

INTEGRATION

Answers

$$1 \quad \mathbf{a} \quad \frac{1}{3}x^3 + c \quad \mathbf{b} \quad \frac{1}{7}x^7 + c \quad \mathbf{c} \quad \frac{1}{2}x^2 + c \quad \mathbf{d} \quad -\frac{1}{3}x^{-3} + c \quad \mathbf{e} \quad 5x + c \quad \mathbf{f} \quad x^3 + c$$

$$\mathbf{g} \quad \frac{1}{2}x^8 + c \quad \mathbf{h} \quad -6x^{-1} + c \quad \mathbf{i} \quad \frac{4}{3}x^6 + c \quad \mathbf{j} \quad \frac{1}{6}x^2 + c \quad \mathbf{k} \quad -\frac{1}{4}x^{-8} + c \quad \mathbf{l} \quad -\frac{3}{8}x^{-2} + c$$

$$2 \quad \mathbf{a} \quad = x^2 + 3x + c \quad \mathbf{b} \quad = 3x^4 - 2x^2 + c \quad \mathbf{c} \quad = 7x - \frac{1}{3}x^3 + c \quad \mathbf{d} \quad = \frac{1}{3}x^3 + \frac{1}{2}x^2 + x + c$$

$$\mathbf{e} \quad = \frac{1}{5}x^5 + \frac{5}{3}x^3 + c \quad \mathbf{f} \quad = \int (x^3 - 3x) dx = \frac{1}{4}x^4 - \frac{3}{2}x^2 + c \quad \mathbf{g} \quad = \int (x^2 - 4x + 4) dx = \frac{1}{3}x^3 - 2x^2 + 4x + c \quad \mathbf{h} \quad = \frac{3}{5}x^5 + \frac{1}{3}x^3 - 6x + c$$

$$\mathbf{i} \quad = \int (2 + x^{-2}) dx = 2x - x^{-1} + c \quad \mathbf{j} \quad = \int (x - x^{-3}) dx = \frac{1}{2}x^2 + \frac{1}{2}x^{-2} + c \quad \mathbf{k} \quad = \int (2x^{-2} - 3x^2) dx = -2x^{-1} - x^3 + c \quad \mathbf{l} \quad = \int (x^2 - 8 + 16x^{-2}) dx = \frac{1}{3}x^3 - 8x - 16x^{-1} + c$$

$$3 \quad \mathbf{a} \quad = \frac{2}{3}y^{\frac{3}{2}} + c \quad \mathbf{b} \quad = \frac{2}{7}y^{\frac{7}{2}} + c \quad \mathbf{c} \quad = 2y^{\frac{1}{2}} + c$$

$$\mathbf{d} \quad = 3y^{\frac{4}{3}} + c \quad \mathbf{e} \quad = \frac{4}{7}y^{\frac{7}{4}} + c \quad \mathbf{f} \quad = 15y^{\frac{1}{3}} + c$$

$$\mathbf{g} \quad = \int y^{\frac{1}{4}} dx = \frac{4}{5}y^{\frac{5}{4}} + c \quad \mathbf{h} \quad = \int 7y^{-\frac{1}{2}} dx = 14y^{\frac{1}{2}} + c \quad \mathbf{i} \quad = \int \frac{1}{2}y^{-2} dx = -\frac{1}{2}y^{-1} + c$$

$$\mathbf{j} \quad = \int y^{\frac{3}{2}} dx = \frac{2}{5}y^{\frac{5}{2}} + c \quad \mathbf{k} \quad = \int \frac{5}{2}y^{-4} dx = -\frac{5}{6}y^{-3} + c \quad \mathbf{l} \quad = \int \frac{1}{3}y^{-\frac{1}{2}} dx = \frac{2}{3}y^{\frac{1}{2}} + c$$

$$4 \quad \mathbf{a} \quad = 2t^{\frac{3}{2}} - t + c \quad \mathbf{b} \quad = \int (2r + r^{\frac{1}{2}}) dr = r^2 + \frac{2}{3}r^{\frac{3}{2}} + c \quad \mathbf{c} \quad = \int (9p^2 - 6p + 1) dp = 3p^3 - 3p^2 + p + c \quad \mathbf{d} \quad = 2x^2 + \frac{3}{4}x^{\frac{4}{3}} + c$$

$$\mathbf{e} \quad = \int (y^{-3} + y) dy = -\frac{1}{2}y^{-2} + \frac{1}{2}y^2 + c \quad \mathbf{f} \quad = \frac{1}{6}x^3 - \frac{2}{5}x^{\frac{5}{2}} + c \quad \mathbf{g} \quad = \int (t^2 + 2) dt = \frac{1}{3}t^3 + 2t + c \quad \mathbf{h} \quad = \frac{3}{8}r^{\frac{8}{3}} - \frac{3}{5}r^{\frac{5}{3}} + c$$

$$\mathbf{i} \quad = \int (2p^3 - \frac{1}{2}p) dp = \frac{1}{2}p^4 - \frac{1}{4}p^2 + c \quad \mathbf{j} \quad = 4y - \frac{4}{11}y^{\frac{11}{4}} + c \quad \mathbf{k} \quad = \int (\frac{1}{3}x^{-2} + 2) dx = -\frac{1}{3}x^{-1} + 2x + c \quad \mathbf{l} \quad = \int (2t^{\frac{1}{2}} + 3t^{-\frac{1}{2}}) dt = \frac{4}{3}t^{\frac{3}{2}} + 6t^{\frac{1}{2}} + c$$

- 5 **a** $= x^3 - \frac{1}{2}x^2 + 6x + c$ **b** $= \frac{1}{7}x^7 - \frac{1}{4}x^4 + x^2 - 5x + c$ **c** $= \int (x^3 - x^2 - 2x) dx$
 $= \frac{1}{4}x^4 - \frac{1}{3}x^3 - x^2 + c$
- d** $= \int (x + 4x^{\frac{1}{2}} + 4) dx$ **e** $= \int (2x^3 + 3x^2 - 8x - 12) dx$ **f** $= \int (x^3 - 2x^{\frac{4}{3}} + 7x^{-2}) dx$
 $= \frac{1}{2}x^2 + \frac{8}{3}x^{\frac{3}{2}} + 4x + c$ $= \frac{1}{2}x^4 + x^3 - 4x^2 - 12x + c$ $= \frac{1}{4}x^4 - \frac{6}{7}x^{\frac{7}{3}} - 7x^{-1} + c$
- g** $= \int (\frac{1}{4}x^{-3} - \frac{2}{3}x^{-2}) dx$ **h** $= \int (1 - 4x^{-2} + 4x^{-4}) dx$ **i** $= \int (x^4 + x^{\frac{5}{2}} - x^{\frac{3}{2}} - 1) dx$
 $= -\frac{1}{8}x^{-2} + \frac{2}{3}x^{-1} + c$ $= x + 4x^{-1} - \frac{4}{3}x^{-3} + c$ $= \frac{1}{5}x^5 + \frac{2}{7}x^{\frac{7}{2}} - \frac{2}{5}x^{\frac{5}{2}} - x + c$
- 6 **a** $y = \int (8x + 3) dx$ **b** $y = \int (\frac{1}{2}x^3 - x^2) dx$ **c** $y = \int \frac{4}{3}x^{-3} dx$
 $y = 4x^2 + 3x + c$ $y = \frac{1}{8}x^4 - \frac{1}{3}x^3 + c$ $y = -\frac{2}{3}x^{-2} + c$
- d** $y = \int (x^3 + 3x^2 + 3x + 1) dx$ **e** $y = \int (2x - 3x^{-\frac{1}{2}}) dx$ **f** $y = \int (x^{\frac{3}{2}} - 2x^{-\frac{3}{2}}) dx$
 $y = \frac{1}{4}x^4 + x^3 + \frac{3}{2}x^2 + x + c$ $y = x^2 - 6x^{\frac{1}{2}} + c$ $y = \frac{2}{5}x^{\frac{5}{2}} + 4x^{-\frac{1}{2}} + c$
- g** $y = \int (\frac{3}{2}x^{-2} - \frac{1}{2}) dx$ **h** $y = \int (10x^{-3} - 2x^{-2}) dx$ **i** $y = \int (3x^{\frac{1}{2}} - \frac{2}{3}x^{-\frac{1}{2}}) dx$
 $y = -\frac{3}{2}x^{-1} - \frac{1}{2}x + c$ $y = -5x^{-2} + 2x^{-1} + c$ $y = 2x^{\frac{3}{2}} - \frac{4}{3}x^{\frac{1}{2}} + c$