

1 Exponential Growth and Decay

Quinton just read that his computer, which costs \$2,500 new, loses 10% of its value every year. If this estimate is accurate, how much will the computer be worth in 15 years?

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2 Exponential Growth and Decay

A fashion blog has 22,000 page views so far. In addition, that number continues to grow 25% every week. How many page views will the blog have in 2 weeks?

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3 Exponential Growth and Decay

The half-life of a radioactive kind of element is 18 minutes. How much will be left after 36 minutes, if you start with 32 grams of it?

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4 Exponential Growth and Decay

In Austin, the use of landlines has been declining at a rate of 20% every year. If there are 51,000 landlines this year, how many will there be in 9 years?

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5 Exponential Growth and Decay

There is a population of 5 bacteria in a colony. If the number of bacteria doubles every 31 minutes, what will the population be 62 minutes from now?

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6 Exponential Growth and Decay

An art gallery owns a painting that is valued at \$37,000. The gallery owner estimates that its value will increase by 10% every year. If the owner is correct, then how much will it be worth in 4 years?

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7 Exponential Growth and Decay

Andrew deposited \$40 in a savings account earning 5% interest, compounded annually. To the nearest cent, how much will he have in 3 years?

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8 Exponential Growth and Decay

A video posted on the internet has gone viral, and the total number of views is increasing by 20% every hour. If the video currently has 52,000 views, how many views will it have in 4 hours?

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Exponential Growth and Decay

Average health premiums have been increasing at a rate of 10%. If an average family's premiums are \$14,000 this year, what will they be in 9 years?

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Exponential Growth and Decay

The community theater in Sugarland has been seeing a 5% drop in attendance every year. If they sold 29,000 tickets this year, how many tickets can they expect to sell 4 years from now?

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Exponential Growth and Decay

Based on past experiences, a homeowner estimates that appliances lose 35% of their resale value each year. If the estimate is accurate, how much will a refrigerator currently valued at \$2,100 be worth in 8 years?

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Exponential Growth and Decay

A cup of hot water that is currently 56°C above room temperature is left out to cool. If the heat difference decreases by 5% every minute, what will the difference be in 19 minutes?

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Exponential Growth and Decay

The Galveston Opera House sold 45,000 tickets this year, but it has been experiencing a 10% drop in sales from one year to the next. If this trend continues, how many tickets will the opera house sell 10 years from now?

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Exponential Growth and Decay

The number of customers at a retail kiosk store has been falling 5% per month. If the store had 10,000 customers this month, how many should it expect to have 6 months from now?

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Exponential Growth and Decay

Northbrook University charges \$35,000 for tuition. If they raise their tuition by 10% each year, how much will tuition be in 10 years?

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Exponential Growth and Decay

A species of insect is approaching extinction. If the population is falling by 5% every year and there are currently 8,700 insects remaining, how many will there be in 5 years?

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17 Exponential Growth and Decay

Noah lives in Houston, where the cost of living increases by 5% every year. If Noah spends \$34,000 this year, how much can he expect to spend 3 years from now to maintain the same standard of living?

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18 Exponential Growth and Decay

Amaya is studying for final exams and just drank a cup of coffee to help her stay awake. The coffee had 91 milligrams of caffeine in it. If her body processes 10% of the caffeine every hour, how much caffeine will be left in 4 hours?

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19 Exponential Growth and Decay

The flu is starting to hit Spring Branch. Currently, there are 120 people infected and is growing at a rate of 5% per day. How many people will have gotten the flu in 5 days?

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20 Exponential Growth and Decay

Bradley is purchasing a new car for \$37,000. If the car loses 20% of its value every year, how much will the car be worth in 7 years?

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21 Exponential Growth and Decay

Rodrigo has put \$9,800 into a retirement fund that has an estimated annual return of 5%. If Rodrigo doesn't add any more money, how much can he expect to have in the fund in 15 years?

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22 Exponential Growth and Decay

Felisa currently brings in an annual salary of \$45,000 and anticipates a raise of 5% every year. What will her salary be in 7 years?

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23 Exponential Growth and Decay

A comic book collector has a first-edition comic currently worth \$370. He anticipates it will grow in value at a rate of 15% per year. How much will this comic book be worth 12 years from now?

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24 Exponential Growth and Decay

A social networking site currently has 70,000 active members. If the site loses 5% of its active members each month, how many active members can the site expect to have in 2 months?

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1

Quinton just read that his new computer, which costs \$2,500, loses 10% of its value every year. Which function can be used to determine the value of his computer after x years?

- A $f(x) = 2,500(.10)^x$ C $f(x) = 10(2,500)^x$
 B $f(x) = 2,500(1.1)^x$ D $f(x) = 2,500(.90)^x$

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2

A table of values for the exponential function f is shown below.

x	0	1	2	3
$f(x)$	45,000	47,250	49,612.50	52,093.12

Which situation could describe this function?

- A An employee receives a bonus of \$2,250 each year.
 B The value of a car depreciates by 5% each year.
 C The value of a car remains constant for 5 years.
 D An employee receives a salary increase of 5% each year.

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3

The function $f(x) = 34,000(1.05)^x$ can be used to determine Noah's cost of living in Houston over time. What does the 1.05 represent?

- A The cost of living will increase by approximately 1% each year
 B The cost of living will decrease by approximately 1% each year
 C The cost of living will increase by approximately 5% each year
 D The cost of living will decrease by approximately 5% each year

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4

A fashion blog has 22,000 page views so far. In addition, that number continues to grow 25% every week. Which function can be used to determine the number of page views the blog will have after x weeks?

- A $f(x) = 22,000(1.25)^x$ C $f(x) = 22,000(25)^x$
 B $f(x) = 22,000(.75)^x$ D $f(x) = 1.25(22,000)^x$

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5

The half-life of a radioactive kind of element is 18 minutes. There are currently 32 grams of the element. Which function can be used to determine the amount remaining after x minutes?

- A $f(x) = 18(.5)^{\frac{x}{18}}$ C $f(x) = 32(.5)^{\frac{x}{18}}$
 B $f(x) = 32(18)^{\frac{x}{2}}$ D $f(x) = .5(32)^{\frac{x}{18}}$

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6

The function $f(x) = 91(.9)^x$ can be used to determine the amount of caffeine remaining in a person's system after drinking a cup of coffee over time. What does the 91 represent?

- A The amount of caffeine increases by 91%
 B The number of minutes it took to consume the coffee
 C The amount of caffeine decreases by 91%
 D The initial amount of caffeine in a cup of coffee

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7

In Austin, the use of landlines has been declining at a rate of 20% every year. There are 51,000 landlines this year. Which function can be used to determine the number of landlines after x years?

- A $f(x) = 51,000(0.8)^x$ C $f(x) = 20(51,000)^x$
 B $f(x) = 51,000(0.2)^x$ D $f(x) = 51,000(1.2)^x$

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8

There is a population of 5 bacteria in a colony. If the number of bacteria doubles every minute, which function can be used to determine what the population will be x minutes from now?

- A $f(x) = 5 + \left(\frac{1}{2}\right)^x$ C $f(x) = 2(5)^x$
 B $f(x) = 5(2)^x$ D $f(x) = 5 + (2)^x$

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9

An art gallery owns a painting that is valued at \$37,000. The gallery owner estimates that its value will increase by 10% every year. If the owner is correct, which function can be used to determine how much the painting will be worth in x years?

- A $f(x) = 37,000(.90)^x$ C $f(x) = 10(37,000)^x$
 B $f(x) = 37,000(10)^x$ D $f(x) = 37,000(1.1)^x$

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10

The function $f(x) = 9,800(1.05)^x$ can be used to determine the amount of money Rodrigo has in a retirement fund with an estimated annual return. What does 9,800 represent?

- A The starting balance in the retirement fund
 B The amount of the annual return
 C The number of years before retiring
 D The balance in the retirement fund after the first year

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11

Andrew deposited \$40 in a savings account earning 5% interest, compounded annually. Which function can be used to determine the amount of money in the savings account after x years?

- A $f(x) = 40(.95)^x$ C $f(x) = .95(40)^x$
 B $f(x) = 40(1.05)^x$ D $f(x) = 1.05(40)^x$

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12

A video posted on the internet has gone viral, and the total number of views is increasing by 20% every hour. If the video currently has 52,000 views, which function can be used to determine the number of views after x hours?

- A $f(x) = 52,000(x + 20)$ C $f(x) = 52,000(20)^x$
 B $f(x) = 52,000(1.2)^x$ D $f(x) = 52,000(x - 20)$

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13

A table of values for the exponential function f is shown below.

x	1	2	3	4	5
$f(x)$	1,000	950	903	858	815

Which situation could describe this function?

- A The number of customers increases by about 5% each month.
 B The number of customers increases by 50 each month.
 C The number of customers decreases by about 5% each month.
 D The number of customers decreases by 50 each month.

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14

Average health premiums have been increasing at a rate of 10%. If an average family's premiums are \$14,000 this year, which function can be used to determine the amount of the family's premium after x years?

- A $f(x) = 14,000(1.10)^x$ C $f(x) = 14,000 + (10)^x$
 B $f(x) = 14,000 + (1.10)^x$ D $f(x) = 14,000(10)^x$

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15

The community theater in Sugarland has been seeing a 5% drop in attendance every year. This year they sold 29,000 tickets. Which function can be used to determine the number of tickets they can expect to sell in x years?

- A $f(x) = 29,000(1.05)^x$ C $f(x) = 29,000(1 - x)^5$
 B $f(x) = 29,000 - (5)^x$ D $f(x) = 29,000(0.95)^x$

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16

Based on past experiences, a homeowner estimates that appliances lose 35% of their resale value each year. Which function can be used to determine the value of a refrigerator after x years if it is currently valued at \$2,100?

- A $f(x) = 2,100(0.35)^x$ C $f(x) = 2,100(0.65)^x$
 B $f(x) = 0.65(2,100)^x$ D $f(x) = 2,100(1.35)^x$

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- 17** The table contains some points on the graph of an exponential function.

x	0	1	2	3	4
y	0.75	1.5	3	6	12

Based on the table, which function represents the same relationship?

- A $f(x) = 0.75(3)^x$
 B $f(x) = 2(0.75)^x$
 C $f(x) = 3(0.75)^x$
 D $f(x) = 0.75(2)^x$

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18

A cup of hot water that is currently 56°C above room temperature is left out to cool. If the heat difference decreases by 5% every minute, which function can be used to determine the heat difference after x minutes?

- A $f(x) = 56(.95)^x$ C $f(x) = 56 - (5)^x$
 B $f(x) = 56(1.05)^x$ D $f(x) = 1.05(56)^x$

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19

The function $f(x) = 45,000(.9)^x$ can be used to determine the number of tickets The Galveston Opera House will sell overtime. What does the 45,000 represent?

- A The cost of each ticket
 B The number of tickets sold this year
 C The number of tickets sold after 9 years
 D The number of tickets remaining each year

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20

A species of insect is approaching extinction. If the population is falling by 5% every year and there are currently 8,700 insects remaining, which function can be used to determine the number of insects after x years?

- A $f(x) = 8,700(0.95)^x$ C $f(x) = 8,700 - (1.05)^x$
 B $f(x) = 8,700 - (5)^x$ D $f(x) = 0.95(8,700)^x$

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- 21** A table of values for the exponential function f is shown below. Which situation could describe this function?

x	0	1	2	3	4
$f(x)$	1200	1260	1323	1389	1458

- A The number of people infected by the flu increases by 60 people each day.
 B The number of people infected by the flu decreases by 60 people each day.
 C The number of people infected by the flu increases by approximately 5% each day.
 D The number of people infected by the flu decreases by approximately 5% each day.

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22

Bradley is purchasing a new car for \$37,000. If the car loses 20% of its value every year, which function can be used to determine how much the car will be worth in x years?

- A $f(x) = 37,000 - (0.2)^x$ C $f(x) = 0.8(37,000)^x$
 B $f(x) = 37,000(0.8)^x$ D $f(x) = 0.2(37,000)^x$

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23

The function $f(x) = 370(1.15)^x$ can be used to determine the value of a first-edition comic over time. What does x represent?

- A The initial value of the comic book
 B The rate of appreciation of the comic book
 C The final value of the comic book
 D The number of years elapsed

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24

A social networking site currently has 70,000 active members. If the site loses 5% of its active members each month, which function can be used to determine the number of active members the site can expect to have in x months?

- A $f(x) = 70,000(0.95)^x$ C $f(x) = 70,000 - (5)^x$
 B $f(x) = 70,000(1.05)^x$ D $f(x) = 0.95(70,000)^x$

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