Stage 1

1. Complete the setting out below to differentiate each function by the product rule. Express your answers in fully factorized form.

(a) $y = x^3(2x+4)$

$y = uv$

$\Rightarrow \dfrac{dy}{dx} = \dfrac{du}{dx}\cdot v + u\cdot\dfrac{dv}{dx}$

$= \boxed{} \times \boxed{} + \boxed{} \times \boxed{}$

$= \boxed{}$

$= \boxed{}$

$= \boxed{}$

Let $u = x^3$ and $v = 2x+4$.

$\dfrac{du}{dx} = \boxed{}$

$\dfrac{dv}{dx} = \boxed{}$

(b) $y = 6x(3x-1)^2$

$y = uv$

$\Rightarrow y' = u'v + uv'$

$= \boxed{} \times \boxed{} + \boxed{} \times \boxed{}$

$= \boxed{}$

$= \boxed{}$

Let $u = 6x$ and $v = (3x-1)^2$.

$u' = \boxed{}$

$v' = \boxed{}$

$= \boxed{}$

2. (a) Differentiate $y = x^3(x-7)$ by expanding the bracket and differentiate each term.

(b) Differentiate $y = x^3(x-7)$ using the product rule with $u = x^3$ and $v = x - 7$.

Use the setting out shown in Question 1(a) and fully factorized your answer.

3. (a) Differentiate $y = (2x-3)(4x+5)$ by expanding the bracket and differentiate each term.

(b) Differentiate $y = (2x-3)(4x+5)$ using the product rule with $u = 2z - 3$ and $v = 4x + 5$.

Use the setting out shown in Question 1(b) and fully factorized your answer.

4. (a) Differentiate $y=(x^2+2)(x^2-7)$ by expanding the bracket and differentiate each term.

(b) Differentiate $y=(x^2+2)(x^2-7)$ by product rule with $u=x^2+2$ and $v=x^2-7$.

Fully factorized your answer.

5. Let the function $y=2x^5(5x+3)^3$.

(i) Use product rule with $u=2x^5$ and $v=(5x+3)^3$, show that

$$\frac{dy}{dx}=10x^4(5x+3)^3+30x^5(5x+3)^2.$$

(ii) By taking out the common factor $10x^4(5x+3)^2$, show that

$$\frac{dy}{dx} = 10x^4(5x+3)^2(8x+3).$$

(iii) Hence, find the x – coordinates of the points on the curve where the tangent is horizontal.

6. Differentiate each function by product rule and fully factorized your answer.

(a) $y = 2x(4x-1)^3$

(b) $y = x^2(3x+4)^3$

(c) $y = x^3(1-2x)^5$

(d) $y = x^4(4-3x)^6$

7. (i) Find the derivative of $y = 3x(2-x)^6$ by product rule.

(ii) Hence, find the tangent and normal to the curve at the origin.

Stage 2

1. Complete the setting out below to differentiate each function by the quotient rule.

(a) $y = \dfrac{3x+4}{2x+5}$

Let $u = 3x+4$ and $v = 2x+5$.

$\dfrac{du}{dx} = \boxed{}$

$\dfrac{dv}{dx} = \boxed{}$

$$y = \frac{u}{v}$$

$$\Rightarrow \quad \frac{dy}{dx} = \frac{\frac{du}{dx} \times v - u \times \frac{dv}{dx}}{v^2}$$

$$= \frac{\boxed{} \times \boxed{} - \boxed{} \times \boxed{}}{\boxed{}}$$

$$= \frac{\boxed{} - \boxed{}}{\boxed{}}$$

$$= \frac{\boxed{}}{\boxed{}}$$

(b) $y = \dfrac{7x-2}{1-4x}$

Let $u = 7x-2$ and $v = 1-4x$.

$u' = \boxed{}$

$v' = \boxed{}$

$$y = \frac{u}{v}$$

$$\Rightarrow \quad \frac{dy}{dx} = \frac{u'v - uv'}{v^2}$$

$$= \frac{\boxed{} \times \boxed{} - \boxed{} \times \boxed{}}{\boxed{}}$$

$$= \frac{\boxed{} - \boxed{}}{\boxed{}}$$

$$= \frac{\boxed{}}{\boxed{}}$$

2. Differentiate each function using the quotient rule.
   State u and v first, and use the setting out in Question 1.

   (a) $y = \dfrac{x}{x+2}$

   (b) $y = \dfrac{x+4}{x-4}$

   (c) $y = \dfrac{3x}{x+5}$

(d) $y=\dfrac{2x}{4x-1}$

(e) $y=\dfrac{1+x}{1-x}$

(f) $y=\dfrac{x+5}{3x+1}$

(g) $y = \dfrac{7x+3}{1-2x}$

(h) $y = \dfrac{2x-9}{5-3x}$

(i) $y = \dfrac{4x-5}{4-5x}$

3. Differentiate each function using quotient rule.
Fully factorize your answer and find any x values for which the tangent is horizontal.

(a) $y = \dfrac{x^2}{x+1}$

(b) $y = \dfrac{x}{x^2-1}$

(c) $y = \dfrac{x^2}{1-2x}$

(d) $y=\dfrac{1+x^2}{1-x}$

(e) $y=\dfrac{x^2-3}{x^2+4}$

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

(g) $y = \dfrac{2x^2}{x^2+1}$

(h) $y = \dfrac{1-x^2}{x^2-2}$

4. (a) Use chain rule to differentiate $y = \dfrac{1}{1-x}$ with $u = 1-x$ and $y = u^{-1}$.

(b) Use quotient rule to differentiate $y = \dfrac{1}{1-x}$ with $u = 1$ and $v = 1 - x$.

5. (a) Use chain rule to differentiate $y = \dfrac{1}{5x-4}$ with $u = 5x - 4$ and $y = u^{-1}$.

(b) Use quotient rule to differentiate $y = \dfrac{1}{5x-4}$ with $u = 1$ and $v = 5x - 4$.

Stage 1

1. (a) $y = uv$

$$\Rightarrow \frac{dy}{dx} = \frac{du}{dx} \cdot v + u \cdot \frac{dv}{dx}$$

$$= \boxed{3x^2} \times \boxed{2x+4} + \boxed{x^3} \cdot \boxed{2}$$

$$= \boxed{2x^2\left[(3x+6)+x\right]}$$

$$= \boxed{2x^2(4x+6)}$$

$$= \boxed{4x^2(2x+3)}$$

Let $u = x^3$ and $v = 2x+4$.

$$\frac{du}{dx} = \boxed{3x^2}$$

$$\frac{dv}{dx} = \boxed{2}$$

(b) $y = uv$

$$\Rightarrow y' = u'v + uv'$$

$$= \boxed{6} \times \boxed{(3x-1)^2} + \boxed{6x} \times \boxed{6(3x-1)}$$

$$= \boxed{6(3x-1)\left[(3x-1)+6x\right]}$$

$$= \boxed{6(3x-1)(9x-1)}$$

Let $u = 6x$ and $v = (3x-1)^2$.

$$u' = \boxed{6}$$

$$v' = \boxed{2(3x-1) \times (3x-1)'}$$

$$= \boxed{6(3x-1)}$$

2. (a) $y = x^3(x-7) = x^4 - 7x^3$

$$\Rightarrow \frac{dy}{dx} = 4x^3 - 7\left(3x^2\right)$$

$$= 4x^3 - 21x^2$$

$$= x^2(4x-21)$$

(b) $y = x^3(x-7)$

$$\Rightarrow \frac{dy}{dx} = \frac{du}{dx} \cdot v + u \cdot \frac{dv}{dx}$$

$$= 3x^2 \cdot (x-7) + x^3 \cdot 1$$

$$= x^2(3x - 21 + x)$$

$$= x^2(4x-21)$$

Let $u = x^3$ and $v = x-7$.

$$\frac{du}{dx} = 3x^2$$

$$\frac{dv}{dx} = 1$$

3. (a) $y=(2x-3)(4x+5)=8x^2-2x-15$

$\Rightarrow \dfrac{dy}{dx}=8(2x)-2-0=16x-2$

(b) $y=(2x-3)(4x+5)$

$\Rightarrow y'=u'v+uv'$

$=2\cdot(4x+5)+(2x-3)\cdot 4$

$=16x-2$

Let $u=2x-3$ and $v=4x+5$.
$u'=2$
$v'=4$

4. (a) $y=(x^2+2)(x^2-7)=x^4-5x^2-14$

$\Rightarrow \dfrac{dy}{dx}=4x^3-5(2x)-0$

$=4x^3-10x$

$=2x(2x^2-5)$

(b) $y=(x^2+2)(x^2-7)$

$\Rightarrow \dfrac{dy}{dx}=\dfrac{du}{dx}\cdot v+u\cdot\dfrac{dv}{dx}$ $(u=x^2+2$ and $v=x^2-7)$

$=2x\cdot(x^2-7)+(x^2+2)\cdot 2x$

$=2x(2x^2-5)$

5. (i) $y=2x^5(5x+3)^3$

$\Rightarrow y'=u'v+uv'$

$=10x^4(5x+3)^3+2x^5\times 15(5x+3)^2$

$=10x^4(5x+3)^3+30x^5(5x+3)^2$

Let $u=2x^5$ and $v=(5x+3)^3$.

$u'=2(5x^4)=10x^4$

$v'=3(5x+3)^2\times(5x+3)'$

$=3(5x+3)^2\times 5$

$=15(5x+3)^2$

(ii) $\dfrac{dy}{dx} = 10x^4(5x+3)^3 + 30x^5(5x+3)^2$

$= 10x^4(5x+3)^2\left[(5x+3)+3x\right]$ (factorize the common factor $10x^4(5x+3)^2$)

$= 10x^4(5x+3)^2(8x+3)$

(iii) Let $\dfrac{dy}{dx} = 0 \Rightarrow 10x^4(5x+3)^2(8x+3) = 0$

$\Rightarrow x^4(5x+3)^2(8x+3) = 0$

$\Rightarrow x = 0,\ x = -\dfrac{3}{5},\ x = -\dfrac{3}{8}$

6. (a) $y = 2x(4x-1)^3$

$\Rightarrow y' = (2x)' \times (4x-1)^3 + 2x \times \left[(4x-1)^3\right]'$

$= 2(4x-1)^3 + 2x \times 3(4x-1)^2 \cdot (4x-1)'$

$= 2(4x-1)^3 + 24x(4x-1)^2$

$= 2(4x-1)^2\left[(4x-1)+12x\right]$

$= 2(4x-1)^2(16x-1)$

(b) $y = x^2(3x+4)^3$

$\Rightarrow y' = (x^2)'(3x+4)^3 + x^2\left[(3x+4)^3\right]'$

$= 2x \cdot (3x+4)^3 + x^2 \cdot 3(3x+4)^2 \cdot (3x+4)'$

$= 2x(3x+4)^3 + 9x^2(3x+4)^2$

$= x(3x+4)^2\left[2(3x+4)+9x\right]$

$= x(3x+4)^2(15x+8)$

(c) $y = x^3(1-2x)^5$

$$\Rightarrow \quad y' = \left(x^3\right)'(1-2x)^5 + x^3\left[(1-2x)^5\right]'$$

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

$$= 3x^2 \cdot (1-2x)^5 + x^3 \cdot 5(1-2x)^4 \cdot (-2)$$

$$= 3x^2 \cdot (1-2x)^5 - 10x^3(1-2x)^4$$

$$= x^2(1-2x)^4\left[3(1-2x) - 10x\right]$$

$$= x^2(1-2x)^4(3-16x)$$

(d) $y = x^4(4-3x)^6$

$$\Rightarrow \quad y' = \left(x^4\right)'(4-3x)^6 + x^4\left[(4-3x)^6\right]'$$

$$= 4x^3(4-3x)^6 + x^4 \cdot 6(4-3x)^5 \cdot (4-3x)'$$

$$= 4x^3(4-3x)^6 + x^4 \cdot 6(4-3x)^5 \cdot (-3)$$

$$= 4x^3(4-3x)^6 - 18x^4(4-3x)^5$$

$$= 2x^3(4-3x)^5\left[2(4-3x) - 9x\right]$$

$$= 2x^3(4-3x)^5(8-15x)$$

7. (i) $y = 3x(2-x)^6$

$$\Rightarrow \quad y' = \left(3x\right)'(2-x)^6 + 3x\left[(2-x)^6\right]'$$

$$= 3(2-x)^6 + 3x \cdot 6(2-x)^5 \cdot (2-x)'$$

$$= 3(2-x)^6 + 3x \cdot 6(2-x)^5 \cdot (-1)$$

$$= 3(2-x)^6 - 18x(2-x)^5$$

$$= 3(2-x)^5\left[(2-x) - 6x\right]$$

$$= 3(2-x)^5(2-7x)$$

(ii) $y' = 3(2-x)^5(2-7x) \quad \Rightarrow \quad y'(0) = 192$

$$\Rightarrow \quad m_T = 192, \quad m_N = -\frac{1}{192} \text{ at point } (0,0)$$

$l_T: \quad y = 192x$

$l_N: \quad y = -\frac{1}{192}x$

Stage 2

1. (a) $y = \frac{u}{v}$

$$\Rightarrow \frac{dy}{dx} = \frac{\frac{du}{dx} \times v - u \times \frac{dv}{dx}}{v^2}$$

$$= \frac{\boxed{3} \times \boxed{2x+5} - \boxed{3x+4} \times \boxed{2}}{\boxed{(2x+5)^2}}$$

$$= \frac{\boxed{6x+15} - \boxed{6x+8}}{\boxed{(2x+5)^2}}$$

$$= \frac{\boxed{7}}{\boxed{(2x+5)^2}}$$

Let $u = 3x+4$ and $v = 2x+5$.

$\frac{du}{dx} = \boxed{3}$

$\frac{dv}{dx} = \boxed{2}$

(b) $y = \frac{u}{v}$

$$\Rightarrow \frac{dy}{dx} = \frac{u'v - uv'}{v^2}$$

$$= \frac{\boxed{7} \times \boxed{1-4x} - \boxed{7x-2} \times \boxed{-4}}{\boxed{(1-4x)^2}}$$

$$= \frac{\boxed{7-28x} - \boxed{8-28x}}{\boxed{(1-4x)^2}}$$

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

Let $u = 7x-2$ and $v = 1-4x$.

$u' = \boxed{7}$

$v' = \boxed{-4}$

2. (a) $\frac{dy}{dx}=\frac{u'v-uv'}{v^2}$

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

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

Let $u=x$ and $v=x+2$.
$u'=1$
$v'=1$

(b) $\frac{dy}{dx}=\frac{u'v-uv'}{v^2}$

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

$=-\frac{8}{(x-4)^2}$

Let $u=x+4$ and $v=x-4$.
$u'=1$
$v'=1$

(c) $\frac{dy}{dx}=\frac{u'v-uv'}{v^2}$

$=\frac{3\times(x+5)-3x\times 1}{(x+5)^2}$

$=\frac{15}{(x+5)^2}$

Let $u=3x$ and $v=x+5$.
$u'=3$
$v'=1$

(d) $\frac{dy}{dx}=\frac{u'v-uv'}{v^2}$

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

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

Let $u=2x$ and $v=4x-1$.
$u'=2$
$v'=4$

(e) $\dfrac{dy}{dx}=\dfrac{u'v-uv'}{v^2}$

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

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

Let $u=1+x$ and $v=1-x$.
$u'=1$
$v'=-1$

(f) $\dfrac{dy}{dx}=\dfrac{u'v-uv'}{v^2}$

$$=\frac{1\times(3x+1)-(x+5)\times 3}{(3x+1)^2}$$

$$=-\frac{14}{(3x+1)^2}$$

Let $u=x+5$ and $v=3x+1$.
$u'=1$
$v'=3$

(g) $\dfrac{dy}{dx}=\dfrac{u'v-uv'}{v^2}$

$$=\frac{7\times(1-2x)-(7x+3)\times(-2)}{(1-2x)^2}$$

$$=\frac{13}{(1-2x)^2}$$

Let $u=7x+3$ and $v=1-2x$.
$u'=7$
$v'=-2$

(h) $\dfrac{dy}{dx}=\dfrac{u'v-uv'}{v^2}$

$$=\frac{2\times(5-3x)-(2x-9)\times(-3)}{(5-3x)^2}$$

$$=-\frac{17}{(5-3x)^2}$$

Let $u=2x-9$ and $v=5-3x$.
$u'=2$
$v'=-3$

(j) $\dfrac{dy}{dx}=\dfrac{u'v-uv'}{v^2}$

Let $u=4x-5$ and $v=4-5x$.
$u'=4$
$v'=-5$

$$=\frac{4\times(4-5x)-(4x-5)\times(-5)}{(4-5x)^2}$$

$$=-\frac{9}{(4-5x)^2}$$

3. (a) $y'=\dfrac{u'v-uv'}{v^2}$

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

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

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

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

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

$$\therefore\quad y'=\frac{x(x+2)}{(x+1)^2}$$

Let $y'=0 \Rightarrow \dfrac{x(x+2)}{(x+1)^2}=0$

$\Rightarrow x(x+2)=0$

$\Rightarrow x=0,\ x=-2$

(b) $y' = \dfrac{u'v - uv'}{v^2}$

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

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

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

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

$\therefore \quad y' = -\dfrac{1+x^2}{(x^2-1)^2}$

Let $y' = 0 \;\Rightarrow\; -\dfrac{1+x^2}{(x^2-1)^2} = 0$

$\Rightarrow\; 1 + x^2 = 0$

$\Rightarrow$ no solutions for x

(c) $y' = \dfrac{u'v - uv'}{v^2}$

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

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

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

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

$\therefore \quad y' = \dfrac{2x(1-x)}{(1-2x)^2}$

Let $y'=0 \Rightarrow \dfrac{2x(1-x)}{(1-2x)^2}=0$

$\Rightarrow 2x(1-x)=0$

$\Rightarrow x=0,\ x=1$

(d) $y'=\dfrac{u'v-uv'}{v^2}$

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

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

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

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

Let $y'=0 \Rightarrow \dfrac{-x^2+2x+1}{(x^2+4)^2}=0$

$\Rightarrow x^2-2x-1=0$

$\Rightarrow x=\dfrac{2\pm\sqrt{4+4}}{2}$

$\Rightarrow x=1+\sqrt{2},\ x=1-\sqrt{2}$

(e) $y'=\dfrac{u'v-uv'}{v^2}$

$$=\frac{\left(x^2-3\right)'\cdot(x^2+4)-(x^2-3)\cdot\left(x^2+4\right)'}{(x^2+4)^2}$$

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

$$=\frac{14x}{(x^2+4)^2}$$

$$\therefore \quad y'=\frac{14x}{(x^2+4)^2}$$

$$\text{Let} \quad y'=0 \quad \Rightarrow \quad \frac{14x}{(x^2+4)^2}=0$$

$$\Rightarrow \quad 14x=0$$

$$\Rightarrow \quad x=0$$

(f) $y'=\dfrac{u'v-uv'}{v^2}$

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

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

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

$$\therefore \quad y'=\frac{x^2+4x+1}{(x+2)^2}$$

$$\text{Let} \quad y'=0 \quad \Rightarrow \quad \frac{x^2+4x+1}{(x+2)^2}=0$$

$$\Rightarrow \quad x^2+4x+1=0$$

$$\Rightarrow \quad x=\frac{-4\pm\sqrt{16-4}}{2}$$

$$\Rightarrow \quad x=-2+\sqrt{3}, \quad x=-2-\sqrt{3}$$

(g) $y' = \dfrac{u'v - uv'}{v^2}$

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

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

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

$$\therefore \quad y' = \frac{4x}{(x^2+1)^2}$$

Let $y' = 0 \quad \Rightarrow \dfrac{4x}{(x^2+1)^2} = 0$

$$\Rightarrow \quad 4x = 0$$
$$\Rightarrow \quad x = 0$$

(h) $y' = \dfrac{u'v - uv'}{v^2}$

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

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

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

$$\therefore \quad y' = \frac{2x}{(x^2-2)^2}$$

Let $y' = 0 \quad \Rightarrow \quad \dfrac{2x}{(x^2-2)^2} = 0$

$$\Rightarrow \quad 2x = 0$$
$$\Rightarrow \quad x = 0$$

4. (a) $y = \dfrac{1}{1-x} = (1-x)^{-1}$

$$\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx} \qquad (\text{Let } u = 1-x \text{ and } y = u^{-1})$$

$$= -(1-x)^{-2} \times (-1)$$

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

(b) $y = \dfrac{1}{1-x}$

$$y' = \frac{u'v - uv'}{v^2}$$

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

$$= \frac{0 \cdot (1-x) - 1 \cdot (-1)}{(1-x)^2}$$

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

$$\therefore \quad y' = \frac{1}{(1-x)^2}$$

5. (a) $y = \dfrac{1}{5x-4} = (5x-4)^{-1}$

$$\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx} \qquad (\text{Let } u = 5x-4 \text{ and } y = u^{-1})$$

$$= -(5x-4)^{-2} \times (5)$$

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

(b) $y = \frac{1}{5x-4}$

$$y' = \frac{u'v - uv'}{v^2}$$

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

$$= \frac{0 \cdot (5x-4) - 1 \cdot 5}{(5x-4)^2}$$

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

$$\therefore \quad y' = -\frac{5}{(5x-4)^2}$$