Product Rule;

$$D_x\left(f(x)\cdot g(x)\right)=\underbrace{f'(x)\cdot g(x)}+\underbrace{f(x)\cdot g'(x)}$$

quation that determines the slope of the following equation (aka the de

the slope at the given value.

$(x^2+2)(3x^3+x)$ $\quad x = 2$

$x(3x^3+x)+(x^2+2)(9x^2+1)$

$^4+2x^2+9x^4+x^2+18x^2+2$

$^4+21x^2+2$

$84+2$

$f(x) = (3x - 2)(4x^3 + 5)$ $\quad$ x = 1.5

$3(4x^3+5) + (3x-2)12x^2$

$2x^3 + 15 + 36x^3 - 24x^2$

$3x^3 - 24x^2 + 15$

$1.5)^3 - 24(1.5)^2 + 15$

$f(x) = (x^2 + x - 3)(x^3 - 6)$ at $x = 3$

$(2x+1)(x^3-6) + (x^2+x-3)\cdot 3x^2$

$2x^4 - 12x + x^3 - 6 + 3x^4 + 3x^3 - 9x^2$

$5x^4 + 4x^3 - 9x^2 - 12x - 6$

$+108 - 162 - 36 - 6$

309

$$\begin{array}{r} 513 \\ -204 \\ \hline 309 \end{array}$$

Quotient Rule;

$$\frac{g(x)\cdot f'(x)-f(x)\cdot g'(x)}{\left(g(x)\right)^2}$$

or

$$D_x\left(\frac{top}{bot}\right)=\frac{bot\cdot dtop-t}{(bot)}$$

ation that determines the slope of the following equation (aka the derivative).
e slope at the given value.

$\frac{3x}{x^2+2}$ x = -1

$\frac{(3x^2+2)\cdot 3 - 3x\cdot 6x}{(3x^2+2)^2}$

$\frac{9x^2+6-18x^2}{(3x^2+2)^2}$

$\frac{-9x^2+6}{(3x^2+2)^2}$

$f(-1) = \frac{-9(-1)^2+6}{(3(-1)^2+2)^2} =$

$= \frac{x^3 + 2x - 4}{x^3}$ at $x=2$

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

$\frac{x^3(3x^2+2) - (x^3+2x-4)\cdot 3x^2}{x^6}$

$\frac{\ldots+2x^3 - \cancel{3x^5} - 6x^3 + 12x^2}{x^6}$

$\frac{\ldots+12\cancel{x}}{\ldots^4} = \frac{-4x+12}{x^4}$

$(x) = \frac{x^2+2}{x^3-5x}$ Find $f'(-2[redacted]$

$-(3x^4+x^2-10)$

$$\frac{(x^3-5x)\cdot 2x - (x^2+2)(3x^2-5)}{(x^3-5x)^2}$$

$$\frac{0x^2 - 3x^4 - x^2 + 10}{(x^3-5x)^2}$$

$$\frac{x^2+10}{5x)^2}$$

$-16 \quad -44 \quad +1$

$$f'(-2) = \frac{-(-2)^4 - 11(-2)^2 + 1}{(-2^3 - 5(-2))^2}$$

$(-8+10)^2$

$(x) = f(x) \cdot g(x)$ and $f(3) = 7,\ f'(3) = 2,\ g(3) = 6,$ *and* $g'(3) = -10$, find the

he tangent line at x = 3.

$= f'(x) \cdot g(x) + f(x) \cdot g'(x)$

$f'(3) \cdot g(3) + f(3) \cdot g'(3)$

$2 \cdot 6 + 7 \cdot -10$

$12 - 70$

-58

$x) = (3x^2 - 4x) \cdot g(x)$ find $h'(5)$ if $g(5) = 2,$ *and* $g'(5) = -3.$

$(6x-4)g(x) + (3x^2-4x)\cdot g'(x)$

$(6\cdot5-4)\cdot g(5) + (3\cdot5^2-4\cdot5)\cdot g'(5)$

$26\cdot2 + 55\cdot{}^-3$

$52 - 165$

$\boxed{113}$

$) = \frac{h(x)}{k(x)}$ find $f'(3)$ if $h(3)=7,\ h'(3)=2,\ k(3)=6,$ *and* $k'(3)=-10$.

$$\frac{k(x)\cdot h'(x) - h(x)\cdot k'(x)}{k'(x)^2}$$

$$\frac{(3)\cdot h'(3) - h(3)\cdot k'(3)}{k'(3)^2}$$

$$\frac{\cdot 2 - 7\cdot {}^-10}{6^2} = \frac{82}{36} = \boxed{\frac{41}{18}}$$