Integrals are the opposite of derivatives; if we integrate something and then differentiate the result, we should get back to where we started. It corresponds to the area under a curve and is defined as $\int_a^b f(x)dx = \lim_{\Delta x \to 0} \sum_{i=a}^{b} f(x_i)\Delta x$. In practice, one evaluates the integral of a polynomial by $\int ax^n dx = \frac{a}{n+1}x^{n+1} + C$, where C is a constant of integration, a is any constant and n is a constant that is not equal to -1. This is an indefinite integral; a definite integral is over a specified range: $\int_{t_1}^{t_2} at^n dt = \frac{a}{n+1}(t_2^{n+1} - t_1^{n+1})$. In this case, the constant of integration cancels, so you can ignore it.

1. Evaluate $\int 3dy$
2. Evaluate $\int (4x^4 - 2x^2 + 7)dx$
3. Evaluate $\int (7z^6 - 55z^{10} - 3z^{14})dz$
4. Evaluate $\int (8t^{-2} + 16t^{-4} + 3t^2)dt$
5. Evaluate $\int (3x^{-3} + 5x^{-5} - 1)dx$
6. Evaluate $\int (2\sqrt[3]{t} + 4\sqrt[5]{t^3})dt$
7. Evaluate $\int (\sqrt{x^7} - \sqrt[7]{x^2} + 2\sqrt[3]{x^7})dx$
8. Evaluate $\int (2t^2 - 1)(1 + 5t)dt$
9. Determine $f(x)$ given that $f'(x) = 3x^5 - 4x^3 - 2x^2 + 7$
10. Determine $h(t)$ given $h'(t) = 3t^{-4} - t^{-3} + t^{-2} - 1$

11. Evaluate $\int_1^3 3dy$
12. Evaluate $\int_1^4 (16x^3 - 6x^2 + 2)dx$
13. Evaluate $\int_{-2}^1 (3t^2 - 5t + 7)dt$
14. Evaluate $\int_3^0 (5x^4 - 3x^2 + x)dx$
15. Evaluate $\int_1^4 \left(\frac{2}{\sqrt{t}} - 3\sqrt{t^3}\right) dt$
16. Evaluate $\int_{-4}^{-1} z^2(5 - 7z)dz$
17. Evaluate $\int_2^1 \frac{3y^5 - 6y^4}{y^4} dy$
18. Evaluate $\int_1^2 (zt^{-2} - tz^{-2})dt$
19. Evaluate $\int_1^2 (zt^{-2} - tz^{-2})dz$
20. Determine the area under the curve $v(t) = 50\,\mathrm{m/s} + (9.8\,\mathrm{m/s^2})t - (0.15\,\mathrm{m/s^3})t^2$ from $t = 0$ to $t = 5$