## S. 23/2

a) $\int_0^4 2x\,dx = [x^2]_0^4 = 16 - 0 = \underline{16}$

b) $\int_0^4 -u\,du = [-\frac{1}{2}u^2]_0^4 = -\frac{1}{2}\cdot 4^2 - 0 = \underline{-8}$

c) $\int_1^{-4} kx\,dx = [\frac{1}{2}kx^2]_1^{-4} = \frac{1}{2}k(-4)^2 - \frac{1}{2}k\cdot 1^2 = \underline{7{,}5k}$

d) $\int_0^2 3x^2\,dx = [x^3]_0^2 = 2^3 - 0^3 = \underline{8}$

e) $\int_{-2}^4 kt^2\,dt = [\frac{1}{3}kt^3]_{-2}^4 = \frac{1}{3}k4^3 - \frac{1}{3}k\cdot(-2)^3 = \frac{64}{3}k + \frac{8}{3}k = \frac{72}{3}k = \underline{24k}$

f) $\int_1^5 k\,dx = [kx]_1^5 = 5k - 1k = \underline{4k}$

g) $\int_{-2}^2 ax^3\,dx = [\frac{1}{4}ax^4]_{-2}^2 = \frac{1}{4}a\cdot 2^4 - \frac{1}{4}a\cdot(-2)^4 = \underline{0}$

h) $\int_{-1}^1 (2x-1)\,dx = [x^2 - x]_{-1}^1 = 1^2 - 1 - ((-1)^2 - (-1)) = 1-1-1-1 = \underline{-2}$

i) $\int_{-2}^{-1} \frac{1}{3}v^2\,dv = [\frac{1}{9}v^3]_{-2}^{-1} = \frac{1}{9}\cdot(-1)^3 - \frac{1}{9}\cdot(-2)^3 = -\frac{1}{9} + \frac{8}{9} = \underline{\frac{7}{9}}$

k) $\int_3^{-3} 3x^5\,dx = [\frac{1}{2}x^6]_3^{-3} = \frac{1}{2}\cdot(-3)^6 - \frac{1}{2}\cdot 3^6 = \underline{0}$

l) $\int_{10}^{20} dx = [x]_{10}^{20} = 20 - 10 = \underline{10}$

m) $\int_{-1}^1 k^4t^2\,dt = [\frac{1}{3}k^4t^3]_{-1}^1 = \frac{1}{3}k^4 1^3 - \frac{1}{3}k^4(-1)^3 = \underline{\frac{2}{3}k^4}$

## S. 23/6

b)

$F(x) = -\frac{1}{4}x^4 + 1{,}5x^2$; $F'(x) = -\frac{1}{4}\cdot 4x^3 + 1{,}5\cdot 2x = -x^3 + 3x$ ✓

$\int_{-4}^4 (-x^3 + 3x)\,dx = [-\frac{1}{4}x^4 + 1{,}5x^2]_{-4}^4 = -\frac{1}{4}\cdot 4^4 + 1{,}5\cdot 4^2 - (-\frac{1}{4}\cdot(-4)^4 + 1{,}5\cdot(-4)^2)$

$= -64 + 32 + 64 - 32 = \underline{0}$

d) $F(t) = \frac{2t}{2t+1}$; $F'(x) = \frac{(2t+1)\cdot 2 - 2t\cdot 2}{(2t+1)^2} = \frac{4t+2-4t}{(2t+1)^2} = \frac{2}{(2t+1)^2}$ ✓

$\int_0^4 \frac{2}{(2t+1)^2}\,dt = [\frac{2t}{2t+1}]_0^4 = \frac{2\cdot 4}{2\cdot 4+1} - \frac{2\cdot 0}{2\cdot 0+1} = \underline{\frac{8}{9} = 0{,}\overline{8}}$