

## Integration practice #1

Write the indefinite integrals

1.  $\int 3x(x^2 + 5)^5 . dx$

2.  $\int \frac{x + 10}{5x} . dx$

3.  $\int \sqrt{4x + 3} . dx$

4.  $\int \frac{1}{2x+1} + e^{3x} . dx$

Calculate the definite integrals:

5.  $\int_1^3 (3x + 4)\sqrt{x} . dx$

6.  $\int_0^3 \frac{x}{x^2 + 1} . dx$

7.  $\int_0^{\pi/8} \frac{4}{\cos^2(2x)} . dx$

8.  $\int_1^8 \frac{4x + x^2}{\sqrt[3]{x}} . dx$

## Answers: Integration practice #1

Write the indefinite integrals

$$1. \quad \int 3x(x^2 + 5)^5 . dx = \frac{3}{2 \times 6} (x^2 + 5)^6 + c = \frac{1}{4} (x^2 + 5)^6 + c$$

$$2. \quad \int \frac{x + 10}{5x} . dx = \int \frac{1}{5} + \frac{2}{x} . dx = \frac{1}{5} x + 2 \ln x + c$$

$$3. \quad \int \sqrt{4x + 3} . dx = \frac{1}{4 \times 1.5} (4x + 3)^{1.5} + c = \frac{1}{6} (4x + 3)^{1.5} + c$$

$$4. \quad \int \frac{1}{2x+1} + e^{3x} . dx = \frac{1}{2} \ln |2x + 1| + \frac{1}{3} e^{3x} + c$$

Calculate the definite integrals:

$$5. \quad \int_1^3 (3x + 4)\sqrt{x} . dx = \int_1^3 3x^{1.5} + 4x^{0.5} . dx = \left[ \frac{3}{2.5} x^{2.5} + \frac{4}{1.5} x^{1.5} \right]_1^3$$
$$= 28.70$$

$$6. \quad \int_0^3 \frac{x}{x^2 + 1} . dx = \left[ \frac{1}{2} \ln |x^2 + 1| \right]_0^3$$
$$= 1.151$$

$$7. \quad \int_0^{\pi/8} \frac{4}{\cos^2(2x)} . dx = \int_0^{\pi/8} 4 \sec^2 2x . dx = \left[ \frac{4}{2} \tan 2x \right]_0^{\pi/8}$$
$$= 2$$

$$8. \quad \int_1^8 \frac{4x + x^2}{\sqrt[3]{x}} . dx = \int_1^8 x^{-1/3} (4x + x^2) . dx = \int_1^8 4x^{2/3} + x^{5/3} . dx$$
$$= \left[ \frac{4 \times 3}{5} x^{5/3} + \frac{3}{8} x^{8/3} \right]_1^8 = 170.025$$