THE CHAIN RULE

1 Use the chain rule to differentiate:

(a) $y = (x^2 - 4)^5$ **(b)** $f(x) = \sqrt{5x - 1}$ **(c)** $y = (x^3 - 3x)^4$

(g) $f(x)=\sqrt{x^2-2x}$

(h) $f(t)=(t^2+4)^{-2}$

(i) $y=\sqrt{25-x^2}$

3 Find the derivative of each function.

(a) $y = \sqrt{x^2 - 4}$ **(b)** $f(x) = \left(x^2 + 1\right)^{\frac{1}{2}}$ **(c)** $y = (1 + 2x)^{-1}$

3 Find the derivative of each function.

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

(h) $f(t) = (t^2 + 4)^{-2}$

(i) $y = \left(x - \frac{1}{x}\right)^4$

4 For $g(x)=x^2+5x+\sqrt[3]{x^2-4}$, indicate whether each statement is correct or incorrect.

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

(b) $g'(x)=4x$

(c) $g'(x)=2x+5+\frac{2x}{3}\left(x^2-4\right)^{-\frac{2}{3}}$

(d) $g'(x)=2x+5+\frac{2x}{3\left(x^2-4\right)^{\frac{2}{3}}}$

5 Find the derivative of each function.

(a) $y = (x-3)(3x+4)^6$ **(b)** $f(x) = x^2\sqrt{1-x^2}$ **(c)** $h(t) = t^3 + (4-t)^4$