Name _____ Date _____

Exponential Growth and Decay Functions Unit Review

Directions: Exponential functions here are written $y = a(b)^x$, with starting value a and factor b for each increase of 1 in the input, as in $y = 500(1.05)^x$. Each table says how its x values step, and every numeric answer comes out exactly, with no rounding.

1. Match each percent change per year to the factor b that the amount is multiplied by each year.

Write the letter of the matching answer on each line.

1. _____ Grows by 5% each year
2. _____ Decays by 5% each year
3. _____ Decays by 20% each year
4. _____ Grows by 50% each year

A. 0.5
B. 1.05
C. 0.05
D. 0.95
E. 1.2
F. 1.5
G. 0.8

2. The function $y = 250(0.92)^x$ models an amount y after x years. Which statement describes the amount?

A. It grows by 8% each year.
B. It decays by 8% each year.
C. It decays by 92% each year.
D. It grows by 92% each year.

3. An account's balance is modeled by $A = 450(1.06)^t$, where A is the balance in dollars and t is the number of years. What does the 1.06 mean?

A. The balance grows by 6% each year.
B. The balance grows by 106% each year.
C. The balance grows by $1.06 each year.
D. The balance starts at $1.06.

4. A savings account starts with $600 and earns 4% interest at the end of each year, which is added to the balance. Which function gives the balance B, in dollars, after t years?

A. $B = 600(0.04)^t$ B. $B = 600(1.04)^t$ C. $B = 600(1.4)^t$ D. $B = 600 + 24t$

5. A phone bought for $800 loses 25% of its value each year. Which function gives its value V, in dollars, t years after it was bought?

A. $V = 800(0.25)^t$ B. $V = 800(1.25)^t$ C. $V = 800 - 200t$ D. $V = 800(0.75)^t$

6. An investment of $500 grows by 10% each year, so its value after t years is $A = 500(1.1)^t$ dollars. What is the investment worth after 3 years?

_____ dollars

7. A tractor worth $900 loses 30% of its value each year. What is the tractor worth after 2 years?

_____ dollars

Values of an exponential function $y = a(b)^x$; x goes up by 1 in each row

x	y
1	6
2	12

x	y
3	24
4	48

8. The table shows values of an exponential function $y = a(b)^x$, and x goes up by 1 in each row. Which function fits the table?

A. $y = 2(3)^x$ B. $y = 6x$ C. $y = 6(2)^x$ D. $y = 3(2)^x$

An Exponential Table

Use the table for these questions.

Values of another exponential function $y = a(b)^x$; x goes up by 1 in each row

x	y
0	500
1	400
2	320
3	256

9. This table comes from an exponential function $y = a(b)^x$, with x going up by 1 in each row. What is the function?

A. $y = 500(0.2)^x$ B. $y = 500 - 100x$ C. $y = 400(0.8)^x$ D. $y = 500(0.8)^x$

10. The table comes from an exponential function $y = a(b)^x$, with x going up by 1 in each row, and the same function continues past the table. What is y when $x = 4$?

_____

11. A 96-gram sample of a substance loses half of its mass each day. How many grams are left after 5 days?

_____ grams

12. Which situation can be modeled by an exponential function?

A. A plant grows 2 cm every week.

B. A tank loses 5 gallons of water every hour.

C. The number of views of a video triples every week.

D. A ticket price rises $3 every year.

13. Two savings plans both start with $200. Plan A adds $50 at the end of each year, so it holds $200 + 50t$ dollars after t years. Plan B grows by 20% at the end of each year, so it holds $200(1.2)^t$ dollars after t years. At the end of which year is Plan B first worth more than Plan A?

_____

14. Which of these functions show exponential decay? Select the three correct functions.

☐ A. $y = 700(0.99)^x$ ☐ B. $y = 0.5(3)^x$ ☐ C. $y = 300(0.9)^x$

☐ D. $y = 50(0.5)^x$ ☐ E. $y = 300(1.9)^x$