5. [10 points] The temperature T in a given room, measured in °F, after an air conditioner is turned on is given by $T = f(t) = 68 + 5e^{-0.02t}$, where t is measured in minutes.

a. [4 points] Find the following limits of $f(t)$:

(i) $\lim_{t\to\infty} f(t) =$ _____

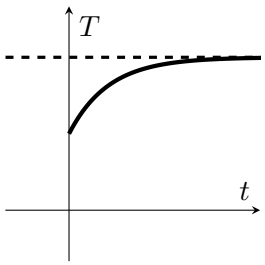
(ii) $\lim_{t\to-\infty} f(t) =$ _____

b. [3 points] Find a formula for $t = f^{-1}(T)$.

$f^{-1}(T) =$ _____

c. [3 points]

The graph of $T = q(t)$ to the right shows the temperature in a different room when being *heated* as a function of time t. The domain shown is $[0, \infty)$ and the dashed line represents a horizontal asymptote of $q(t)$.



Given that behavior, which of the following *could* be a formula for $q(t)$? (*Circle all that apply.*)

$q(t) = 3\log(t+2)$

$q(t) = 50 \cdot 1.02^t$

$q(t) = -0.7^t + 65$

$q(t) = -3\log(t+5)$

$q(t) = -e^{-0.2t} + 67$

$q(t) = -e^{0.1t} + 69$