

1. Which of the following statements correctly distinguishes a linear function from an exponential function based on their output changes?

A.) Linear functions change by a constant multiplication, while exponential functions change by a constant addition.

B.) Linear functions always have a growth factor greater than 1, while exponential functions do not.

C.) Linear functions have a constant growth rate expressed as a percentage, while exponential functions change by a constant number.

D.) Linear functions change by a constant addition or subtraction, while exponential functions change by a constant multiplication or division.

2. If a population grows from 100 to 120 in one hour, what is the growth rate r ?

A.) 0.15 or 15%

B.) 0.12 or 12%

C.) 0.17 or 17%

D.) 0.20 or 20%

3. Given the exponential function $f(x) = 3(2)^x$, what is the initial value and what is the growth factor?

A.) Initial value is 1, growth factor is 2

B.) Initial value is 3, growth factor is 3

C.) Initial value is 2, growth factor is 3

D.) Initial value is 3, growth factor is 2

4. Which domain and range correctly describe the function $f(x) = 2^x$?

A.) Domain: $(0, \infty)$; Range: $(-\infty, \infty)$

B.) Domain: $(0, \infty)$; Range: $(0, \infty)$

C.) Domain: $(-\infty, \infty)$; Range: $(0, \infty)$

D.) Domain: $(-\infty, \infty)$; Range: $(-\infty, \infty)$

5. What transformation has been applied to the parent function $f(x) = 2^x$ to get $p(x) = 2^{x-3}$?

A.) Vertical shift 3 units down

B.) Horizontal shift 3 units to the left

C.) Horizontal shift 3 units to the right

D.) Vertical shift 3 units up

6. If an investment of \$5000 grows at 5% compounded quarterly, what is the formula to calculate the amount after t years?

A.) $A(t) = 5000e^{(0.05t)}$

B.) $A(t) = 5000(1 + 0.05)^t$

C.) $A(t) = 5000(1 + 0.05/4)^{(4t)}$

D.) $A(t) = 5000(1 + 0.05/12)^{(12t)}$

7. When interest is compounded continuously at rate r , which formula models the amount $A(t)$?

A.) $A(t) = P(1 + r)^t$

B.) $A(t) = P(1 + r/n)^{nt}$

C.) $A(t) = P * r * t$

D.) $A(t) = Pe^{rt}$

8. Solve the exponential equation $5^x = 125$ algebraically.

A.) $x = \log(125)$

B.) $x = 3$

C.) $x = 5$

D.) $x = 25$

9. Given the logarithmic equation $\ln(x) = 3$, what is the equivalent exponential form?

A.) $x = e^3$

B.) $x = \log_e(3)$

C.) $\ln(x) = e^3$

D.) $x = 3^e$

10. If a function $f(x) = 2^x$ is reflected across the x-axis and shifted down 3 units, which of the following is the function?

A.) $f(x) = -2^{(x - 3)}$

B.) $f(x) = -2^x - 3$

C.) $f(x) = 2^x + 3$

D.) $f(x) = 2^{(x + 3)}$