§11.4, 38. Plot the equation \( r = 1 - 3 \cos \theta \).

Solution: Note that when \( \cos \) has a maximum, at \( \theta = 0 \), we have \( r = -2 \), and when it has a minimum at \( \theta = \pi \) we have \( r = 4 \) (which in Cartesian coordinates is \((-4, 0))

§11.5, 46. Find the length of the polar curve \( r = e^{2\theta} \) \( 0 \leq \theta \leq 2\pi \).

Solution: We use the formula, noting that \( dr/d\theta = 2e^{2\theta} \). So

\[
L = \int_{0}^{2\pi} \sqrt{(e^{2\theta})^2 + (2e^{2\theta})^2} \, d\theta
\]

(1)

\[
= \sqrt{5} \int_{0}^{2\pi} e^{2\theta} \, d\theta
\]

(2)

\[
= \frac{\sqrt{5}}{2} e^{2\theta} \bigg|_{0}^{2\pi} = \frac{\sqrt{5}}{2} (e^{4\pi} - 1)
\]

(3)
§11.6, 20. Find the vertices, foci, and asymptotes of the hyperbola and sketch its
graph:

\[
\frac{y^2}{16} - \frac{x^2}{36} = 1.
\]

Solution: We see that \(a = 4\), \(b = 6\), so that \(c = \sqrt{4^2 + 6^2} = \sqrt{52}\). Thus
the foci are \((0, \pm \sqrt{52})\), the vertices \((0, \pm 4)\) and the asymptotes \(y = \pm \frac{2}{3} x\).
Here is the graph:

§13, 10. Find the distance from \((3, 7, -5)\) to each of the following:

(a) The \(xy\)-plane. Solution: Since the \(z\)-coordinate is \(-5\), the distance
to the \(xy\)-plane is \(\left| -5 \right| = 5\).

(b) The \(yz\)-plane. Solution: Distance=3.

(c) The \(xz\)-plane. Solution: Distance=7.

(d) The \(x\)-axis. Solution: Here, our point is 7 units away from the \(x\)-axis
in the \(y\)-direction and 5 units from the \(x\)-axis in the \(z\)-direction, so
that the point is distance \(\sqrt{7^2 + 5^2} = \sqrt{74}\) units from the \(x\)-axis.

(e) The \(y\)-axis. Solution: \(D = \sqrt{3^2 + 5^2} = \sqrt{34}\).

(f) The \(z\)-axis. Solution: \(D = \sqrt{3^2 + 7^2} = \sqrt{58}\).