

Løsningsskitser:

1 Der skal gælde: $y'(t) = 0$, hhv. $x'(t) = 0$.

3 A2, B3, C1.

4 a $\mathbf{t} = [1, 0]$, $\mathbf{n} = [0, 1]$, $\kappa = 0$.

b $\mathbf{t} = \frac{1}{\sqrt{14}}[1, 2, 3]$, $\kappa = \frac{\sqrt{266}}{98} \sim 0.166$.

5 a $\mathbf{r}(t) = [t \cos t, t \sin t] \Rightarrow |\mathbf{r}(t)| = t$.

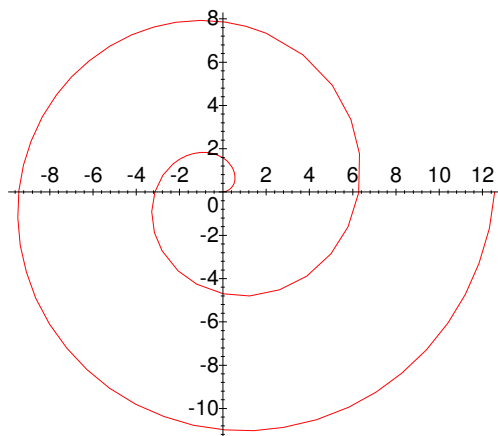
b $\mathbf{r}'(t) = [\cos t - t \sin t, \sin t + t \cos t]$, $v(t) = \sqrt{1 + t^2}$,
 $\mathbf{r}''(t) = [-2 \sin t - t \cos t, 2 \cos t - t \sin t]$,

c

$$\kappa(t) = \frac{2 + t^2}{(1 + t^2)^{\frac{3}{2}}} = \frac{1 + t^2}{(1 + t^2)^{\frac{3}{2}}} + \frac{1}{(1 + t^2)^{\frac{3}{2}}} = \frac{1}{(1 + t^2)^{\frac{1}{2}}} + \frac{1}{(1 + t^2)^{\frac{3}{2}}}.$$

Nævnerne af disse to sidste led er monotont voksende, derfor er begge led – og deres sum – monotont aftagende.

d $|\mathbf{a}_t(t)| = v'(t) = \frac{|\mathbf{r}''(t) \cdot \mathbf{r}'(t)|}{|\mathbf{r}'(t)|} = \frac{t}{\sqrt{1+t^2}}$, $|\mathbf{a}_n(t)| = v^2(t)\kappa(t) = \frac{|\mathbf{r}''(t) \cdot \hat{\mathbf{r}}'(t)|}{|\mathbf{r}'(t)|} = \frac{2+t^2}{\sqrt{1+t^2}}$.



Figur 1: Arkimedes spiral