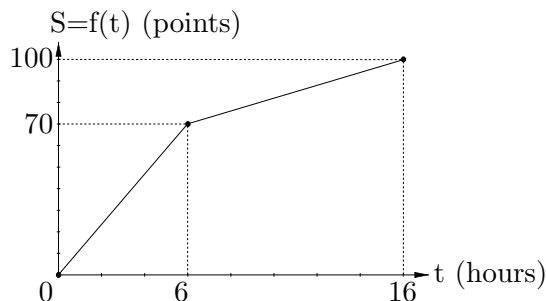


3. [9 points] Let t be the number of hours you spent studying for a midterm, which is worth 100 points. Let S be your score in the midterm, and let G be the letter grade you get. The graph of the function f so that $S = f(t)$ is drawn below.



Also, the function h so that $G = h(S)$ is given by the table below.

S	0 – 35	36 – 50	51 – 74	75 – 86	87 – 100
$G = h(S)$	E	D	C	B	A

For example, if you get a score between 0 and 35, you get an E grade.

- a. [5 points] Find a formula for the function f written as a piecewise defined function.

Solution:

The slope of the line between $(0, 0)$ and $(6, 70)$ is $\frac{70}{6}$. Thus, when $0 \leq t \leq 6$, $f(t) = \frac{70}{6}t$. Also, the slope of the line between $(6, 70)$ and $(16, 100)$ is $\frac{100-70}{16-6} = 3$, so the equation of this line is of the form $S = 3t + c$. Plug in the point $(6, 70)$ to solve for $c = 52$. Thus, when $6 \leq t \leq 16$, $f(t) = 3t + 52$. Putting this together, we obtain

$$f(t) = \begin{cases} \frac{70}{6}t & \text{if } 0 \leq t \leq 6 \\ 3t + 52 & \text{if } 6 \leq t \leq 16 \end{cases}$$

- b. [2 points] What is the minimum amount of time you need to spend studying to get an A in the midterm? Include units and your answer must be exact or accurate up to 2 decimal places.

Solution: The minimum score needed to get an A is 87. Using the equation for f , solve $3t + 52 = 87$, to obtain $t = \frac{35}{3} = 11.66$ hours.

Answer: 11.66 hours.

- c. [2 points] Give a practical interpretation of the statement $h(f(6)) = C$. Use complete sentences in your answer.

Solution: After studying for 6 hours, I will get the letter grade C for the midterm.