



Exponential Functions - Intro

- 1** What does this term represent in a model of growth in credit card debt with yearly interest?

$$D = D_0 \cdot (1 + r)^{(t)}$$
$$D_0 = ?$$

A $D_0 = \text{final debt}$

B $D_0 = \text{starting debt}$

- 2** In this model of yearly compounding growth of money in a savings account, which term represents the time?

$$P = P_0 \cdot (1 + r)^{(t)}$$
$$\text{time} = ?$$

A r

B t

C P_0

- 3** What does this term represent in a model of decline of a toxin concentration (weekly dialysis)?

$$C = C_0 \cdot (1 - r)^{(t)}$$
$$t = ?$$

A $t = \text{rate}$

B $t = \text{final concentration}$

C $t = \text{time}$

- 4** In this model of decline of a bird population (yearly breeding cycle), which term represents the final population?

$$P = P_0 \cdot (1 - r)^{(t)}$$
$$\text{final population} = ?$$

A P_0

B F

C t

- 5** Which equation describes this scenario?

An insect population starts at 300. Each subsequent yearly breeding season it grows by 2%. After 4 years it has increased to a population of 324.

A $324 = 200 \cdot (1 + 0.03)^{(4)}$

B $324 = 300 \cdot (1 + 0.02)^{(4)}$

C $324 = 400 \cdot (1 + 0.02)^{(3)}$

- 6** Which scenario describes this equation?

$$751 = 500 \cdot (1 + 0.06)^{(7)}$$

A An insect population starts at 600. Each subsequent yearly breeding season it grows by 5%. After 7 years it has increased to a population of 751.

B An insect population starts at 500. Each subsequent yearly breeding season it grows by 6%. After 7 years it has increased to a population of 751.

- 7** Which equation describes this scenario?

A charitable endowment starts with \$800. Each daily it disburses 4% of its remaining funds. After 9 days its funds have decreased to \$554.

A $554 = 900 \cdot (1 - 0.04)^{(8)}$

B $554 = 800 \cdot (1 - 0.09)^{(4)}$

C $554 = 800 \cdot (1 - 0.04)^{(9)}$



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8 Which scenario describes this equation?

$$587 = 800 \cdot (1 - 0.06)^{(5)}$$

A A charitable endowment starts with \$600. Each weekly it disburses 8% of its remaining funds. After 5 weeks its funds have decreased to \$587.

B A charitable endowment starts with \$800. Each weekly it disburses 6% of its remaining funds. After 5 weeks its funds have decreased to \$587.

9 Rearrange the exponential equation to solve for for the time given this scenario?

A charitable endowment starts with \$300. Each monthly it disburses 5% of its remaining funds. After a certain number of months its funds have decreased to \$209.

A
$$t = \frac{\ln \frac{209}{300}}{\ln(1 - 0.05)}$$

B
$$t = \frac{\ln \frac{209}{300}}{\ln(1 + 0.05)}$$

10 Rearrange the exponential equation to solve for for the rate given this scenario?

A toxin starts at a concentration of 400mg/L. Each daily dialysis reduces it by a certain percent. After 6 days it has decreased to a concentration of 333mg/L.

A
$$r = +\left(\frac{333}{400}\right)^{\frac{1}{6}} + 1$$

B
$$r = -\left(\frac{333}{400}\right)^{\frac{1}{6}} - 1$$

12 What does this term represent in a model of continuous growth of a bacteria population?

$$P = P_0 \cdot e^{(r \cdot t)}$$

$$P_0 = ?$$

A P_0 = starting population

B P_0 = final population

C P_0 = rate

11 Rearrange the exponential equation to solve for for the starting cash given this scenario?

A charitable endowment starts with a certain amount of money. Each weekly it disburses 9% of its remaining funds. After 5 weeks its funds have decreased to \$499.

A
$$P_0 = \frac{499}{(1 + 0.09)^5}$$

B
$$P_0 = \frac{499}{(1 - 0.09)^5}$$

C
$$P_0 = 499 \cdot (1 - 0.09)^5$$

13 In this model of growth of debt on a credit card with continuous compounding, which term represents the rate?

$$D = D_0 \cdot e^{(r \cdot t)}$$

$$\text{rate} = ?$$

A D_0

B t

C D

D r

14 What does this term represent in a model of continuous decline of a whale population?

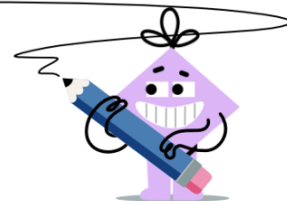
$$P = P_0 \cdot e^{(-r \cdot t)}$$

$$P_0 = ?$$

A P_0 = starting population

B P_0 = rate

C P_0 = time



Exponential Functions - Intro

- 15** In this model of continuous decay of a radioactive material, which term represents the final concentration?

$$R = R_0 \cdot e^{(-r \cdot t)}$$

final concentration = ?

A

 r

B

 R

C

 R_0

- 16** Which scenario describes this equation?

$$514 = 300 \cdot e^{(0.06 \cdot 9)}$$

A

An insect population starts at 300. It grows continuously at 6% growth per week. After 9 weeks it has increased to a population of 514.

B

An insect population starts at 900. It grows continuously at 6% growth per week. After 3 weeks it has increased to a population of 514.

- 17** Which equation describes this scenario?

A company's share price starts at \$700. It grows continuously at 5% growth per month. After 6 months it has a share price of \$944.

A

$$944 = 700 \cdot e^{(0.05 \cdot 6)}$$

B

$$944 = 700 \cdot e^{(0.06 \cdot 5)}$$

C

$$944 = 500 \cdot e^{(0.07 \cdot 6)}$$

D

$$944 = 600 \cdot e^{(0.05 \cdot 7)}$$

- 18** Which equation describes this scenario?

A radioactive material starts at an isotope concentration of 800ppm. It decays continuously at 9% per hour. After 2 hours it has decayed to an isotope concentration of 668ppm.

A

$$668 = 800 \cdot e^{(-0.09 \cdot 2)}$$

B

$$668 = 900 \cdot e^{(-0.08 \cdot 2)}$$

C

$$668 = 200 \cdot e^{(-0.09 \cdot 8)}$$

- 19** Which scenario describes this equation?

$$314 = 400 \cdot e^{(-0.03 \cdot 8)}$$

A

A radioactive material starts at an isotope concentration of 800ppm. It decays continuously at 3% per day. After 4 days it has decayed to an isotope concentration of 314ppm.

B

A radioactive material starts at an isotope concentration of 400ppm. It decays continuously at 3% per day. After 8 days it has decayed to an isotope concentration of 314ppm.

- 20** What is the time in this equation for a decline of a whale population (yearly breeding cycle)?

$$508 = 600 \cdot (1 - 0.08)^{(2)}$$

A

$$t = 600$$

B

$$t = 507$$

C

$$t = 2$$

- 21** What is the final population in this equation for a continuous decline of a whale population?

$$710 = 800 \cdot e^{(-0.04 \cdot 3)}$$

A

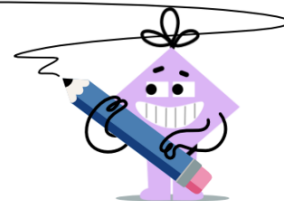
$$P = 4$$

B

$$P = 710$$

C

$$P = 3$$



Exponential Functions - Intro

- 22** What is the value of the final population given this model of a growth of an insect population that breeds once per year?

$$P = 400 \cdot (1 + 0.02)^{(9)}$$

- | | |
|---|-----------|
| A | $P = 660$ |
| B | $P = 478$ |
| C | $P = 510$ |
| D | $P = 570$ |

- 23** What is the value of the final cash given this model of a balance of a charitable endowment (daily disbursements)?

$$P = 200 \cdot (1 - 0.06)^{(4)}$$

- | | |
|---|-----------|
| A | $P = 156$ |
| B | $P = 115$ |
| C | $P = 145$ |
| D | $P = 105$ |

- 24** What is the value of the time given this model of a yearly compounding growth of money in a savings account?

$$441 = 400 \cdot (1 + 0.02)^{(t)}$$

- | | |
|---|---------------|
| A | $t = 5$ years |
| B | $t = 4$ years |
| C | $t = 6$ years |
| D | $t = 3$ years |

- 25** What is the value of the time given this model of a decline of a toxin concentration (weekly dialysis)?

$$104 = 200 \cdot (1 - 0.07)^{(t)}$$

- | | |
|---|----------------|
| A | $t = 10$ weeks |
| B | $t = 9$ weeks |
| C | $t = 8$ weeks |
| D | $t = 7$ weeks |

- 26** What is the final population in this equation for a growth of an insect population that breeds once per year?

$$973 = 900 \cdot (1 + 0.04)^{(2)}$$

- | | |
|---|-----------|
| A | $P = 973$ |
| B | $P = 2$ |
| C | $P = 900$ |

- 27** What is the time in this equation for a continuously compounding growth of money in a savings account?

$$902 = 800 \cdot e^{(0.03 \cdot 4)}$$

- | | |
|---|-----------|
| A | $t = 4$ |
| B | $t = 901$ |
| C | $t = 800$ |

- 28** What is the value of the final price given this model of a continuously compounding growth of a share price?

$$S = 400 \cdot e^{(0.06 \cdot 7)}$$

- | | |
|---|-----------|
| A | $S = 455$ |
| B | $S = 615$ |
| C | $S = 610$ |
| D | $S = 608$ |



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- 29** What is the value of the final concentration given this model of a continuous reduction of a toxin concentration?

$$C = 300 \cdot e^{(-0.07 \cdot 4)}$$

- | | |
|---|-----------|
| A | $C = 280$ |
| B | $C = 226$ |
| C | $C = 255$ |
| D | $C = 230$ |

- 30** Rearrange this equation to solve for the starting population given this model of a continuous growth of a bacteria population?

$$225 = P_0 \cdot e^{(0.03 \cdot 4)}$$

- | | | | |
|---|--|---|--|
| A | $P_0 = \frac{225}{e^{(0.03 \cdot 4)}}$ | B | $P_0 = \frac{e^{(0.03 \cdot 4)}}{225}$ |
| C | $P_0 = \frac{225}{e^{(\frac{0.03}{4})}}$ | | |

- 31** Rearrange this equation to solve for the starting concentration given this model of a continuous decay of a radioactive material?

$$471 = R_0 \cdot e^{(-0.08 \cdot 3)}$$

- | | | | |
|---|---|---|---|
| A | $R_0 = \frac{e^{(-0.08 \cdot 3)}}{471}$ | B | $R_0 = \frac{471}{e^{(-0.08 \cdot 3)}}$ |
| C | $R_0 = \frac{471}{e^{(\frac{-0.08}{3})}}$ | | |

- 32** What is the value of the starting debt given this model of a growth of debt on a credit card with continuous compounding?

$$508 = D_0 \cdot e^{(0.08 \cdot 3)}$$

- | | | | |
|---|-------------|---|-------------|
| A | $D_0 = 100$ | B | $D_0 = 300$ |
| C | $D_0 = 400$ | D | $D_0 = 600$ |

- 33** What is the value of the starting population given this model of a continuous decline of a bird population?

$$255 = P_0 \cdot e^{(-0.09 \cdot 5)}$$

- | | | | |
|---|-------------|---|-------------|
| A | $P_0 = 100$ | B | $P_0 = 400$ |
| C | $P_0 = 600$ | D | $P_0 = 700$ |

- 34** Rearrange this equation to solve for the rate given this model of a decline of a bird population (yearly breeding cycle)?

$$691 = 800 \cdot (1 - r)^{(2)}$$

- | | | | |
|---|---|---|---|
| A | $r = -\left(\frac{691}{800}\right)^{\frac{1}{2}} - 1$ | B | $r = +\left(\frac{691}{800}\right)^{\frac{1}{2}} + 1$ |
| C | $r = -\left(\frac{691}{800}\right)^{\frac{2}{2}} - 1$ | | |

- 35** Rearrange this equation to solve for the time given this model of a balance of a charitable endowment (monthly disbursements)?

$$608 = 800 \cdot (1 - 0.03)^{(t)}$$

- | | | | |
|---|---|---|---|
| A | $t = \frac{\ln 608 \cdot 800}{\ln(1 - 0.03)}$ | B | $t = \frac{\ln \frac{608}{800}}{\ln(1 - 0.03)}$ |
| C | $t = \frac{\ln \frac{608}{800}}{\ln(1 + 0.03)}$ | | |



Exponential Functions - Intro

- 36** What is the value of the rate given this model of a growth of a rabbit population (yearly breeding cycle)?

$$344 = 300 \cdot (1 + r)^{(7)}$$

- | | |
|-------------|-------------|
| A $r = 3\%$ | B $r = 5\%$ |
| C $r = 2\%$ | D $r = 1\%$ |

- 37** What is the value of the starting debt given this model of a growth in credit card debt with monthly interest?

$$364 = D_0 \cdot (1 + 0.05)^{(4)}$$

- | | |
|---------------|---------------|
| A $D_0 = 300$ | B $D_0 = 600$ |
| C $D_0 = 500$ | D $D_0 = 100$ |

- 38** Rearrange this equation to solve for the starting population given this model of a decline of a bird population (yearly breeding cycle)?

$$829 = P_0 \cdot (1 - 0.04)^{(2)}$$

A

$$P_0 = \frac{829}{(1 + 0.04)^2}$$

B

$$P_0 = 829 \cdot (1 - 0.04)^2$$

C

$$P_0 = \frac{829}{(1 - 0.04)^2}$$

- 39** What is the value of the rate given this model of a decline of a whale population (yearly breeding cycle)?

$$156 = 200 \cdot (1 - r)^{(8)}$$

- | | |
|-------------|-------------|
| A $r = 5\%$ | B $r = 3\%$ |
| C $r = 7\%$ | D $r = 4\%$ |

- 40** What is the value of the starting population given this model of a decline of a whale population (yearly breeding cycle)?

$$378 = P_0 \cdot (1 - 0.05)^{(9)}$$

- | | |
|---------------|---------------|
| A $P_0 = 400$ | B $P_0 = 700$ |
| C $P_0 = 900$ | D $P_0 = 600$ |

- 41** Rearrange the exponential equation to solve for the time given this scenario?

A credit card starts with \$800 of debt. Each subsequent quarter it grows by 9% in interest. After a certain number of quarters the debt has grown to \$1,341.

A

$$t = \frac{\ln 1341 \cdot 800}{\ln(1 + 0.09)}$$

B

$$t = \frac{\ln \frac{1341}{800}}{\ln(1 + 0.09)}$$

C

$$t = \frac{\ln \frac{1341}{800}}{\ln(1 - 0.09)}$$



Exponential Functions - Intro

- 42** Rearrange the exponential equation to solve for the rate given this scenario?

A savings account starts with \$300. Each subsequent quarter it earns a certain percent interest. After 9 quarters it has \$599.

A $r = \left(\frac{599}{300}\right)^{\frac{9}{2}} - 1$

B $r = \left(\frac{599}{300}\right)^{\frac{1}{9}} - 1$

C $r = -\left(\frac{599}{300}\right)^{\frac{1}{9}} + 1$

- 44** Rearrange this equation to solve for the rate given this model of a growth of an insect population that breeds once per year?

$$655 = 500 \cdot (1 + r)^{(4)}$$

A $r = \left(\frac{655}{500}\right)^{\frac{1}{4}} - 1$

B $r = -\left(\frac{655}{500}\right)^{\frac{1}{4}} + 1$

C $r = \left(\frac{655}{500}\right)^{\frac{4}{2}} - 1$

- 43** Rearrange the exponential equation to solve for the starting population given this scenario?

A rabbit population starts at a certain size. Each subsequent yearly breeding season it grows by 3%. After 2 years it has increased to a population of 848 rabbits.

A $P_0 = \frac{848}{(1 + 0.03)^2}$

B $P_0 = \frac{848}{(1 - 0.03)^2}$

C $P_0 = 848 \cdot (1 + 0.03)^2$

- 45** Rearrange this equation to solve for the time given this model of a growth of a rabbit population (yearly breeding cycle)?

$$358 = 300 \cdot (1 + 0.02)^{(t)}$$

A $t = \frac{\ln \frac{358}{300}}{\ln(1 - 0.02)}$

B $t = \frac{\ln 358 \cdot 300}{\ln(1 + 0.02)}$

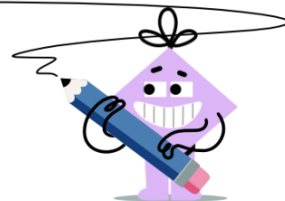
C $t = \frac{\ln \frac{358}{300}}{\ln(1 + 0.02)}$

- 46** Rearrange this equation to solve for the starting cash given this model of a quarterly compounding growth of money in a savings account?

$$1,462 = P_0 \cdot (1 + 0.09)^{(7)}$$

A $P_0 = \frac{1462}{(1 + 0.09)^7}$

B $P_0 = 1462 \cdot (1 + 0.09)^7$



Exponential Functions - Intro

- 47** Rearrange this equation to solve for the time given this model of a growth of debt on a credit card with continuous compounding?

$$1,369 = 900 \cdot e^{(0.06 \cdot t)}$$

A

$$t = \frac{\ln \frac{1369}{900}}{0.06}$$

B

$$t = -\frac{\ln 1369 \cdot 900}{0.06}$$

- 48** Rearrange this equation to solve for the rate given this model of a continuously compounding growth of a share price?

$$575 = 500 \cdot e^{(r \cdot 7)}$$

A

$$r = \frac{e^{\frac{575}{500}}}{7}$$

B

$$r = \frac{\ln \frac{575}{500}}{7}$$

- 49** Rearrange this equation to solve for the time given this model of a continuous decline of a bird population?

$$553 = 600 \cdot e^{(-0.02 \cdot t)}$$

A

$$t = -\frac{\ln \frac{553}{600}}{0.02}$$

B

$$t = +\frac{\ln 553 \cdot 600}{0.02}$$

C

$$t = -\frac{0.02}{\ln \frac{553}{600}}$$

- 50** Rearrange this equation to solve for the rate given this model of a continuous decline of a bird population?

$$157 = 200 \cdot e^{(-r \cdot 8)}$$

A

$$r = -\frac{e^{\frac{157}{200}}}{8}$$

B

$$r = -\frac{\ln \frac{157}{200}}{8}$$

C

$$r = -\frac{\ln \frac{200}{157}}{8}$$

- 51** What is the value of the time given this model of a continuous decay of a radioactive material?

$$376 = 400 \cdot e^{(-0.03 \cdot t)}$$

A

$$t = 4 \text{ weeks}$$

B

$$t = 1 \text{ week}$$

C

$$t = 3 \text{ weeks}$$

D

$$t = 2 \text{ weeks}$$

- 52** Rearrange the exponential equation to solve for for the time given this scenario?

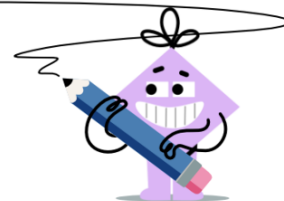
A bird population starts at 300. It declines continuously at 7% per quarter. After a certain number of quarters it has decreased to a population of 260.

A

$$t = -\frac{0.07}{\ln \frac{260}{300}}$$

B

$$t = -\frac{\ln \frac{260}{300}}{0.07}$$



Exponential Functions - Intro

53 What is the value of the time given this model of a continuous growth of a bacteria population?

$$758 = 700 \cdot e^{(0.02 \cdot t)}$$

- | | |
|---|--------------|
| A | $t = 6$ days |
| B | $t = 4$ days |
| C | $t = 2$ days |
| D | $t = 3$ days |

54 Rearrange the exponential equation to solve for the rate of decay given this scenario?

A radioactive material starts at an isotope concentration of 700ppm. It decays continuously at a certain percent per week. After 2 weeks it has decayed to an isotope concentration of 659ppm.

- | | | | |
|---|--------------------------------------|---|--------------------------------------|
| A | $r = -\frac{\ln \frac{700}{659}}{2}$ | B | $r = -\frac{\ln \frac{659}{700}}{2}$ |
| C | $r = -\frac{e^{\frac{659}{700}}}{2}$ | | |

55 What is the value of the final cash given this scenario?

A savings account starts with \$400. Each subsequent year it earns 6% in interest. After 2 years it has a certain amount of cash.

- | | |
|---|-----------|
| A | $P = 449$ |
| B | $P = 345$ |
| C | $P = 370$ |

56 What is the value of the rate given this scenario?

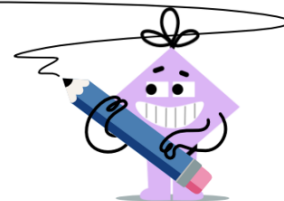
An insect population starts at 900. Each subsequent yearly breeding season it grows by a certain percent. After 5 years it has increased to a population of 1,094.

- | | | | |
|---|-----------|---|-----------|
| A | $r = 6\%$ | B | $r = 7\%$ |
| C | $r = 5\%$ | D | $r = 4\%$ |

57 What is the value of the rate given this model of a continuously compounding growth of a share price?

$$838 = 700 \cdot e^{(r \cdot 3)}$$

- | | |
|---|------------|
| A | $r = 7\%$ |
| B | $r = 9\%$ |
| C | $r = 6\%$ |
| D | $r = 10\%$ |



Exponential Functions - Intro

58 What is the value of the rate given this model of a continuous reduction of a toxin concentration?

$$292 = 600 \cdot e^{(-r \cdot 8)}$$

A	$r = 9\%$
B	$r = 12\%$
C	$r = 7\%$
D	$r = 5\%$

59 What is the value of the time given this scenario?

A rabbit population starts at 500. Each subsequent yearly breeding season it grows by 4%. After a certain number of years it has increased to a population of 632 rabbits.

A	$t = 7$ years
B	$t = 5$ years
C	$t = 4$ years
D	$t = 6$ years

60 What is the value of the starting population given this scenario?

A rabbit population starts at a certain size. Each subsequent yearly breeding season it grows by 4%. After 2 years it has increased to a population of 865 rabbits.

A	$P_0 = 600$
B	$P_0 = 1100$
C	$P_0 = 800$
D	$P_0 = 500$

61 What is the value of the final concentration given this scenario?

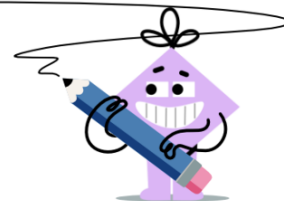
A toxin starts at a concentration of 700mg/L. Each hourly dialysis reduces it by 8%. After 6 hours it has decreased to a certain concentration.

A	$C = 335$
B	$C = 424$
C	$C = 400$

62 What is the value of the rate given this scenario?

A whale population starts at 500. Each subsequent year it declines by a certain percent. After 9 years it has decreased to a population of 416 whales.

A	$r = 4\%$	B	$r = 1\%$
C	$r = 5\%$	D	$r = 2\%$



Exponential Functions - Intro

63 What is the value of the time given this scenario?

A charitable endowment starts with \$600. Each yearly it disburses 7% of its remaining funds. After a certain number of years its funds have decreased to \$448.

- | | |
|---|---------------|
| A | $t = 6$ years |
| B | $t = 4$ years |
| C | $t = 5$ years |
| D | $t = 3$ years |

64 What is the value of the starting concentration given this scenario?

A toxin starts at a certain concentration. Each hourly dialysis reduces it by 9%. After 2 hours it has decreased to a concentration of 414mg/L.

- | | | | |
|---|-------------|---|-------------|
| A | $C_0 = 800$ | B | $C_0 = 500$ |
| C | $C_0 = 400$ | D | $C_0 = 700$ |

65 What is the value of the final concentration given this scenario?

A radioactive material starts at an isotope concentration of 700ppm. It decays continuously at 8% per hour. After 2 hours it has decayed to a certain isotope concentration.

- | | |
|---|-----------|
| A | $R = 555$ |
| B | $R = 596$ |
| C | $R = 740$ |

66 What is the value of the final population given this scenario?

An insect population starts at 700. It grows continuously at 2% growth per week. After 3 weeks it has increased to a certain population.

- | | |
|---|-------------|
| A | $P = 965$ |
| B | $P = 1,020$ |
| C | $P = 760$ |
| D | $P = 743$ |

67 Rearrange the exponential equation to solve for for the starting price given this scenario?

A company's share price starts at a certain value. It grows continuously at 8% growth per year. After 3 years it has a share price of \$762.

- | | | | |
|---|--|---|--|
| A | $S_0 = \frac{e^{(0.08 \cdot 3)}}{762}$ | B | $S_0 = \frac{762}{e^{(0.08 \cdot 3)}}$ |
|---|--|---|--|

68 Rearrange the exponential equation to solve for for the starting concentration given this scenario?

A toxin starts at a certain concentration. It declines continuously at 4% per hour. After 8 hours it has decreased to a concentration of 653mg/L.

- | | | | |
|---|---|---|---|
| A | $C_0 = \frac{653}{e^{(-0.04 \cdot 8)}}$ | B | $C_0 = \frac{e^{(-0.04 \cdot 8)}}{653}$ |
|---|---|---|---|



Exponential Functions - Intro

69 What is the value of the starting population given this scenario?

A rabbit population starts at a certain size. It grows continuously at 4% growth per year. After 8 years it has increased to a population of 413 rabbits.

- | | | | |
|---|-------------|---|-------------|
| A | $P_0 = 300$ | B | $P_0 = 600$ |
| C | $P_0 = 400$ | D | $P_0 = 500$ |

70 What is the value of the starting concentration given this scenario?

A radioactive material starts at a certain isotope concentration. It decays continuously at 2% per hour. After 6 hours it has decayed to an isotope concentration of 620ppm.

- | | | | |
|---|-------------|---|-------------|
| A | $R_0 = 700$ | B | $R_0 = 400$ |
| C | $R_0 = 600$ | D | $R_0 = 500$ |

71 What is the value of the time given this scenario?

A credit card starts with \$500 of debt. It grows continuously at 9% interest per year. After a certain number of years the debt has grown to \$858.

- | | |
|---|---------------|
| A | $t = 7$ years |
| B | $t = 5$ years |
| C | $t = 4$ years |
| D | $t = 6$ years |

72 What is the value of the time given this scenario?

A radioactive material starts at an isotope concentration of 800ppm. It decays continuously at 5% per hour. After a certain number of hours it has decayed to an isotope concentration of 563ppm.

- | | |
|---|---------------|
| A | $t = 8$ hours |
| B | $t = 5$ hours |
| C | $t = 7$ hours |

73 What is the dB magnitude on the decibel scale when the sound energy is 10^{18} W/m^2 ?

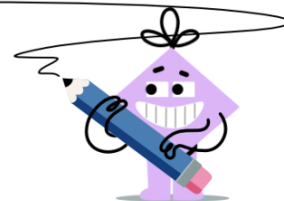
$$\text{dB} = 10 \log\left(\frac{I}{I_0}\right)$$
$$I_0 = 10^{-12} \text{ W/m}^2$$
$$I = 10^{18} \text{ W/m}^2$$

- | | |
|---|-----------------------|
| A | $\beta = 24\text{dB}$ |
| B | $\beta = 30\text{dB}$ |

74 What is the value of the rate given this scenario?

A rabbit population starts at 900. It grows continuously at a certain percent growth per year. After 7 years it has increased to a population of 1,575 rabbits.

- | | |
|---|------------|
| A | $r = 11\%$ |
| B | $r = 4\%$ |
| C | $r = 12\%$ |
| D | $r = 8\%$ |



Exponential Functions - Intro

75 What is the value of the rate given this scenario?

A bird population starts at 800. It declines continuously at a certain percent per year. After 4 years it has decreased to a population of 558.

A $r = 9\%$

B $r = 7\%$

C $r = 11\%$

D $r = 10\%$

76 What is the magnitude on the Richter scale when the wave height is $10^{4.1}$ micrometers?

$$M = \log\left(\frac{I}{I_0}\right)$$

$$I_0 = 1 \mu\text{m}$$

$$I = 10^{4.1} \mu\text{m}$$

A $M = 4.6$

B $M = 4.1$

77 What is the wave height of an earthquake with a magnitude of 9 on the Richter scale?

$$M = \log\left(\frac{I}{I_0}\right)$$

$$I_0 = 1 \mu\text{m}$$

$$M = 9$$

A $I = 10^{11} \mu\text{m}$

B $I = 10^9 \mu\text{m}$

78 What is the wave height of an earthquake with a magnitude of 2.6 on the Richter scale?

$$M = \log\left(\frac{I}{I_0}\right)$$

$$I_0 = 1 \mu\text{m}$$

$$M = 2.6$$

A $I = 10^{4.1} \mu\text{m}$

B $I = 10^{2.6} \mu\text{m}$

79 If 2 solutions have pHs of 13.9 and 2 on the pH scale what is the ratio of their Hydrogen ion concentration measurements?

$$\text{pH} = -\log[\text{H}^+]$$

$$\text{pH}_2 = 2$$

$$\text{pH}_1 = 13.9$$

A $\frac{[\text{H}^+]_2}{[\text{H}^+]_1} = 2.51 \times 10^{13}$

B $\frac{[\text{H}^+]_2}{[\text{H}^+]_1} = 7.94 \times 10^{11}$

80 If 2 earthquakes have magnitudes of 2 and 6 on the Richter scale what is the ratio of their wave size measurements?

$$M = \log\left(\frac{I}{I_0}\right)$$

$$M_2 = 6$$

$$M_1 = 2$$

A $\frac{I_2}{I_1} = 10,000$

B $\frac{I_2}{I_1} = 31,623$