

SM3-A (Base 'e' Exponential)

Period _____

Solve each equation. Remember to check for extraneous solutions.

1) $\sqrt{7k - 34} = k - 4$

- 2) For the following function, provide the following: (a) initial value (b) horizontal asymptote, (c) growth factor.

$$f(x) = 3 \cdot 5^x + 10$$

- 3) For the following function: (a) what is the domain? (b) what is the range?

$$f(x) = 2 \cdot 7^x$$

- 4) A cake was cooked in an oven at 350 degrees Fahrenheit. The cake was removed from the oven and placed on the counter in a room that was at 65 degrees. After 20 minutes the temperature of the cake was 120 degrees.

- a) What is the base exponential (accurate to 3 decimal places)?
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- b) How long will it take to cool to 90 degrees?

- 5) A cup of hot chocolate was heated in the microwave oven to just below boiling (100 C is boiling). When it was removed from the microwave oven the temperature of the hot chocolate was 92 C. After 12 minutes, the hot chocolate had cooled to 50 C. The temperature of the room was 22 C.

- a) What is base of the exponential (accurate to 3 decimal places)?
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- b) How long does it take for it to cool to 30 C?

- 6) A bowl of soup was taken from a pot that was boiling on the stop top (212 degree F). Twenty minutes later the bowl of soup was at 110 F. The temperature of the room was 65 F.

- a) What is base of the exponential (accurate to 3 decimal places)?
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- b) How long does it take for it to cool to 80 F?

- 7) A bar of steel was removed from a blast furnace at 1500 F. It was then "quenched" by dipping it into a tank of oil that was at 100 F. It took 1 minute to reduce the temperature of the steel bar to 400 F.

- a) What is base of the exponential (accurate to 3 decimal places)?
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- b) How long must the steel bar be quenched to lower its temperature to 110 F?

- 8) CitiBank will pay 3.5% annual interest compounded continuously. If you deposit \$500, how much money will you have after 10 years?
- 9) Zions Bank will pay 4.75% annual interest compounded continuously. If you deposit \$500, how much money will you have after 10 years?
- 10) Zions Bank will pay 4.75% annual interest compounded continuously. If you deposit \$500, how long will it take for your money to double?
- 11) Citi Bank will pay 3.5% annual interest compounded continuously. If you deposit \$500, how long will it take for your money to double?
- 12) An arrow is shot up from the top of a 200 foot cliff with an initial upward velocity of 300 feet per sec. The modeling equation is $h(t) = -16t^2 + 300t + 200$
- a) What is the maximum height the arrow will reach?
 - b) When will it reach that height?
 - c) When will it hit the ground at the bottom of the cliff?
- 13) An arrow is shot up from the top of 10 story building (100 feet tall) with an initial upward velocity of 400 feet per sec. The modeling equation is $h(t) = -16t^2 + 400t + 100$
- a) What is the maximum height the arrow will reach?
 - b) When will it reach that height?
 - c) When will it hit the ground at the bottom of the cliff?

Solve each question. Round your answer to the nearest hundredth.

- 14) Working alone, it takes Sarawong nine hours to harvest a field. Ashley can harvest the same field in 11 hours. Find how long it would take them if they worked together.
- 15) Nicole can dig a 10 ft by 10 ft hole in eight hours. Imani can dig the same hole in nine hours. If they worked together how long would it take them?