NAME:

Test 22 (Lessons 43–44): Logarithmic Functions and Their Applications

1) Paulo saved $\$5500$ from a summer job. He finds a high-yield savings account with 4.75% interest that compounds continuously. If Paulo does not add any more money to the account, how long will it take to save $\$6000$? $y = Pe^{rt}$

2) Write the inverse of $h(x)$.

$h(x) = 8^{x-5}$

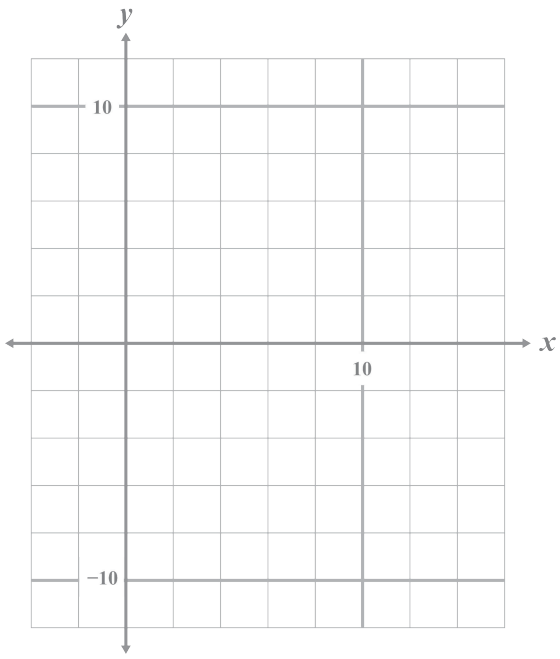
3) Name the domain and range of the inverse of $q(x)$.

$q(x) = e^{x} + 3$

4) Describe the transformation of the functions $f(x)$ to $g(x)$.

$f(x) = \ln(x) + 5 \quad g(x) = \ln(x - 1)$

5) Graph: $y = \log_2 x$



6) Name the end behavior of $y = \log_2 x$.

For problems 7–10 use the description below.

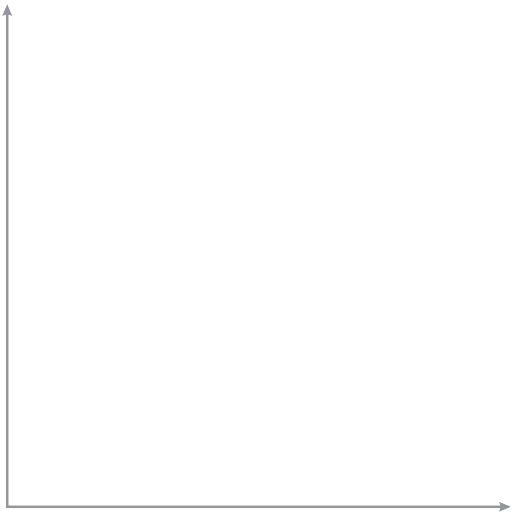
At 8:30 a.m., Douglas drinks a 16 ounce coffee containing 182 milligrams of caffeine. He knows the half-life of caffeine in regular coffee is about five hours. He found a formula that approximates the amount of caffeine in his system at any time:

$$C(t) = C_0(0.5)^{\frac{t}{h}}$$

C_0: Initial amount of caffeine
t: Time in hours
h: Half-life

7) Write the equation.

8) Sketch a graph. Include labels.



9) Determine the approximate amount of caffeine in Douglas' system at 8:30 a.m. the next day.

10) After how many hours will Douglas have one-fourth of the amount of caffeine that he started with that day?