

18.  $2e^{3x+5} = 14$

*Evaluate.*

20.  $\log_3 8$

22. Write an exponential function  $y = ab^x$  (with  $b > 0$ ) that contains the points (1, 16) and (do not use decimals for  $a$  and  $b$ )

24. The epidemic began with 30 persons infected. The number of infected persons increased by 47% each day after the epidemic began.

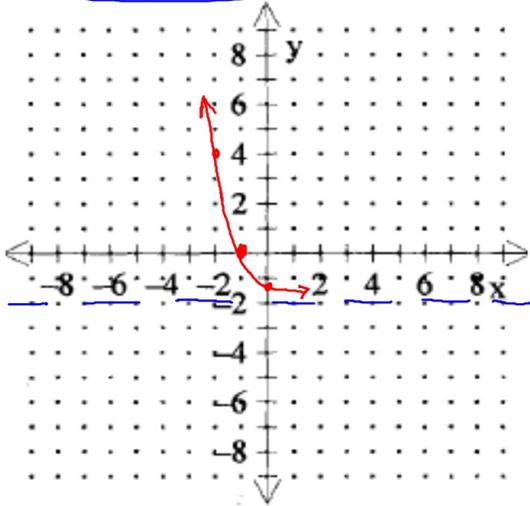
- Write an exponential growth model for the number of infected persons ( $I$ ),  $t$  days after the epidemic began.
- How many persons were infected 1 week after the epidemic began?
- To the nearest day, about how many days did it take for 6,600 persons to be infected?

26. If \$10,000 is invested at an annual interest rate of 3.5% compounded semiannually, how much will the investment be worth at the end of 2 years? Use the formula  $A = P\left(1 + \frac{r}{n}\right)^{nt}$  and round the answer to the nearest cent.

$$28. y = 2\left(\frac{1}{3}\right)^{x+1} - 2$$

|    |      |
|----|------|
| x  | y    |
| 0  | -1/3 |
| -1 | 0    |

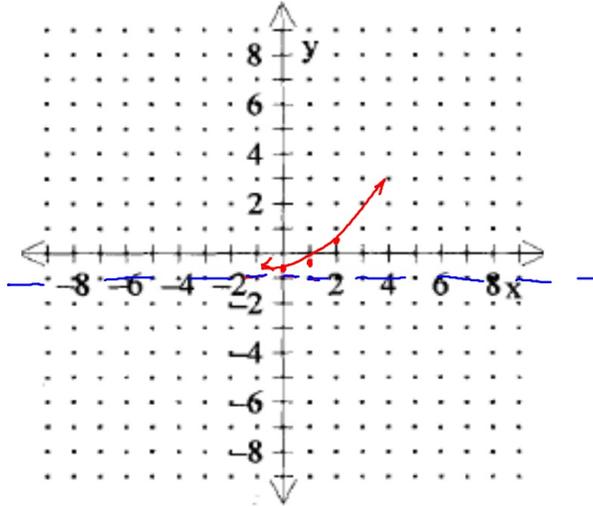
D: all real #s  
R:  $y > -2$



$$30. y = \frac{1}{2}e^{x-1} - 1$$

|   |      |
|---|------|
| x | y    |
| 0 | -1.8 |
| 1 | -1   |

D: all real #s  
R:  $y > -1$



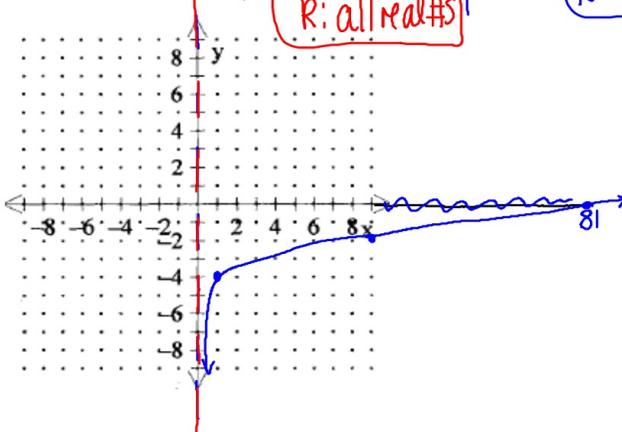
$$32. y = \log_3 x - 4$$

$$y + 4 = \log_3 x$$

$$3^{y+4} = x$$

|    |    |
|----|----|
| x  | y  |
| 81 | 0  |
| 1  | -4 |

D:  $x > 0$   
R: all real #s



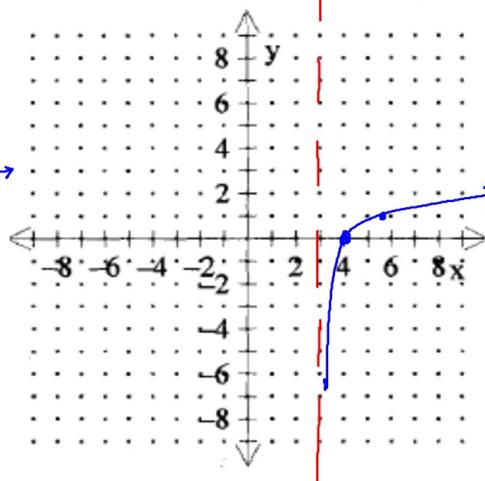
$$34. y = \ln(x-3)$$

$$y = \log_e(x-3)$$

$$e^y + 3 = x \quad e^y = x - 3$$

|     |   |
|-----|---|
| x   | y |
| 4   | 0 |
| 5.7 | 1 |

D:  $x > 3$   
R: all real #s



Solve for  $x$ .

17.  $50^{2x-1} + 7 = 407$

19.  $5^{2x+1} = 2^{4x-3}$   
 $\log 5^{2x+1} = \log 2^{4x-3}$

$$(2x+1)\log 5 = (4x-3)\log 2$$
$$2x\log 5 + 1\log 5 = 4x\log 2 - 3\log 2$$
$$1\log 5 + 3\log 2 = 4x\log 2 - 2x\log 5$$

$$\frac{\log 40}{\log 64} = \frac{\log(5 \cdot 2^3)}{\log(6 \div 25)} = \frac{\log 5 + \log 2^3}{\log 2^4 - \log 5^2} = \frac{\log 5 + 3\log 2}{\log 2^4 - \log 5^2} = \frac{x(4\log 2 - 2\log 5)}{\log 2^4 - \log 5^2}$$

21.  $\ln 18 - \frac{1}{2}\ln 36$

$$\ln 18 - \ln \sqrt{36}$$

$$\ln\left(\frac{18}{6}\right) = \ln 3$$

23. Write a power function  $y = ax^b$  that contains the points (2, 28) and (8, 192).

$$y = ax^b$$
$$28 = a \cdot 2^b \rightarrow a = \frac{28}{2^b}$$
$$192 = a \cdot 8^b$$

$$192 = \frac{28}{2^b} \cdot 8^b$$

$$\frac{48}{7} = \left(\frac{8}{2}\right)^b$$

$$\frac{48}{7} = 4^b$$
$$\log\left(\frac{48}{7}\right) = \log 4^b$$

$$\log\left(\frac{48}{7}\right) = b \log 4 \approx 1.39$$

$$\frac{\log\left(\frac{48}{7}\right)}{\log 4} = a = \frac{28}{2^{1.39}} \approx 10.68$$

25. The output power  $P$  (in watts) of a satellite is given by  $P = 50e^{-t/250}$ , where  $t$  is the number of days that the satellite has been in operation.

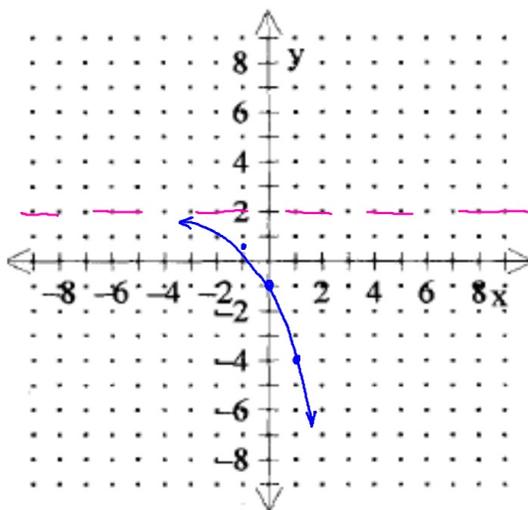
a) To the nearest watt, compute the power output of the satellite on the 45<sup>th</sup> day.

b) If the equipment aboard the satellite requires 15 watts of power, about how long, to the nearest day will the satellite continue to operate?

$$\begin{aligned}
 \text{b) } 15 &= 50e^{-t/250} \\
 .3 &= e^{-t/250} \\
 \ln .3 &= \underbrace{\ln e^{-t/250}} \\
 \ln .3 &= -t/250 \\
 -250 \ln .3 &= t
 \end{aligned}$$

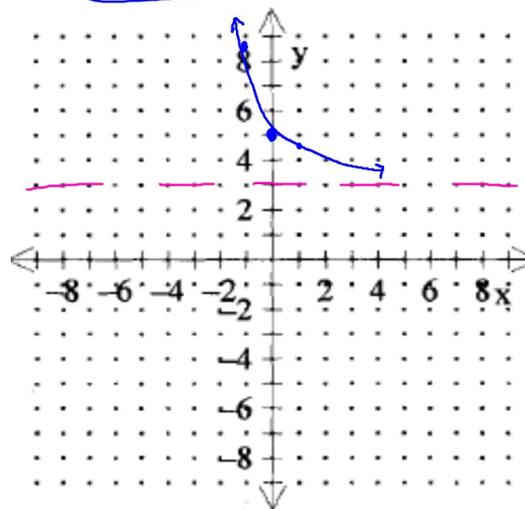
27.  $y = -3(2)^x + 2$

|                              |   |
|------------------------------|---|
| D: all real #s<br>R: $y < 2$ | $\begin{array}{r l} x & y \\ 0 & 4 \\ 1 & -4 \end{array}$ |
|------------------------------|---|



29.  $y = 2e^{-x} + 3$

|                              |   |
|------------------------------|---|
| D: all real #s<br>R: $y > 3$ | $\begin{array}{r l} x & y \\ 0 & 5 \\ -1 & 8.4 \end{array}$ |
|------------------------------|---|

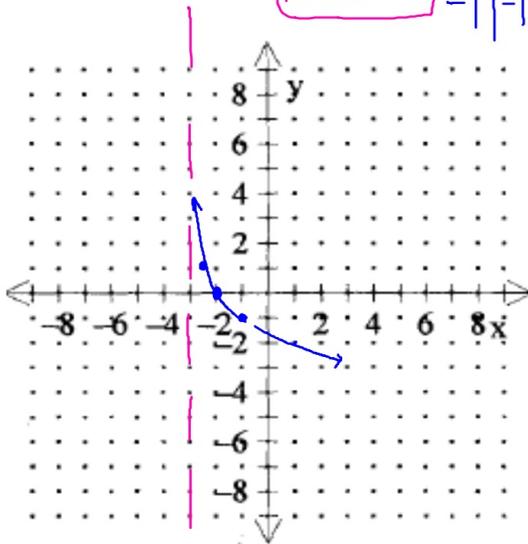


31.  $y = \log_{1/2}(x+3)$

$\frac{1}{2}^y = x+3$        $\frac{1}{2}^y - 3 = x$

| x    | y  |
|------|----|
| -2   | 0  |
| -2.5 | 1  |
| -1   | -1 |

D:  $x > -3$   
R: all real #s



33.  $y = \ln x + 2$

$y - 2 = \ln_e x$   
 $e^{y-2} = x$

| x    | y |
|------|---|
| 0.14 | 0 |
| 1    | 2 |

D:  $x > 0$   
R: all real #s

