Quiz # 3A

(1) A box with a square base has no top. If it has a surface area of 16 square meters, express the volume $V$ of the box as a function of the length $x$ of its base.

Quiz # 3B

(1) A local electronics company finds that money spent on newspaper advertising and the number of iPods that will sell are linearly related. The company found that 80 iPods are sold when $1,000 is spent on advertising and that 120 iPods are sold when $1,800 is spent on advertising. Express the number $N$ of iPods that will sell as a function of the amount $a$ spent on advertising.
Solutions (Quiz # 3A)

Volume \( V = x^2 h \)

Surface area \( 16 = x^2 + 4xh \)

Solve for \( h \):
\[
16 - \frac{x^2}{4x} = h
\]

Substitute in volume formula:
\[
V = x^2 \left( \frac{16 - x^2}{4x} \right)
\]

You don't need to simplify.
Solutions (Quiz #3 B)

\(N=\) # of iPods sold

\(a=\) dollar amt spent on advertising

Given \(a=1000,\ N=80\)

\(a=1800,\ N=120\)

Find equation of line through
\((1000,\ 80)\) and \((1800,\ 120)\)

Slope \(m = \frac{120-80}{1800-1000} = \frac{1}{20}\)

Point slope form: \(N-80 = \frac{1}{20}(a-1000)\)

or \(N = \frac{a}{20} + 30\)

Slope intercept form: \(N = \frac{a}{20} + b\)

Since \(N=80\) when \(a=1000\)

\(\Rightarrow 80 = \frac{1000}{20} + b \Rightarrow b=30\)

(cont'd) Hence \(N = \frac{a}{20} + 30\)
You could also do it the other way around:

\[
\begin{align*}
\begin{array}{c}
N \times a \\
x, y
\end{array} & \begin{array}{c}
(80, 1000) \\
(120, 1800)
\end{array}
\end{align*}
\]

\[
\Rightarrow m = \frac{1800 - 1000}{120 - 80} = 20
\]

\[
\therefore y - 1000 = 20(x - 80)
\]

\[
y = 20x - 600
\]

\[
\Rightarrow a = 20N - 600
\]

solve for \[N = \frac{a}{20} + 30\]