Drugs in the Bloodstream If a drug is injected into the bloodstream, the percent of the maximum dosage that is present at time \( t \) is given by

\[
y = 100 \left( 1 - e^{-0.35(10-t)} \right)
\]

where \( t \) is in hours, with \( 0 \leq t \leq 10 \).

a. What percent of the drug is present after 2 hours?

Let \( t = 2 \) and solve for \( y \).

\[
y = 100 \left( 1 - e^{-0.35(10-2)} \right)
\]

\[
y = 100 \left( 1 - e^{-0.35(8)} \right)
\]

\[
y = 100 \left( 1 - e^{-2.8} \right)
\]

\[
y \approx 100 (1 - 0.06081)
\]

\[
y \approx 100 (0.93919)
\]

\[
y \approx 93.919
\]

After 2 hours 93.92% of the drug will remain in the bloodstream.

b. Graph this function.

c. When is the drug totally gone from the bloodstream?

The drug is totally gone from the bloodstream when \( y \% \) equals zero. This is where the graph of \( y \) crosses the \( x \)-axis.

We can see that this happens when \( t = 10 \) and say that after 10 hours the drug is totally gone from the bloodstream.

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1Harshbarger/Yocco, College Algebra In Context, 5e, p. 326, #54.
$100\left(1 - e^{(-35(10-x))}\right)$