# Exercise 21E.1  Integraler

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**1. Find:**

**1.1. a)**

$$\int (x^4 - x^2 - x + 2)dx$$

$$f(x) = x^4 - x^2 - x + 2$$

$$F(x) = \frac{x^5}{5} - \frac{x^3}{3} + \frac{x^2}{2} + 2x + c$$

**1.2. b)**

$$\int (\sqrt{x} + e^x)dx$$

$$f(x) = \sqrt{x} + e^x$$

$$F(x) = 2 * \frac{x^{\frac{3}{2}}}{3} + e^x + c$$

**1.3. c)**

$$\int (3e^x - \frac{1}{x})dx$$

$$f(x) = 3e^x - \frac{1}{x}$$

$$F(x) = 3e^x - ln(|x|) + c$$

**1.4. d)**

$$\int (x\sqrt{x} - \frac{2}{x})dx$$

$$f(x) = x\sqrt{x} - \frac{2}{x}$$

$$f(x) = x * x^{\frac{1}{2}} - \frac{2}{x}$$

$$F(x) = \frac{2 * x^{\frac{5}{2}}}{5} - 2 * ln(|x|) + c$$

**1.5. e)**

$$\int (\frac{1}{x\sqrt{x}} + \frac{4}{x})dx$$

$$f(x) = \frac{1}{x\sqrt{x}} + \frac{4}{x}$$

$$F(x) = 4 * ln(|x|) - \frac{2}{\sqrt{x}} + c$$

**1.6. f)**

$$\int (\frac{1}{2} x^3 - x^4 + x^{\frac{1}{3}})dx$$

$$f(x) = \frac{1}{2} x^3 - x^4 + x^{\frac{1}{3}}$$

$$F(x) = \frac{x^4}{8} - \frac{x^5}{5} + \frac{3x^{\frac{4}{3}}}{4} + c$$

**1.7. g)**

$$\int (x^2 + \frac{3}{x})dx$$

$$f(x) = x^2 + \frac{3}{x}$$

$$F(x) = \frac{x^3}{3} + 3 * ln(|x|) + c$$

**1.8. h)**

$$\int (\frac{1}{2x} + x^2 - e^x)dx$$

$$f(x) = \frac{1}{2x} + x^2 - e^x)dx$$

$$F(x) = ln(|2x|) + \frac{x^3}{3} - e^x + c$$

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**1.9. i)**

$$\int (5e^x + \frac{1}{3}x^3 - \frac{4}{x})dx$$

$$f(x) = 5e^x + \frac{1}{3}x^3 - \frac{4}{x}$$

$$F(x) = 5e^x + \frac{x^4}{12} - 4 * ln(|x|) + c$$

$$\int (5e^x + \frac{1}{3}x^3 - \frac{4}{x})dx = 5e^x + \frac{x^4}{12} - 4 * ln(|x|) + c$$

## 2. Integrate with respect to x:

**2.1. a)**

$$\int (3 \sin x - 2)dx$$

$$= -3 \cos x - 2x + c$$

**2.6. f)**

$$\int (- \sin x + 2\sqrt{x})dx$$

$$= \cos x + \frac{4x^{\frac{3}{2}}}{3}$$

**2.2. b)**

$$\int (4x - 2 \cos x)dx$$

$$= 2x^2 - 2 \sin x + c$$

**2.3. c)**

$$\int (\sin x - 2 \cos x + e^x)dx$$

$$= - \cos x - 2 \sin x + e^x + c$$

**2.4. d)**

$$\int (x^2\sqrt{x} - 10 \sin x)dx$$

$$= \frac{x^3}{3} * \frac{2x^{\frac{3}{2}}}{3} - 10 \cos x + c$$

**2.5. e)**

$$\int (\frac{x(x-1)}{3} + \cos x)dx$$

$$\int (\frac{x^2}{3} - \frac{x}{3} + \cos x)dx$$

$$= \frac{x^3}{9} - \frac{x^2}{4} + \sin x + c$$

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**3. Evaluate the following and check with your graphing calculator:**

**3.1. a)**

$$\int_0^1 (x^3)\,dx$$

$$= [\frac{x^4}{4}]^1_0$$

$$F(1) - F(0) = \frac{1^4}{4} - \frac{0^4}{4}$$

$$= 1 - \frac{1}{4} = \frac{3}{4}$$

Jag lyckades inte så bra med [ ] symbolerna, jag ska hitta ett sätt att få till det snyggare innan jag gör klart resten.

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