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Seccion 1

1. $f(x) = -3x^{-3}$
$f'(x) = -3 \cdot -3x^{-4} = 9x^{-4}$

2. $f(x) = 5x^7 + 2x - 6$
$f'(x) = 7 \cdot 5x^6 + 2 = 35x^6 + 2$

3. $f(x) = \frac{-8}{x^{10}}$
$f'(x) = -8 \cdot x^{-10}$
$f'(x) = -8 \cdot -10x^{-11}$
$f'(x) = \frac{-8 \cdot -10}{x^{11}} = \frac{80}{x^{11}}$

4. $f(x) = 5x^4 - 2x^3 + 6x - 2$
$f'(x) = 4 \cdot 5x^3 - 3 \cdot 2x^2 + 6$
$f'(x) = 20x^3 - 6x^2 + 6$

5. $f(x) = \frac{3}{5x^5}$
$f'(x) = \frac{3}{5}\left(\frac{1}{x^5}\right)$
$f'(x) = \frac{3}{5}(x^{-5})$
$f'(x) = \frac{3}{5}(-5x^{-6})$
$f'(x) = -\frac{3}{x^6}$

6. $f(x) = 4x^{10} + 12x^7 - 5x^4 + 8$
$f'(x) = 10 \cdot 4x^9 + 7 \cdot 12x^6 - 4 \cdot 5x^3$
$f'(x) = 40x^9 + 84x^6 - 20x^3$

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7. $f(x) = \sqrt[6]{x}$

$f'(x) = x^{\frac{1}{6}}$

$f'(x) = \frac{1}{6} x^{-\frac{5}{6}}$

$f'(x) = \frac{1}{6x^{\frac{5}{6}}}$

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

$f'(x) = (1 \cdot (-1x^{-2}) + (1(-2x^{-3}) + (-1(-3x^{-4})$

$f'(x) = -1 \cdot x^{-2} - 2x^{-3} + 3x^{-4}$

$f'(x) = -\frac{1}{x^2} - \frac{2}{x^3} + \frac{3}{x^4}$

9. $f(x) = 3x^{-5} + 2x^{-3}$

$f'(x) = (-5 \cdot 3x^{-6}) + (-3 \cdot 2x^{-4})$

$f'(x) = (-15x^{-6}) + (-6x^{-4})$

$f'(x) = \frac{-15}{x^6} - \frac{6}{x^4}$

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

$f'(x) = 9x^2 - 3x^{\frac{1}{3}} + \frac{3}{x^3} - 0$

$f'(x) = 9x^2 - x^{-\frac{2}{3}}$

$f'(x) = 9x^2 - \frac{1}{\sqrt[3]{x^2}} + 3 \cdot x^{-3}$

$f'(x) = 9x^2 - \frac{1}{\sqrt[3]{x^2}} - 9 \cdot x^{-4}$

$f'(x) = 9x^2 - \frac{1}{\sqrt[3]{x^2}} - \frac{9}{x^4}$

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Sección 2

1. $f(x)=(x^2+2)(x^3+1)$

$f'(x)=(x^2+2)3x^2+(x^3+1)2x$

$f'(x)=3x^4+6x^2+2x^4+2x$

$f'(x)=5x^4+6x^2+2x$

2. $f(x)=(x^4-1)(x^2+1)$

$f'(x)=(x^4-1)2x+(x^2+1)4x^3$

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

$f'(x)=6x^5+4x^3-2x$

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

$f'(x)=(3x^2+1)^{-1}$

$f'(x)-1(3x^2+1)^{-2}\cdot 6x$

$f'(x)-6x(3x^2+1)^{-2}$

$f'(x)\ \frac{-6x}{(3x^2+1)^2}$

4. $f(x)=\frac{2}{5x^2-1}$

$f'(x)=2(5x^2-1)^{-1}$

$f'(x)=-2(5x^2-1)^{-2}\cdot 10x$

$f'(x)=\frac{-20x}{(5x^2-1)^2}$

5. $f(x)=\frac{x-1}{x+1}$

$f'(x)=\frac{1\cdot(x+1)-1(x-1)}{(x+1)^2}$

$f'(x)=\frac{2}{(x+1)^2}$

Norma

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6. $f(x)=\frac{2x-1}{x-1}$

$f'(x)=\frac{2(x-1)-(2x-1)1}{(x-1)^2}$

$f'(x)=\frac{2x-2-2x+1}{(x-1)^2}$

$f'(x)=\frac{-1}{(x-1)^2}$

7. $f(x)=(1-x)^2$

$f'(x)=2(1-x)\cdot -1$

$f'(x)=-2(1-x)$

8. $f(x)=(5x^2-3\sqrt{x})^5$

$f'(x)=5(5x^2-3\sqrt{x})^4\cdot 10x-3x^{\frac{1}{2}}$

$f'(x)=5(5x^2-3\sqrt{x})^4\cdot 10x-\frac{3}{2}x^{-\frac{1}{2}}$

$f'(x)=5(5x^2-3\sqrt{x})^4\cdot 10x-\frac{3}{2\sqrt{x}}$

$f'(x)=5(5x^2-3\sqrt{x})^4(10x-\frac{3}{2\sqrt{x}})$

9. $f(x)=\sqrt[5]{(2x^2-3x+1)^3}$

$f(x)=(2x^2-3x+1)^{3/5}$

$f'(x)=\frac{3}{5}(2x^2-3x+1)^{-\frac{2}{5}}\cdot 4x-3$

$f'(x)=\frac{3}{5}\cdot 4x-3\ (2x^2-3x+1)^{-\frac{2}{5}}$

$f'(x)=\frac{12x-9}{5}\ (2x^2-3x+1)^{-\frac{2}{5}}$

$f'(x)=\frac{12x-9}{5\sqrt[5]{2x^2-3x+1^2}}$

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10. $f(x)=\frac{(2x-5)^7}{2x}$

$f'(x)=\frac{7(2x-5)^6\cdot 2\cdot 2x-(2x-5)^7\cdot 2}{(2x)^2}$

$f'(x)=\frac{28x(2x-5)^6-(2x-5)^7\cdot 2}{(2x)^2}$

$f'(x)=\frac{28x(2x-5)^6-2(2x-5)^7}{4x^2}$

$f'(x)=\frac{2(14x(2x-5)^6-(2x-5)^7}{4x^2}$

$f'(x)=\frac{14x(2x-5)^6-(2x-5)^7}{2x^2}$

Sección 3

1. $f(x)=\operatorname{sen}(3x-1)$
   $f'(x)=\cos(3x-1)\cdot 3$
   $f'(x)=3\cos(3x-1)$
2. $f(x)=\cos 2x^7$
   $f'(x)=-\operatorname{sen} 2x^7\cdot(7\cdot 2x^6)$
   $f'(x)=-\operatorname{Sen} 2x^7\cdot(14x^6)$
   $f'(x)=-14x^6\operatorname{sen} 2x^7$
3. $f(x)=\tan\sqrt[3]{x}$
   $f'(x)=\sec^2\sqrt[3]{x}\cdot 3x^2$
   $f'(x)=3x^2\sec^2\sqrt[3]{x}$
4. $f(x)=\sec(1-2x-x^3)$
   $f'(x)=\sec(1-2x-x^3)\tan(1-2x-x^3)\cdot(3x^2-2)$
   $f(x)=(3x^2-2)\sec(1-2x-x^3)\tan(1-2x-x^3)$
5. $f(x)=\operatorname{sen}5x+\cos 5x$
   $f'(x)=\cos 5x\cdot 5-\operatorname{sen}5x\cdot 5$
   $f'(x)=5\cos 5x-5\operatorname{sen}5x$

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6. $f(x) = \tan^5 x^5$

$f'(x) = \tan^4 x^5 \sec^2 x^5 \cdot 5x^4$

$f'(x) = 5x^4 \tan^4 x^5 \sec^2 x^5$

7. $f(x) = \dfrac{2x-1}{\tan 5x}$

$f'(x) = \dfrac{2(\tan 5x) - 2x+1(\sec^2 5x \cdot 5)}{(\tan 5x)^2}$

8. $f(x) = \cos(\tan 3x)$

$f'(x) = -\operatorname{sen}(\tan 3x) \cdot \sec^2 3x \cdot 3$

$f'(x) = -3\operatorname{sen}(\tan 3x) \sec^2 3x$

Sección 4

1. $f(x) = \operatorname{arc\,sen}(2x-1)$

$f'(x) = \dfrac{2}{\sqrt{1-(2x-1)^2}}$

2. $f(x) = \operatorname{arc\,cos}(x^2+3)$

$f'(x) = \dfrac{-1}{\sqrt{1-(x^2+3)^2}}$

3. $f(x) = \operatorname{arc\,tan}(1+x+x^2)$

$f'(x) \quad \dfrac{2x+1}{1+(1+x+x^2)^2}$

4. $f(x) = \operatorname{arc\,cot}(3x^2-1)$

$f'(x) = \dfrac{-1}{1+(3x^2-1)^2}$

5. $f(x) = \operatorname{arc\,sec}(5-x)$

$f'(x) = \dfrac{1}{(5-x)\sqrt{(5-x)^2-1}}$

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6. $f(x) = \operatorname{arc\,csc} \sqrt[3]{x}$

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

7. $f(x) = \operatorname{arc\,cot} \sqrt{x}$

$$f'(x) = \frac{-1}{1 + (\sqrt{x})^2}$$

$$f'(x) = \frac{-1}{1+x}$$

8. $f(x) = \sqrt{\operatorname{arc\,sen} 2x}$

$$f'(x) = \frac{\frac{1}{\sqrt{1-(2x)^2}}}{2\sqrt{\operatorname{arc\,sen} 2x}}$$

9. $f(x) = \dfrac{\operatorname{arc\,tan} 5x}{\cot 7x}$

$$f'(x) = \frac{1}{\dfrac{1+(5x)^2(\cot 7x) + (\csc^2 7x \cdot 7)\operatorname{arctan} 5x}{(\cot 7x)^2}}$$

10. $f(x) = (\operatorname{arc\,sen} 3x)^5$

$$f'(x) = 5(\operatorname{arc\,sen} 3x)^4 \cdot \frac{1}{\sqrt{1-(3x)^2}}$$

$$f'(x) \quad \frac{5(\operatorname{arc\,sen} 3x)^4}{\sqrt{1-(3x)^2}}$$

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Sección 5

1. $f(x) = \log_2(x^4 - 4x^2)$

$$f'(x) = \frac{1}{\ln 2} \cdot \frac{4x^3 - 8x}{x^4 - 4x^2}$$

$$f'(x) = \frac{4x^3 - 8x}{\ln 2 (x^4 - 4x^2)}$$

2. $f(x) = \ln(2x^2 - x)$

$$f'(x) = \frac{4x - 1}{2x^2 - x}$$

3. $f(x) = \tan(\ln x^2)$

$$f'(x) = \sec^2(\ln x^2) \cdot \frac{2x}{x^2}$$

$$f'(x) = \frac{2x}{x^2} \sec^2(\ln x^2)$$

4. $f(x) = \ln(\operatorname{sen} x) + \ln(\tan 3x)$

$$f'(x) = \frac{\cos x}{\operatorname{sen} x} + \frac{\sec^2 3x \cdot 3}{\tan 3x}$$

$$f'(x) = \frac{\cos x}{\operatorname{sen} x} + \frac{3\sec^2 3x}{\tan 3x}$$

5. $f(x) = \ln(\tan^2 3x)$

$$f'(x) = \frac{\tan 3x \sec^2 3x \cdot 3}{\tan^2 3x}$$

$$f'(x) = \frac{3 \tan 3x \sec^2 3x}{\tan^2 3x}$$

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6. $f(x) = \frac{\cos 4x}{\log 5x}$

$$f'(x) = \frac{(-\operatorname{sen} 4x \cdot 4)\log 5x - \frac{1}{\ln 10}\cdot\frac{5}{5x}}{(\log 5x)^2}$$

$$f'(x) = \frac{-4\operatorname{sen} 4x \log 5x - \frac{5\cos 4x}{\ln 10 \cdot 5x}}{(\log 5x)^2}$$

7. $f(x) = \log_5(\operatorname{sen} 2x)$

$$f'(x) = \frac{1}{\ln 5}\cdot\frac{\cos 2x \cdot 2}{\operatorname{sen} 2x}$$

$$f'(x) = \frac{2\cos 2x}{\ln 5 \cdot \operatorname{sen} 2x}$$

8. $f(x) = \log_2(\operatorname{arc}\cos(x - x^2))$

$$f'(x) = \frac{1}{\ln 2}\cdot\frac{\frac{-1}{\sqrt{1-(x-x^2)^2}}}{\operatorname{arc}\cos(x-x^2)}$$

$$f'(x) = \frac{-1}{\sqrt{1-(x-x^2)^2}\ln 2 \cdot \operatorname{arc}\cos(x-x^2)}$$

9. $f(x) = \operatorname{arc}\cos(\ln x^2)$

$$f'(x) = \frac{-1}{\sqrt{1-(\ln x^2)^2}}$$

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10. $f(x) = \sqrt{1+\ln 3x}$

$f'(x) = (1+\ln 3x)^{\frac{1}{2}}$

$f'(x) = \frac{1}{2}(1+\ln 3x)^{-\frac{1}{2}} \cdot \frac{3}{3x}$

$f'(x) = \frac{1}{2\sqrt{1+\ln 3x}} \cdot \frac{3}{3x}$

$f'(x) = \frac{1}{2\sqrt{1+\ln 3x}} \cdot \frac{1}{x}$

$f'(x) = \frac{1}{2x\sqrt{1+\ln 3x}}$

1. $f(x) = (3x)^{2x}$

$\ln f(x) = \ln (3x)^{2x}$

$\ln f(x) = 2x \cdot \ln(3x)$

$\frac{1}{f(x)} \cdot f'(x) = 2 \cdot \ln(3x) + (2x) \cdot \frac{1}{3x} \cdot 3$

$\frac{f'(x)}{f(x)} = 2\ln(3x) + \frac{2x \cdot 3}{3x}$

$\frac{f'(x)}{f(x)} = 2\ln(3x) + \frac{6x}{3x}$

$f'(x) = (3x)^{2x} \cdot [2\ln(3x) + 2]$

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2. $f(x) = (3x^2)^{\cos 2x}$

$\ln f(x) = \ln (3x^2)^{\cos 2x}$

$\ln f(x) = \cos 2x \cdot \ln(3x^2)$

$\frac{1}{f(x)} \cdot f'(x) = (-\operatorname{sen} 2x \cdot 2) \ln(3x^2) + \cos 2x \cdot \frac{1}{3x^2} \cdot 6x$

$\frac{f'(x)}{f(x)} = -2\operatorname{sen} 2x \cdot \ln(3x^2) + \frac{\cos 2x \cdot 6x}{3x^2}$

$f'(x) = (3x^2)^{\cos 2x} \left[-2\operatorname{sen} 2x \cdot \ln(3x^2) + \frac{6x \cos 2x}{3x^2} \right]$

3. $f(x) = (\cos 3x)^{x+2}$

$\ln f(x) = \ln (\cos 3x)^{x+2}$

$\ln f(x) = (x+2) \ln(\cos 3x)$

$\frac{1}{f(x)} \cdot f'(x) = 1 \cdot \ln(\cos 3x) + (x+2) \cdot \frac{1}{\cos 3x} \cdot -\operatorname{sen} 3x \cdot 3$

$\frac{f'(x)}{f(x)} = \ln(\cos 3x + (x+2) \frac{3 \operatorname{sen} x}{\cos 3x}$

$\frac{f'(x)}{f(x)} = \ln(\cos 3x - \frac{3(x+2) \operatorname{sen} x}{\cos 3x}$

$f'(x) = (\cos 3x)^{x+2} \left[\ln \cos 3x - \frac{3(x+2) \operatorname{sen} x}{\cos 3x} \right]$

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4. $f(x) = (x^5 - 5x^2)^{5x-6}$

$Ln f(x) = Ln (x^5 - 5x^2)^{5x-6}$

$Ln f(x) = 5x - 6 \cdot Ln(x^5 - 5x^2)$

$$\frac{1}{f(x)} \cdot f'(x) = 5 \cdot Ln(x^5 - 5x^2) + 5x - 6 \cdot \frac{1}{x^5 - 5x^2} \cdot 5x^4 - 10x$$

$$\frac{f'(x)}{f(x)} = 5 Ln(x^5 - 5x^2) + \frac{(5x-6)(5x^4 - 10)}{x^5 - 5x^2}$$

$$f'(x) = (x^5 - 5x^2)^{5x-6} \left[5 Ln(x^5 - 5x^2) + \frac{(5x-6)(5x^4 - 10}{x^5 - 5x^2} \right]$$

5. $f(x) = (\text{sen } x^2)^{\cot(3x-1)}$

$Ln f(x) = Ln (\text{sen } x^2)^{\cot(3x-1)}$

$Ln f(x) = \cot(3x-1) \cdot Ln(\text{sen } x^2)$

$$\frac{1}{f(x)} \cdot f'(x) = -\csc^2(3x-1) \cdot 3 \cdot Ln(\text{sen } x^2) + \cot(3x-1) \cdot \frac{1}{\text{sen } x^2} \cdot \cos x^2 \cdot 2x$$

$$\frac{f'(x)}{f(x)} = -3 \csc^2(3x-1) \cdot Ln(\text{sen } x^2) + \frac{2x \cot(3x-1) \cos x^2}{\text{sen } x^2}$$

$$f'(x) = (\text{sen } x^2)^{\cot(3x-1)} \left[-3 \csc^2(3x-1) \cdot Ln(\text{sen } x^2) + \frac{2x \cot(3x-1) \cos x^2}{\text{sen } x^2} \right]$$