Zadania z analizy matematycznej. Całki.

1. Oblicz całki nieoznaczone:

   (a) $\int \left(x^3 - 2x^2 + 5 + \frac{1}{x}\right)\, dx$,
   (b) $\int (\sqrt{x} + \sqrt[4]{x} - \sqrt[3]{x^7})\, dx$,
   (c) $\int \left(\frac{1}{\sqrt{x}} - \frac{3}{\sqrt[3]{x^5}}\right)\, dx$,
   (d) $\int \frac{10x^8 - 3}{x^3}\, dx$,
   (e) $\int x \cdot e^x\, dx$,
   (f) $\int x^2 \cdot e^x\, dx$,
   (g) $\int x \sin x\, dx$,
   (h) $\int x^2 \cos x\, dx$,
   (i) $\int \sin x \cos x\, dx$,
   (j) $\int e^x \sin x\, dx$,
   (k) $\int (2x + 3) \cdot \sin x\, dx$,
   (l) $\int e^{3x}\, dx$,
   (m) $\int \cos(3x + 2)\, dx$,
   (n) $\int \sin \frac{x}{2}\, dx$,
   (o) $\int \sqrt{-4x + 2}\, dx$,
   (p) $\int (3x + 2)^{23}\, dx$,
   (q) $\int x \cdot e^{x^2}\, dx$,
   (r) $\int \frac{1}{x \ln x}\, dx$,
   (s) $\int \frac{2x}{x^2 - 4}\, dx$,
   (t) $\int \frac{\sin x}{3 \cos x + 5}\, dx$,
   (u) $\int \frac{3}{4x - 2}\, dx$,
   (v) $\int x\sqrt{x^2 + 1}\, dx$,
   (w) $\int \frac{e^{1/x}}{x^2}\, dx$,
   (x) $\int 6^{1-x}\, dx$,
   (y) $\int \frac{x}{\sqrt{x^2 + 6}}\, dx$.

2. Oblicz całki funkcji wymiernych:

   (a) $\int \frac{1}{x^2 - 25}\, dx$,
   (b) $\int \frac{1}{x^2 - 5x + 6}\, dx$,
   (c) $\int \frac{1}{x^2 + 1}\, dx$,
   (d) $\int \frac{1}{x^2 + 3x + 3}$,
   (e) $\int \frac{2x + 7}{x^2 + x - 2}\, dx$,
   (f) $\int \frac{5x - 2}{x^2 + 4}\, dx$,
   (g) $\int \frac{x + 1}{x^2 + x + 1}\, dx$.

3. Oblicz całki oznaczone:

   (a) $\int_3^5 \frac{x}{x^2 - 4}\, dx$,
   (b) $\int_0^2 x \cdot e^x\, dx$,
   (c) $\int_0^\pi (\sin x + \cos x)\, dx$,
   (d) $\int_0^1 x\sqrt{x^2 + 1}\, dx$.

4. Oblicz pola figur ograniczonych krzywymi:

   (a) $y = x^2$, $y = x$,
   (b) $y = x^3$, $y = 4x$,
   (c) $y = x^2 - x - 6$, $-x^2 + 5x + 14$,
   (d) $y = x^2$, $y = x^3$,
   (e) $y = x^2$, $2x - y + 3 = 0$,
   (f) $xy = 4$, $x + y = 5$,
   (g) $y = \sin x$, $x = 0$, $x = \pi$.