

Write in exponential form.

1. $\log_4 x = \frac{1}{2}$

$$4^{\frac{1}{2}} = x$$

2. $\ln 7.39 \approx 2$

$$e^2 \approx 7.39$$

Write in logarithmic form.

3. $e^4 \approx 54.6$

$$\ln 54.6 \approx 4$$

4. $9^3 = 729$

$$\log_9 729 = 3$$

Solve using log properties or solving exponent rules.

5. $81^x = 729^{x-2}$

$$x = 6$$

6. $\left(\frac{1}{343}\right) = 49^{x+3}$

$$x = -4.5$$

7. $9^x = 31.2$

$$x = 1.566$$

8. $4e^{3x} - 11 = 5$

$$x = 0.462$$

9. $8 \log_5 2 = \log_5 64x$

$$x = 4$$

10. $\log_2 4x - \log_2 5 = 4$

$$x = 20$$

$$11. \ln 14 + \ln x = 3$$

$$x = 1.435$$

$$12. 8^{7x} = 2$$

$$x = 0.048$$

$$13. \log_7 4 + 2\log_7 x = \log_7 196$$

$$x = 7$$

$$x = \cancel{-7}$$

$$14. 4^{x+6} = 14^{8x}$$

$$x = 0.422$$

$$15. \ln(2x - 1) = 5$$

$$x = 74.707$$

$$16. \ln(x - 2) - \ln 4 = \ln 3$$

$$x = 14$$

$$17. 4^{x-5} = 77$$

$$x = 8.133$$

$$18. e^{2x-7} + 4 = 9$$

$$x = 4.305$$

$$19. \log_6 3x = 2$$

$$x = 12$$

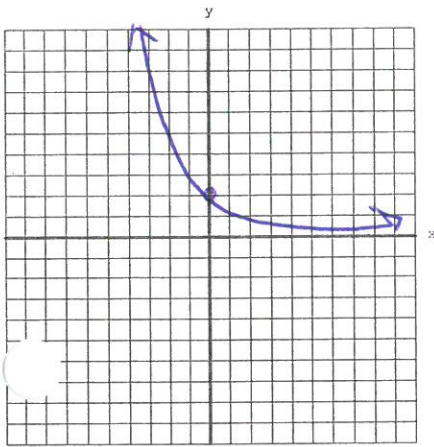
20. $2^{5-x} = 9^{x+1}$

$x = 0.439$

Identify as exponential growth or decay and then make a rough sketch of the graph.

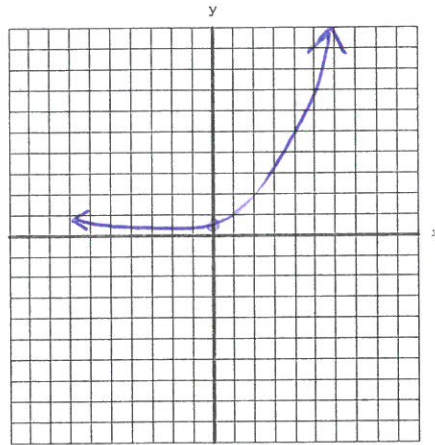
21. $y = 2\left(\frac{1}{4}\right)^x$

Growth or Decay?



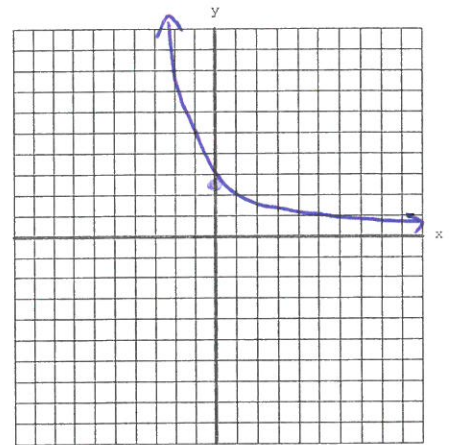
22. $y = \frac{1}{2}(6)^x$

Growth or Decay?



23. $y = \frac{5}{2}\left(\frac{2}{5}\right)^x$

Growth or Decay?



Formulas:

$$y = a(1 \pm r)^t$$

Exponential Growth or Decay

$$y = Pe^{rt}$$

Compound Continuously

$$y = P\left(1 + \frac{r}{n}\right)^{nt}$$

Compound any other way

24. You buy a new car for \$22,500. The value of the car decreases by 25% each year.

a. What is the value of the car after three years? $\$9492.19$

b. In approximately how many years is the car worth \$5300?

$t \approx 5.025$

Formulas:

$$y = a(1 \pm r)^t$$

Exponential Growth or Decay

$$y = Pe^{rt}$$

Compound Continuously

$$y = P \left(1 + \frac{r}{n}\right)^{nt}$$

Compound any other way

25. Gasoline costs \$2.15 per gallon. The price per gallon increases an average of 4.5% per year.

a. What would be the approximate price after 2 years? $\$2.35$

b. If this trend continues, how many years before gas prices reach \$3 per gallon?

$$t \approx 7.568$$

26. You deposited \$4600 in an account that earns 2.6% annual interest. Find the balance after 5 years if the interest is compounded:

a. continuously $\$5238.61$

b. quarterly $\$5236.41$

c. Approximate the number of years it would take for your balance to reach \$6800 if the account is compounded continuously.

$$t \approx 15.034$$

d. Approximate the number of years it would take for your balance to double if the account is compounded every 6 months.

$$t \approx 26.832$$