

NAME: \_\_\_\_\_

1. Find  $x$  if  $e^{7.5x} = 6$ , and you are given  $\ln 6 = 1.7918$ .

[A] 4.1858

[B] 1.2500

[C] 0.2389

[D] 0.1333

4. Solve  $44 = 4e^{0.05t}$ . Round your answer to the nearest hundredth.

2. Solve for  $x$  correct to four decimal places:

$$e^{5x} = 6$$

5. Solve  $160 = 8e^{0.035t}$ . Round your answer to the nearest hundredth.

3. Solve for  $x$  correct to four decimal places:

$$e^{8x} = 2.9$$

6. Solve  $e^{2x} + 5 = 8$  using a graphing calculator.

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7. Compare the quantity in Column A with the quantity in Column B.

<u>Column A</u>	<u>Column B</u>
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$x$ , when $e^x = 15$	$e^e$
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- [A] The quantity in Column A is greater.  
[B] The quantity in Column B is greater.  
[C] The two quantities are equal.  
[D] The relationship cannot be determined on the basis of the information supplied.

9. A certain radioactive material decays according to the law  $A = A_0 e^{-0.021t}$ , where  $A_0$  is the initial amount present and  $A$  is the amount present in  $t$  years. What is the half-life of this material? Round the answer to two decimal places.

- [A] 66.01 years                      [B] 95.24 years  
[C] 33.01 years  
[D] impossible to determine without knowing  $A_0$

8. The number of bacteria present in a culture after  $t$  minutes is given as  $B = 100e^{kt}$ . If there are 9790 bacteria present after 7 minutes, find  $k$ .

- [A] 32.088                      [B] 0.764  
[C] 0.655                      [D] 4.584

10. Newton's Law of Cooling is given by the function,  $T(t) = T_r + (T_i - T_r)e^{kt}$ , where  $T(t)$  is the temperature of a heated substance  $t$  minutes after it has been removed from a heat (or cooling) source.  $T_i$  is the substance's initial temperature,  $k$  is a constant for that substance, and  $T_r$  is room temperature.

The initial temperature of a roast beef is  $240^\circ$  F, room temperature is  $70^\circ$ , and  $k = -0.041$ . How long will it take to cool to within one degree of room temperature?

[1] C

[2] 0.3584

[3] 0.1331

[4] 47.96

[5] 85.59

[6] 0.549

[7] B

[8] C

[9] C

[10]  $t = 125$  min