Øving 3

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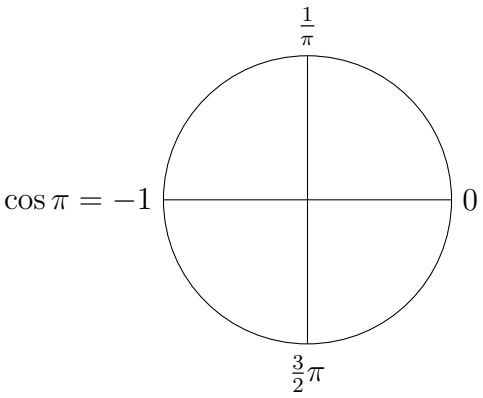
1 (a)

$$\begin{aligned} x^2 - 6x + y^2 + 2y + 7 &= 0 \\ x^2 - 6x + y^2 + 2y + 10 &= 3 \\ (x^2 - 6x + 9) + (y^2 + 2y + 1) &= 3 \\ (x-3)^2 + (y+1)^2 &= 3 \end{aligned}$$

$\boxed{sentrum = (3, -1)}$ og $\boxed{radius = \sqrt{3}}$

(b) Likningen $x^2 - 6x + 2y^2 + 4y + 7 = 0$ er ikke likningen til en sirkel fordi leddet $2y^2$ hindrer at y-delen kan skrives om til et fullstendig kvadrat. Likningen er derimot likningen til en ellipse hvis det er av interessant informasjon.

2 (a)



$\boxed{\cos x = -1, \text{ for } x = \pi + 2\pi \cdot n}$

(b)

$$\begin{aligned} \cos(2x) &= 1 - 2\sin^2(x) \\ \cos^2(x) - \sin^2(x) &= 1 - 2(1 - \cos^2(x)) \\ \cos^2(x) - \sin^2(x) &= 2\cos^2(x) - 1 \\ -\cos^2(x) - \sin^2(x) &= -1 \\ \cos^2(x) + \sin^2(x) &= 1 \end{aligned}$$

3

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\begin{aligned}
x^2 + 2x + 2 &> 50 \\
x^2 + 2x + 2 - 50 &> 0 \\
x^2 + 8x - 6x - 48 &> 0 \\
x(x+8) - 6(x+8) &> 0 \\
(x+8)(x-6) &> 0 \\
\boxed{x \in \langle \leftarrow, -8 \rangle} &\wedge \boxed{x \in \langle 6, \rightarrow \rangle}
\end{aligned}
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4

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\begin{aligned}
e^{2x} + e^x - 2 = 0, \quad u = e^x \\
u^2 + u - 2 = 0 \\
u = -2 \quad &\wedge \quad u = 1 \\
e^x = -2 \quad &\wedge \quad e^x = 1 \\
x \notin \mathbb{R} \quad &\wedge \quad x = \ln(1) = 0 \\
&\boxed{x = 0}
\end{aligned}
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