Teen Birth Rate *The birth rate in 2013 for U.S. girls ages 15 to 19 was the lowest since the government began tracking the statistic in 1940. The highest birth rate for U.S. teens was 96.3 per 1000 girls in 1957. In 2013, the birth rate was lowest at 26.3. Let x equal the number of years after 1950.*[1]

a. *what is the slope of the line joining the points* $(7, 96.3)$ *and* $(63, 26.3)$*?*

Notice that x represents the number of years after 1950. So 1957 is represented by $x = 7$ and 2013 is represented by $x = 63$. The y coordinates of these points are the corresponding number of births per 1000 girls.

$$
\begin{aligned}
m &= \frac{y_2 - y_1}{x_2 - x_1} \\
&= \frac{26.3 - 96.3}{63 - 7} \\
&= \frac{-70}{56} \\
&= -1.25
\end{aligned}
$$

b. *What is the average rate of change in the birth rate over this period?*

Between the years 1957 and 2013, the average rate of change (or slope) in birth rate was -1.25 births per 1000 girls.

c. *What does the average rate of change tell about the birth rate?*

Since the rate is negative, we can say that the birth rate had decreased over this time period.

d. *Use the slope from part (a) and the birth rate from 2013 to write the equation of the line. Let x represent the number of years after 1950. (Source: Centers for Disease Control and Prevention)*

From part (a), $m = -1.25$ and the year 2013 corresponds to the point $(63, 26.3)$. Use these values to fill in the point-slope equation for a line and solve for y.

$$
\begin{aligned}
y - y_1 &= m(x - x_1) \\
y - 26.3 &= -1.25(x - 63) \\
y - 26.3 &= -1.25x + 78.75 \\
y &= -1.25x + 105.05
\end{aligned}
$$

The equation of the line representing the number of births per 1000 girls, y, as a function of the number of years after 1950, x, is: $y = -1.25x + 105.05$

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[1]Harshbarger/Yocco, *College Algebra In Context*, 5e, p. 74, #62.