The method: The chain rule

Derivative of the outside, keeping the inside, times the derivative of the inside.

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

derivative of $\sqrt{u}$ is $1 \div (2\sqrt{u})$, times u'

$\frac{2}{2\sqrt{2x}} = \frac{1}{\sqrt{2x}}$

$f(x) = (4x^2 + 8)^5$ $f'(x) = 40x(4x^2 + 8)^4$

outside: $5(4x^2 + 8)^4$; inside: $8x$ derivative of the outside times the derivative of the inside

$5(4x^2 + 8)^4(8x) = 40x(4x^2 + 8)^4$

Problems 1 and 2 worked out · Version 0A

$f(x) = \sqrt{6x + 4}$ $f'(x) = \frac{3}{\sqrt{6x + 4}}$

derivative of $\sqrt{u}$ is $1 \div (2\sqrt{u})$, times u'

$\frac{6}{2\sqrt{6x + 4}} = \frac{3}{\sqrt{6x + 4}}$

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

derivative of $\sqrt{u}$ is $1 \div (2\sqrt{u})$, times u'

$\frac{6}{2\sqrt{6x + 2}} = \frac{3}{\sqrt{6x + 2}}$

The chain rule · Version 0A

1) $\frac{3}{\sqrt{6x + 4}}$ 2) $\frac{3}{\sqrt{6x + 2}}$ 3) $-36x(-3x^2 - 3)^5$

4) $\frac{2}{\sqrt{4x - 4}}$ 5) $-40x(-4x^2 - 2)^4$ 6) $\frac{2}{\sqrt{4x + 1}}$

7) $\frac{2}{\sqrt{4x - 1}}$ 8) $-24x(-2x^2 - 7)^5$ 9) $-2(-x + 4)$

10) $3(x - 3)^2$ 11) $\frac{2}{\sqrt{4x}}$ 12) $\frac{1}{\sqrt{2x + 5}}$ 13) $20(5x - 6)^3$

14) $\frac{4}{\sqrt{8x + 9}}$ 15) $\frac{1}{\sqrt{2x - 2}}$