$$\int_a^b g'(x)\cdot h(x)\,dx = \left[g(x)\cdot h(x)\right]_a^b - \int_a^b g(x)\cdot h'(x)\,dx$$

d) $$\int_1^2 3x^2 \ln(x)\,dx = \left[x^3 \ln(x)\right]_1^2 - \int_1^2 x^3 \cdot \frac{1}{x}\,dx$$

$$= \left[x^3 \ln(x)\right]_1^2 - \left[\frac{1}{3}x^3\right]_1^2$$

$$= 8\ln(2) - \frac{7}{3} \approx 3{,}2$$