

Kapitel 1

Kompletterande uppgifter

1.1 Skissera den mängd i planet som i polära koordinater (r, φ) ges av

- a) $0 \leq r \leq 2, \quad 0 \leq \varphi \leq 2\pi,$
- b) $0 \leq r \leq 1, \quad \frac{3\pi}{4} \leq \varphi \leq \frac{5\pi}{4},$
- c) $1 \leq r \leq 3, \quad 0 \leq \varphi \leq 2\pi,$
- d) $2 \leq r \leq 3, \quad \frac{3\pi}{2} \leq \varphi \leq 2\pi,$
- e) $r = 1, \quad 0 \leq \varphi \leq 2\pi,$
- f) $0 \leq r \leq 2, \quad \varphi = \frac{\pi}{4}.$

1.2 Skissera den mängd i rummet som i rymdpolära koordinater (r, θ, φ) ges av

- a) $0 \leq r \leq 1, \quad 0 \leq \theta \leq \pi, \quad 0 \leq \varphi \leq 2\pi,$
- b) $r = 2, \quad 0 \leq \theta \leq \pi, \quad 0 \leq \varphi \leq 2\pi,$
- c) $0 \leq r \leq 3, \quad 0 \leq \theta \leq \frac{\pi}{2}, \quad 0 \leq \varphi \leq \frac{\pi}{2},$
- d) $1 \leq r \leq 2, \quad \frac{\pi}{2} \leq \theta \leq \pi, \quad 0 \leq \varphi \leq 2\pi,$
- e) $0 \leq r \leq 1, \quad \theta = \frac{\pi}{4}, \quad 0 \leq \varphi \leq \pi.$

1.3 Skissera kurvan i planet/rummet som parametriseras av

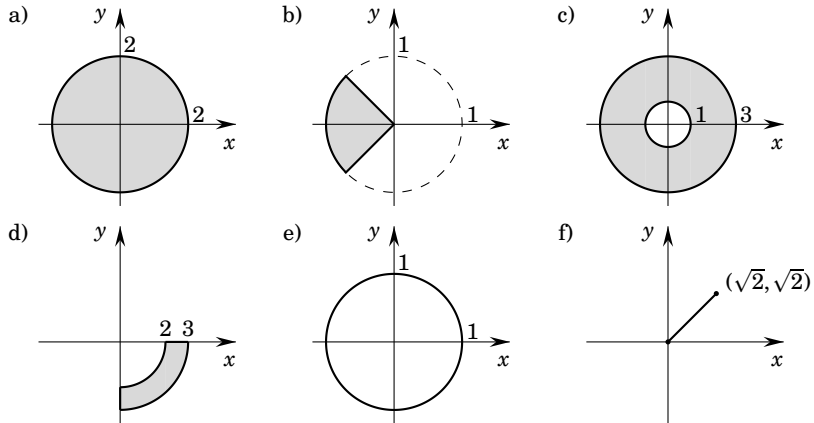
- a) $\mathbf{r}(t) = (t, t^2), \quad -2 \leq t \leq 2$
- b) $\mathbf{r}(t) = (3 \cos t, 3 \sin t), \quad 0 \leq t \leq 2\pi$
- c) $\mathbf{r}(t) = (2 \cos t, 3 \sin t), \quad 0 \leq t \leq 2\pi$
- d) $\mathbf{r}(t) = (1 + \cos t, -1 + \sin t), \quad \pi \leq t \leq 2\pi$
- e) $\mathbf{r}(t) = (-1 + t, 1 - 2t), \quad t \in \mathbb{R}$
- f) $\mathbf{r}(t) = (-1 + t^3, 1 - 2t^3), \quad t \in \mathbb{R}$
- g) $\mathbf{r}(t) = (t, t, 1 - t), \quad 0 \leq t \leq 1$
- h) $\mathbf{r}(t) = (t, 2 \cos t, 2 \sin t), \quad 0 \leq t \leq 2\pi.$

1.4 Skissera ytan som parametriseras av

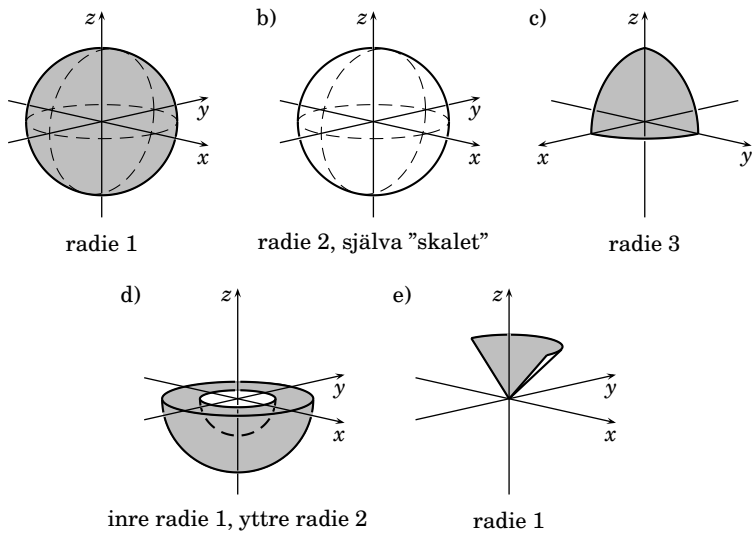
- a) $\mathbf{r}(s, t) = (s, t, s^2 + t^2), \quad 0 \leq s^2 + t^2 \leq 4$
- b) $\mathbf{r}(s, t) = (\cos s, \sin s, t), \quad 0 \leq s \leq 2\pi, t \in \mathbb{R}$
- c) $\mathbf{r}(s, t) = (1, s, t), \quad (s, t) \in \mathbb{R}^2$
- d) $\mathbf{r}(s, t) = (\sin s \cos t, \sin s \sin t, \cos s), \quad 0 \leq s \leq \frac{\pi}{2}, 0 \leq t \leq 2\pi.$

Svar Kapitel 1

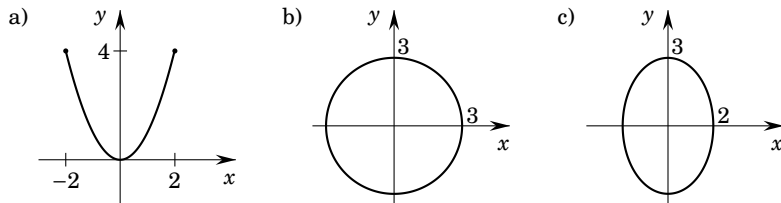
1.1

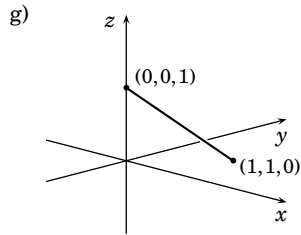
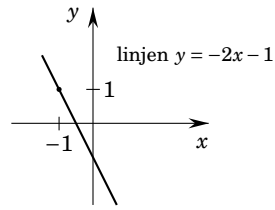
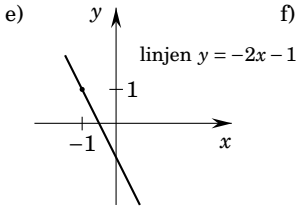
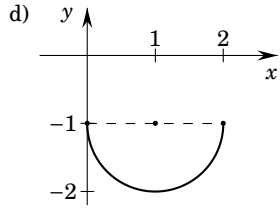


1.2

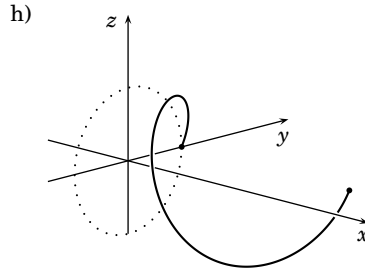


1.3



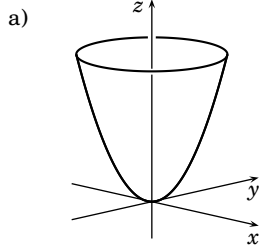


linjestycket mellan $(0, 0, 1)$ och $(1, 1, 0)$

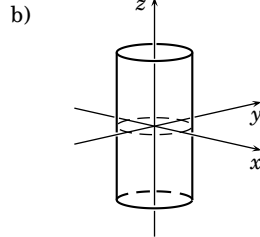


spiral kring x -axeln, "radie" 2

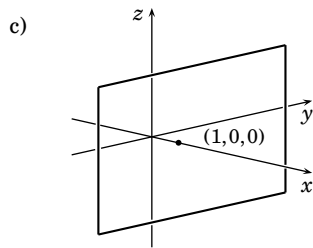
1.4



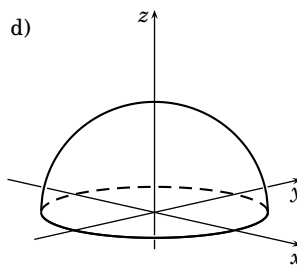
paraboloid, "avskuren" av planet $z = 4$



cylinder kring z -axeln, radie 1, "oändligt" utsträckt



planet $x = 1$



övre halvsfären, radie 1, medelpunkt origo