Facit till dugga 2 a) och 2 b) i kursen TMV 138, 2014 11 27

Dugga 2 a)

1. (a) falsk
   (b) falsk
   (c) sann
   (d) sann
2. (a)

$$\int \frac{x}{(x^2-1)^{3/2}}\,dx = C - \frac{1}{\sqrt{x^2-1}}$$

   (b)

$$\int_0^{2\pi} \sin(x/2)\,dx = 4\pi.$$

3.

$$\begin{aligned}\int_{-1}^{\infty} \frac{2}{x^2+4x+5}\,dx &= \int_{-1}^{\infty} \frac{2}{(x+1)^2+1}\,dx = \\ &= \lim_{b\to\infty} 2\left[\arctan(x+2)\right]_{-1}^{b} = 2\left(\frac{\pi}{2}-\frac{\pi}{4}\right) = \frac{\pi}{2}\end{aligned}$$

Dugga 2 b)

1. (a) sann
   (b) falsk
   (c) falsk
   (d) sann
2. (a)

$$\int \frac{x}{(x^2+1)^{3/2}}dx = C - \frac{1}{\sqrt{x^2+1}}\,.$$

   (b)

$$\int_0^{2\pi} 4x\cos(2x)\,dx = 0.$$

3.

$$\begin{aligned}\int_{-1}^{0} \frac{x+2}{x^2+4x+5}\,dx &= \frac{1}{2}\int_{-1}^{0} \frac{2x+4}{x^2+4x+5}\,dx = \frac{1}{2}\left[\ln(x^2+4x+5)\right]_{-1}^{0} = \\ &= \frac{1}{2}(\ln 5 - \ln 2) = \frac{1}{2}\ln\left(\frac{5}{2}\right)\end{aligned}$$

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