

# Exponential Growth and Decay Assignment

Solve the following problem involving exponential growth and decay using manual calculation.

A. A computer worth \$2500 depreciates 25% every year, what is the computers value during the fourth year?

	Time	Calculation	Value
	0	-	2500
(1.)	1		
(2.)	2		
(3.)	3		
(4.)	4		

B. The population of a 100,000. A sociologist determines that every five years the population increases by 20% of what it was in the beginning of the 5-year period. What will be the city population be in 20 years?

	Time	Calculation	Population
	0	-	100,000
(5.)	1 for 5 years		
(6.)	2 for 10 years		
(7.)	3 for 15 years		
(8.)	4 for 20 years		

# Exponential Growth and Decay Assignment

Solve the following problem involving exponential growth and decay using equation table.

C. A certain bacterial culture doubles in number everyday if there were 10000 bacteria in at the end of the first day, how many will be there after 5 days?

	Time	Equation	Amount
	1	$1000(2)^0$	10000
(9.)	2		
(10.)	3		
(11.)	4		
(12.)	5		
(13.)	t		

D. A Ford Everest cost \$45, 000 depreciates its value by 23% every year. What will be its value after 4 years?

	Time	Equation	Amount
	0	$45000(1-0.23)^0$	45000
(14.)	1		
(15.)	2		
(16.)	3		
(17.)	4		
(18.)	t		

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

# Exponential Growth and Decay Assignment

Solve the following problem involving exponential growth and decay using equation.

E. Find the final amount of \$3500 invested in the bank for 10 years compounded semi - annually at the following rates below.

19. 6% interest rate

20. 8% interest rate

21. 10% interest rate.

22. 12% interest rate

F. Find the final amount of \$500 invested in the bank for 5 years at 10% rate compounded at the following terms.

23. Compounded Annually

24. Compounded Semi-Annually

25. Compounded Quarterly

# Exponential Growth and Decay Assignment

## Answer:

Solve the following problem involving exponential growth and decay using manual calculation.

A. A computer worth \$2500 depreciates 25% every year, what is the computers value during the fourth year?

	Time	Calculation	Value
	0	-	2500
(1.)	1	$2500 - (2500(0.25))$	1875
(2.)	2	$1875 - (1875(0.25))$	1406.25
(3.)	3	$1406.25 - (1406.25(0.25))$	1054.69
(4.)	4	$1054.69 - (1054.69(0.25))$	791.02

B. The population of a city is 100,000. A sociologist determines that every five years the population increases by 20% of what it was in the beginning of the 5-year period. What will be the city's population in 20 years?

	Time	Calculation	Population
	0	-	100,000
(5.)	1 for 5 years	$100000 + (100000(0.2))$	120,000
(6.)	2 for 10 years	$120000 + (120000(0.2))$	144000
(7.)	3 for 15 years	$144000 + (144000(0.2))$	172800
(8.)	4 for 20 years	$172800 + (172800(0.2))$	207,360

# Exponential Growth and Decay Assignment

Solve the following problem involving exponential growth and decay using equation table.

C. A certain bacterial culture doubles in number every day. If there were 10000 bacteria at the end of the first day, how many will be there after 5 days?

	Time	Equation	Amount
	1	$1000(2)^0$	10000
(9.)	2	$1000(2)^1$	20000
(10.)	3	$1000(2)^2$	40000
(11.)	4	$1000(2)^3$	80000
(12.)	5	$1000(2)^4$	160000
(13.)	t	$1000(2)^{t-1}$	$N_t$

D. A Ford Everest cost \$45,000 depreciates its value by 23% every year. What will be its value after 4 years?

	Time	Equation	Amount
	0	$45000(1-0.23)^0$	45000
(14.)	1	$45000(1-0.23)^1$	34650
(15.)	2	$45000(1-0.23)^2$	26680.5
(16.)	3	$45000(1-0.23)^3$	20543.985
(17.)	4	$45000(1-0.23)^4$	15818.87
(18.)	t	$45000(1-0.23)^t$	$N_t$

# Exponential Growth and Decay Assignment

Solve the following problem involving exponential growth and decay using equation.

E. Find the final amount of \$3500 invested in the bank for 10 years compounded semi - annually at the following rates below.

19. 6% interest rate

Solution:

$$N_{10} = 3500 \left( 1 + \frac{0.06}{2} \right)^{2(10)} = 6321.39$$

20. 8% interest rate

Solution:

$$N_{10} = 3500 \left( 1 + \frac{0.08}{2} \right)^{2(10)} = 7668.9$$

21. 10% interest rate.

Solution:

$$N_{10} = 3500 \left( 1 + \frac{0.1}{2} \right)^{2(10)} = 9286.54$$

22. 12% interest rate

Solution:

$$N_{10} = 3500 \left( 1 + \frac{0.12}{2} \right)^{2(10)} = 11224.97$$

F. Find the final amount of \$500 invested in the bank for 5 years at 10% rate compounded at the following terms.

23. Compounded Annually

Solution:

$$N_5 = 500(1 + 0.1)^5 = 805.26$$

24. Compounded Semi-Annually

Solution:

$$N_5 = 500 \left( 1 + \frac{0.1}{2} \right)^{5(2)} = 814.45$$

25. Compounded Quarterly

Solution:

$$N_5 = 500 \left( 1 + \frac{0.1}{4} \right)^{5(4)} = 819.31$$