M 408M Discussion Session
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Polar Coordinates

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1. \( x = r \sin \theta, \ y = r \cos \theta \)
2. \( x^2 + y^2 = r^2, \ \tan \theta = \frac{y}{x} \).
3. A point on the plane has many polar coordinates representations.
4. Example: \( P = (1, 1) \).
1. Example: Vertical line

\[ x = a \]

\[ r \cos \theta = a \Rightarrow r = \frac{a}{\cos \theta}. \]
1. Completing the squares

\[ x^2 + y^2 + 3x + 4 = 0. \]

\[ x^2 + y^2 + 5y - \pi = 0. \]

\[ x^2 + y^2 + 7x - 9y = 0. \]