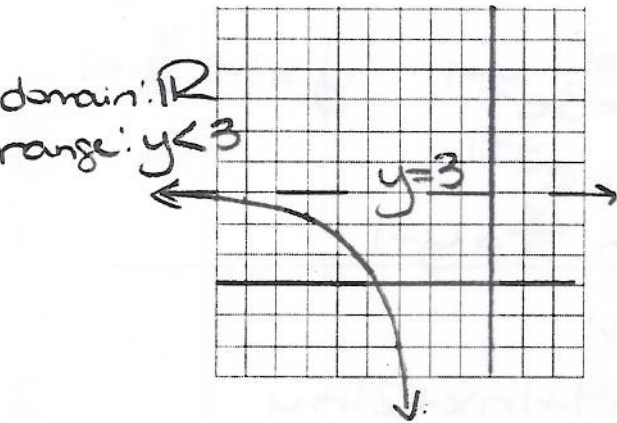
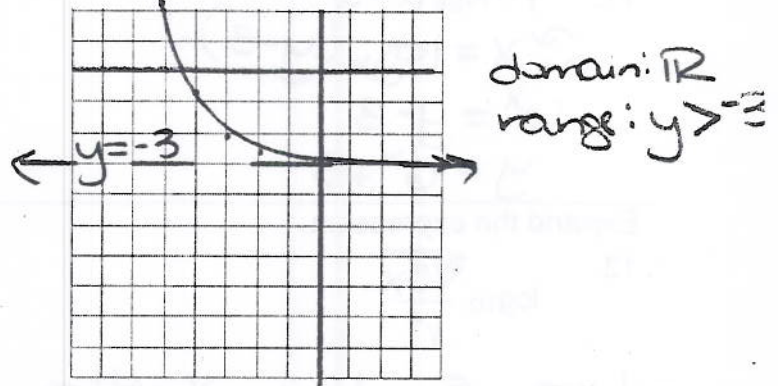


Graph the function, identify the asymptote, and state the domain and range.

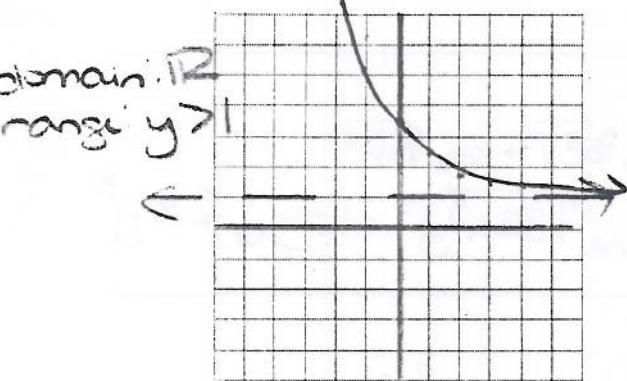
1.  $y = -5 \cdot 2^{x+3} + 3$



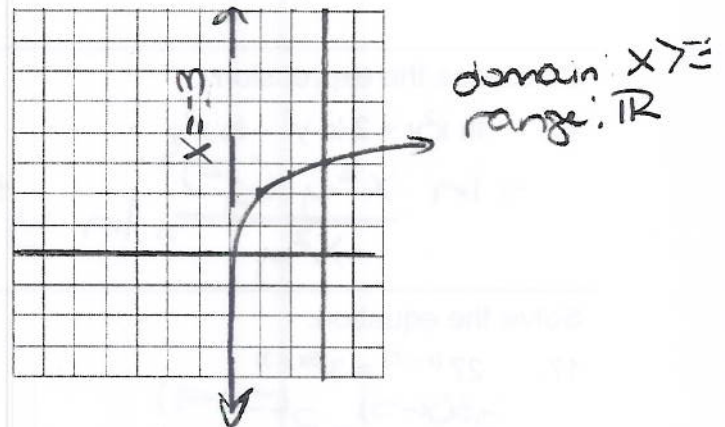
2.  $y = \frac{1}{3} \left( \frac{2}{5} \right)^{x+2} - 3$



3.  $y = 2.5e^{5x} + 1$



4.  $y = \log_3(x+3) + 2$



Simplify the expression.

5.  $3(e^{-3x} \cdot e^{+3x})^2 = 3(e^0)^2 = 3$

6.  $\sqrt[3]{8e^{10x}} = 2e^{3x} \sqrt[3]{e^x}$

7.  $\log_8 512^x = \log_3 3^{3x} = 3x$

8.  $9^{\log_3 7x} = 3^{2 \log_3 7x} = 3^{\log_3 (7x)^2} = (7x)^2 = 49x^2$

Solve.

9. You deposit \$2500 in a savings account that pays 4% annual interest. If the account compounds daily, how long will it take for the account to reach \$4000 to the nearest year?

$$4000 = 2500 \left( 1 + \frac{.04}{365} \right)^{365t}$$

$$1.6 = \left( 1 + \frac{.04}{365} \right)^{365t}$$

$$\log \left( 1 + \frac{.04}{365} \right) 1.6 = 365t$$

$$t = \frac{\log 1.6}{\log \left( 1 + \frac{.04}{365} \right)}$$

$$t \approx 12 \text{ years}$$

10. A new motorboat costs \$6000. The value of the boat decreases by 15% each year. What is the value of the boat after 3 years?

$$y = 6000(1 - .15)^3 \approx \$3684.75$$

Find the inverse function.

11.  $y = \log_6(x - 3)$

$$\curvearrowright x = \log_6(y - 3)$$

$$6^x = y - 3$$

$$y = 6^x + 3$$

12.  $y = 3e^{x+1}$

$$\curvearrowright x = 3e^{y+1} \quad y = \ln \frac{x}{3} - 1$$

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

$$\ln \frac{x}{3} = y + 1$$

Expand the expression.

13.  $\log_{1/2} \frac{\sqrt[3]{5x}}{y^4}$

$$= \frac{1}{3} \log_{1/2} 5 + \frac{1}{3} \log_{1/2} x - 4 \log_{1/2} y$$

14.  $\ln 4xy^2$

$$= \ln 4 + \ln x + 2 \ln y$$

Condense the expression.

15.  $\ln x^2y + 2 \ln y^2 - \ln x^2y$

$$= \ln \frac{x^2y \cdot (y^2)^2}{x^2y} = \ln y^4$$

16.

$$\log_6 \sqrt[5]{x^3y^4} + \log_6 \sqrt[4]{x^2y^11}$$

$$= \log_6 \sqrt[5]{32x^3y^5} = \log_6 2xy^3$$

Solve the equation.

17.  $27^{(x-5)} = 3^{(5x+3)}$

$$3^{3(x-5)} = 3^{(5x+3)}$$

$$3x - 15 = 5x + 3$$

$$2x = -18$$

$$x = -9$$

19.

$$\log_4(x^2 + 10x) = 2$$

$$x = 9, x$$

$$3^2 = x^2 - 3x$$

$$0 = x^2 - 3x - 9$$

$$0 = (x - 9)(x + 1)$$

18.

$$(0.16)^{x+6} = (0.4)^{x^2+3x}$$

$$.4^{2(x+6)} = .4^{(x^2+3x)} \quad x = -4, 3$$

$$2x + 12 = x^2 + 3x$$

$$0 = x^2 + x - 12$$

$$0 = (x + 4)(x - 3)$$

20.

$$\log_4 x + \log_4(x + 6) = 2$$

$$\log_4(x^2 + 6x) = 2 \quad x = -8, 2$$

$$4^2 = x^2 + 6x$$

$$0 = x^2 + 6x - 16$$

$$0 = (x + 8)(x - 2)$$

21. Write an exponential function  $y = ab^x$  whose graph passes through (3, 8) and (6, 15).

$$\therefore y = 5 \cdot 3^x$$

22. Write a power function  $y = ax^b$  whose graph passes through (3, 8) and (6, 15).

$$45 = ab^2 \quad 105 = ab^4$$

$$a = \frac{45}{b^2}$$

$$= \frac{45}{9}$$

$$= 5$$

$$405 = \frac{45}{b^2} b^4$$

$$9 = b^2$$

$$b = 3$$

$$8 = a \cdot 3^b$$

$$a = \frac{8}{3^b}$$

$$= 2.95$$

$$15 = a \cdot 6^b$$

$$15 = \frac{8}{3^b} 6^b$$

$$15/8 = 2^b$$

$$\log_2 15/8 = b$$

$$\therefore y = 2.95x^{1.07}$$

$$\log_2 15/8 = b \approx 1.07$$