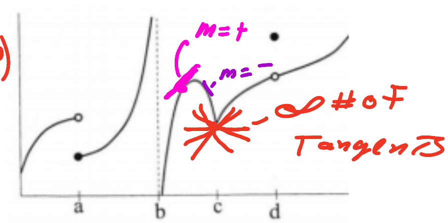
$h(x) = F(x) - g(x)$

$h'(x) = F'(x) - g'(x)$

4. Consider the graph of f given to the right.

a) On what interval is f continuous?

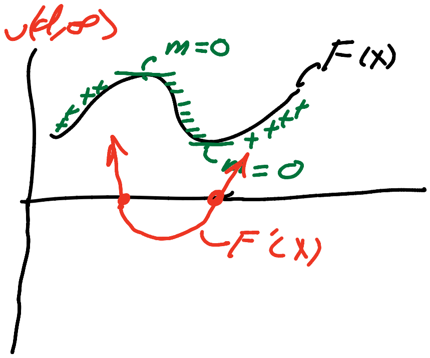
$(0,a) \cup (a,b) \cup (b,d) \cup (d,\infty)$



b) On what interval is f $\underbrace{\text{differentiable}}_{\text{Slope}}$?

$(0,a) \cup (a,b) \cup (b,c) \cup (c,d) \cup (d,\infty)$

F'(x)



5. Use the figure to the right to answer the following questions.

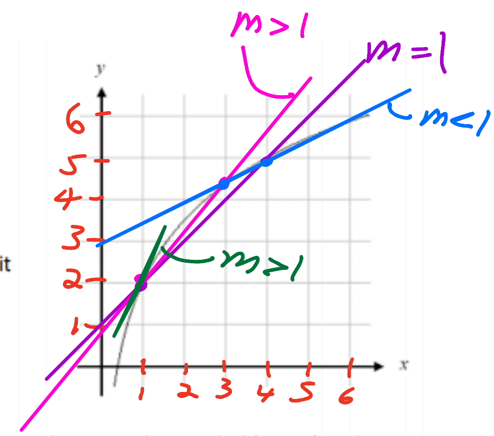
a) Find $f(1)$ and $f(4)$.

$F(1)=2$ $\quad$ $F(4)=5$

b) What is the geometric interpretation of $\frac{f(4)-f(1)}{4-1}$? Draw it on the graph to the right.

Slope

$\frac{5-2}{4-1}=\frac{3}{3}=1$



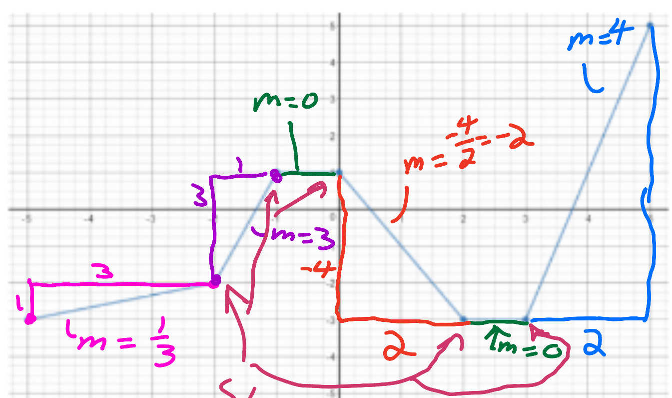
c) Using the geometric interpretation of each expression, insert the inequality symbol (< or >) in the box between the two expressions that makes the statement true.

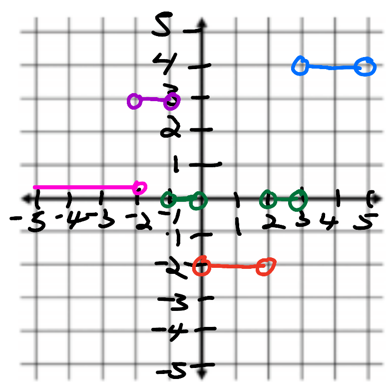
$\frac{f(4)-f(1)}{4-1} \boxed{>} \frac{f(4)-f(3)}{4-3}$ $\qquad$ $\frac{f(4)-f(1)}{4-1} \boxed{<} f'(1)$

1 $\qquad$ 1

Tangent Slope at $x=1$

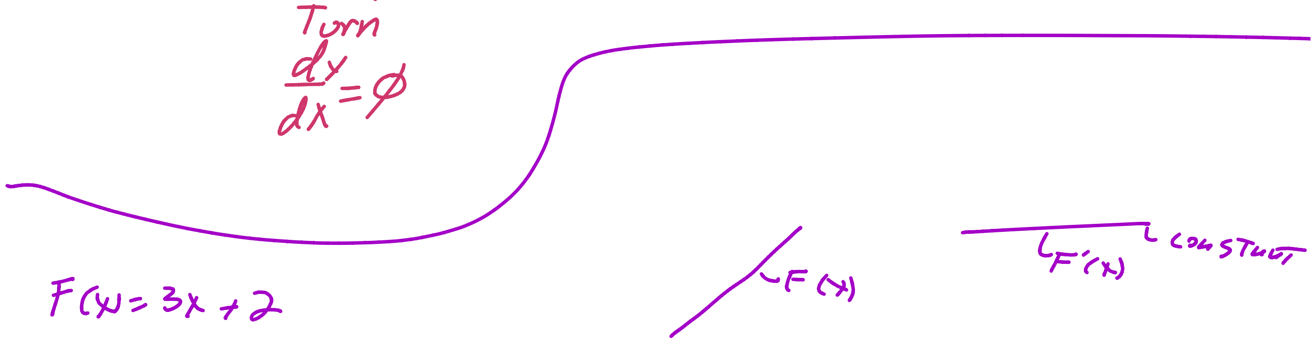
Graph the derivative of the function below on the grid to the right.





Sharp Turn

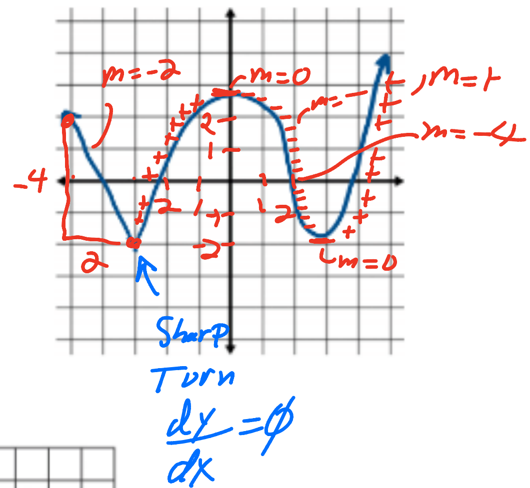
$\frac{dy}{dx}=\emptyset$

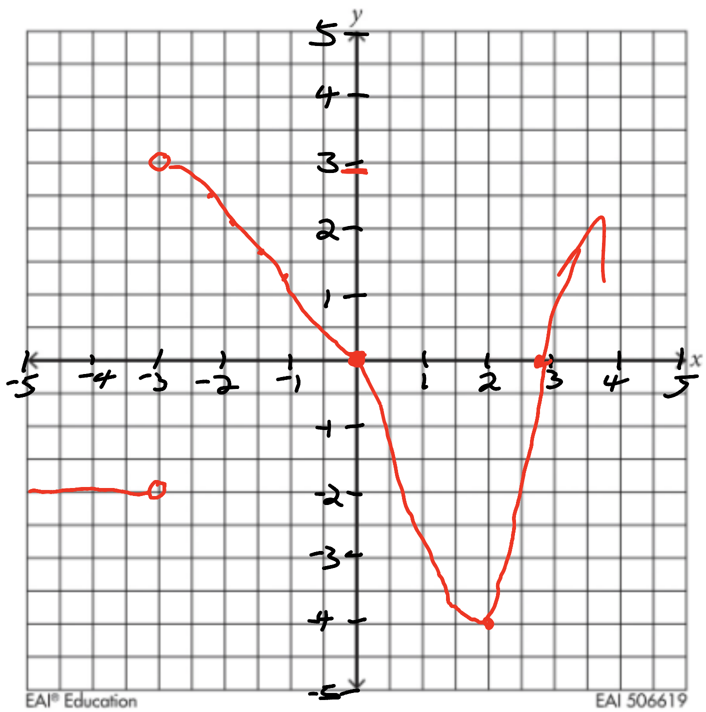


$F(x)=3x+2$

$F'(x)=3$

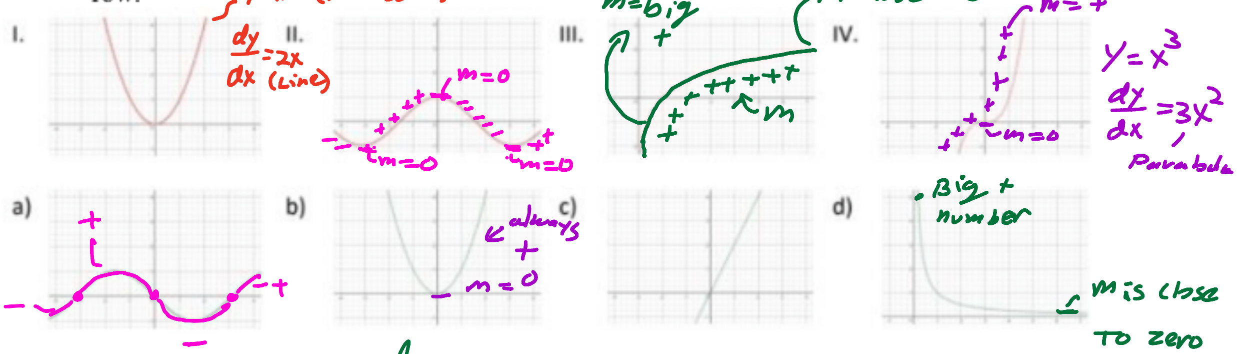
10. Sketch the derivative of the following function.



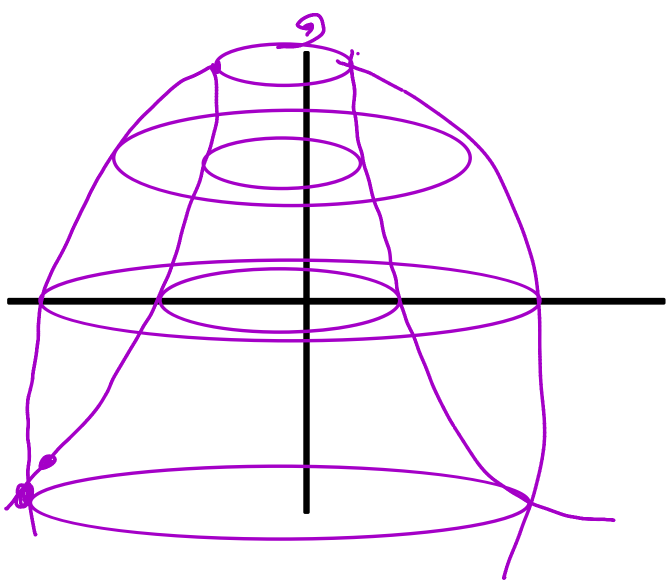


$y = \ln x$

9. Match the graph of each function in the top row with the graph of its derivative in the bottom row.



I. ___c___ II. ___a___ III. ___d___ IV. ___b___



$(3x - 2x^2)(5 + 4x) = F(x)$

$F'(x) = (3-4x)(5+4x) + (3x - 2x^2)(4)$

$F'(2) = (3-4\cdot 2)(5+4\cdot 2) + (3\cdot 2 - 2\cdot 2^2)\cdot 4 = -5\cdot 13 + -2\cdot 4$

$6 - 8$

$= -65 - 8 = -73$

Slope at $x=2 = -73$

$y = 3x^2 \sin x$

$\frac{dy}{dx} = 6x\cdot \sin x + 3x^2\cdot \cos x$

$y = (3x^4+2)(6x^2-x)(7x^4+2)$

$\frac{dy}{dx} = (12x^3)(6x^2-x)(7x^4+2) + (3x^4+2)\left[(12x-1)(7x^4+2) + (6x^2-x)(28x^3)\right]$

$= 12x^3(6x^2-x)(7x^4+2) + (3x^4+2)(12x-1)(7x^4+2) + (3x^4+2)(6x^2-x)(28x^3)$

$y = (3x^4+2)(6x^2-x)(7x^4+2)$

$\frac{dy}{dx} = (12x^3)(6x^2-x)(7x^4+2) + (3x^4+2)(12x-1)(7x^4+2) + (3x^4+2)(6x^2-x)(28x^3)$

$h(x) = F(x)\cdot g(x)\cdot p(x)$

$h'(x) = F'(x)\cdot g(x)\cdot p(x) + F(x)\cdot g'(x)\cdot p(x) + F(x)\cdot g(x)\cdot p'(x)$

$y = 5x^{-2}$

$\frac{dy}{dx} = -10x^{-3} = \frac{-10}{x^3}$

$y = \dfrac{5x-2}{x^2+1}$.

$$\frac{dy}{dx} = \frac{5(x^2+1) - (5x-2)(2x)}{(x^2+1)^2} = \frac{5x^2+5-(10x^2-4x)}{(x^2+1)^2}$$

$$\frac{-5x^2+4x+5}{(x^2+1)^2}$$

cannot be Factored

Leave iT

Tangent Line aT $(-1,1)$

$f(x) = \dfrac{3-(1/x)}{x+5} = \dfrac{3-x^{-1}}{x+5}$

$$F'(x) = \frac{(-\cdot -1\cdot x^{-1-1})(x+5) - (3-x^{-1})(1)}{(x+5)^2} = \frac{\left(\frac{1}{x^2}\right)(x+5) - \left(3-\frac{1}{x}\right)}{(x+5)^2}$$

$$F'(-1) = \frac{\frac{1}{(-1)^2}(-1+5) - \left(3-\frac{1}{-1}\right)}{(-1+5)^2} = \frac{1\cdot 4 - (3+1)}{4^2} = \frac{4-4}{4^2} = \frac{0}{16}$$

$m=0$

$\cancel{F(x) = \dfrac{3-\frac{1}{x}}{x+5}}$

$\cancel{F'(-1) = 0}$

Point $(-1,1)$

$y=0x+b$

$1=0(-1)+b$

$1=0+b$

$1=b$

$y=0x+1$

$y=1$