

Differentiation 1 (answers)

1. (a) $6x + 6$ (b) $4x^3 + 2x^{-2}$ (c) $8x + 12$
2. (a) $4x^3 - 5x^4$ (b) $6x - 3x^{-4}$ (c) $-x^{-2} - \frac{2}{3}x^{-3}$
- (d) $\frac{5}{2}t^{\frac{3}{2}} + 2t$ (e) $-\frac{4}{3}p^{-\frac{7}{3}} + \frac{1}{3}p^{-\frac{4}{3}}$ (f) $\frac{1}{2}u^{-\frac{1}{2}} - \frac{1}{4}u^{-\frac{3}{2}}$
- (g) $1 - 4x^{-3}$ (h) $\frac{5}{2}v^{-\frac{1}{2}} - v^{-\frac{3}{2}}$ (i) $\frac{1}{2}t^{-\frac{1}{2}}$
3. (a) 4 (b) -3
4. $y = -8x - 3$
5. f is increasing when $0 < x < 1$.
6. (a) $(\frac{2}{3}, \frac{32}{27})$, *Max.*, $(2, 0)$, *Min.*
- (b) $(0, 0)$ and $(2, 0)$
- (c)
7. (a) $h = \frac{4000}{x^2}$
- (b) Proof
- (c) 20 by 20 by 10 (since $x = 20$ and $h = 10$)

Differentiation 2 (answers)

1. $\frac{3}{2}x^{\frac{1}{2}} - \frac{1}{2x^{\frac{3}{2}}}$
2. $f'(x) = 1 + 9x^{-\frac{5}{2}}$
3. $\theta = 63^\circ$
4. proof
5. T(-1,-4), $y = 6x + 2$
6. (a) Proof (b) Proof (c) Proof
- (d) $x = 1.04$ and $w = 1.39$ metres