

Conic Sections and Parametric Equations: math test, Grade 12 – download the PDF

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Circle

/ 4 pts

Consider $x^2 + y^2 + 6x - 10y + 18 = 0$.

- Write it in standard form and give the center and radius.
- Is the point $(-3, 9)$ on the circle?
- Find where the circle meets the line $y = 5$.

2 Parabola

/ 4 pts

Consider $y^2 = 16x$.

- Give the vertex, focus and directrix.
- Find the points with $x = 9$ and show that each is 13 units from the focus.

3 Ellipse

/ 4 pts

An ellipse has equation $16x^2 + 25y^2 = 400$.

- Write it in standard form and find a , b , c and the vertices.
- Give the foci and the eccentricity.
- The point $P\left(3, \frac{16}{5}\right)$ lies on the ellipse. Compute the sum of its distances to the foci.

4 Hyperbola

/ 4 pts

Consider $\frac{y^2}{36} - \frac{x^2}{64} = 1$.

- Find a , b , c and the eccentricity.
- Give the vertices, the foci and the asymptotes.

5 Parametric equations

/ 4 pts

- Eliminate t from $x = 1 + 4\cos t$, $y = -2 + 3\sin t$, name the curve and give its center, and the point for $t = \frac{\pi}{2}$.
- Eliminate t from $x = 3t - 1$, $y = t^2$.



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