

*P.I. A.A.9: Analyze and solve verbal problems that involve exponential growth and decay*

1. Write and solve an exponential function to model the situation and find the value after the given time. Round to the nearest whole number. \$20,000 purchase; 6% loss in value each year; 17 years

[A]  $y = 20,000(1.06)^x$   
\$50,807

[B]  $y = 20,000(0.94)^x$   
\$7431

[C]  $y = 20,000(0.94)^x$   
\$6986

[D]  $y = 20,000(1.06)^x$   
\$53,855

2. Write and solve an exponential function to model the situation and find the population after the given time. Round to the nearest whole number. 2 million initial population; 4% annual decrease; 3 years

[A]  $y = 2,000,000(0.96)^x$   
1,769,472

[B]  $y = 2,000,000(1.04)^x$   
2,163,200

[C]  $y = 2,000,000(0.96)^x$   
1,843,200

[D]  $y = 2,000,000(1.04)^x$   
2,249,728

3. Write an exponential function to model the situation. Then predict the value of the function after 5 years (to the nearest whole number).

A population of 390 animals that increases at an annual rate of 10%.

4. Write an exponential function to model the situation. Then predict the value of the function after 5 years (to the nearest whole number).

A population of 410 animals that decreases at an annual rate of 14%.

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

the value of  $y$  when  $x = 5$

Column A      Column B

$y = a(0.4)^x$        $y = a(1.02)^x$

[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.

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

$$p > q$$

Column A

Column B

$$y = pb^{kx}$$

$$y = qb^{kx}$$

- [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.

7. Compare the quantities in Column A and Column B.

Column A

Column B

the value of  $y = 6^x$  at  $x = 4$       the value of  $y = x^6$  at  $x = 4$

- [A] The quantity in Column A is greater.                      [B] The quantity in Column B is greater.  
[C] The quantities are equal.  
[D] The relationship cannot be determined from the information given.

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[1] C

[2] A

[3]  $f(x) = 390(1.1)^x$ ; 628

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[4]  $f(x) = 410(0.86)^x$ ; 193

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[5] D

[6] A

[7] B