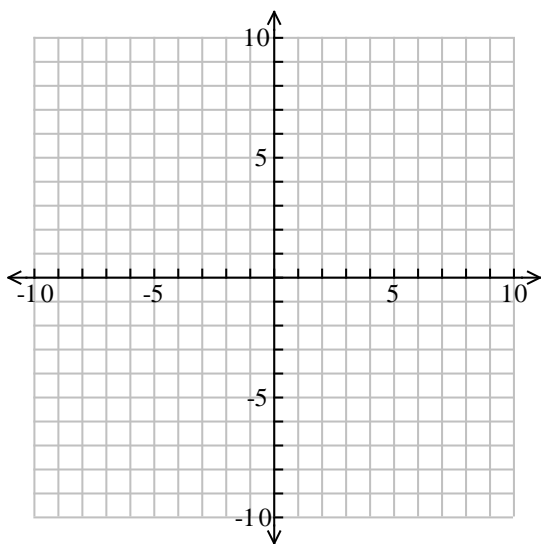


1. Find the domain, intercepts, horizontal asymptote, vertical asymptote(s), and hole(s) of the function $f(x) = \frac{2x^3 - 3x^2 - 5x}{x^3 + x^2 - 9x - 9}$, and then graph it.



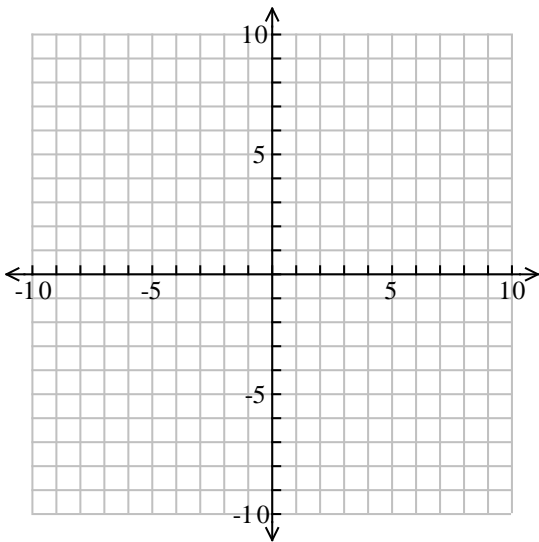
2. $\lim_{x \rightarrow \infty} \frac{8x^5 - 6x^2 + 9}{4 - x^5 + 7x} =$

3. $\left(\frac{-27}{1000}\right)^{\frac{-2}{3}} =$

4. If $\left(\frac{2}{3}, \frac{16}{81}\right)$ is a point on the graph of $f(x) = a^x$, what does a equal?

5. If $f(x) = -2^{(x+5)} - 4$ what is the domain, range and intercepts? What transformations of $g(x) = 2^x$ are needed to graph f ? Is f or g increasing?

6. Find the domain, intercepts, horizontal asymptote, vertical asymptote(s), and hole(s) of the function $f(x) = \frac{12x}{x^2 + 4x + 4}$, and then graph it.



7. Exactly solve $9\ln(2x+3) - 5 = 2$ for x .

8. Express $5 \cdot 3^{11x}$ as a natural exponential expression.

9. To four decimal places, evaluate the following:

a. $e \approx$

b. $4e^{-3} \approx$

c. $-2e^5 + 3 \approx$

10. If $R(t) = R(0) \cdot 2^t$ is the number of people who know a rumor after t days, how long will it take for the number who know the rumor to quadruple?

11. Exactly evaluate:

a. $\log_7 \sqrt[5]{49} =$

b. $\log \frac{1}{10000} =$

c. $\ln e^{x+9} =$

d. $\log_2 1 =$

e. $3^{\log_3(32x-1)} =$

$$12. \lim_{x \rightarrow -\infty} \frac{2x^4 + 9x^2 - 2}{x^3 - 4x^2} =$$

13. If $f(x) = \log_7(x+4) - 1$ what is the domain, range and intercepts? What transformations of $g(x) = \log_7 x$ are needed to graph f ? Is f or g increasing?

$$14. \text{Expand } \ln \left(\frac{2(x-1)}{y^3} \right)^4 =$$

15. Exactly solve the equation $7e^{3x-8} - 9 = 24$ for x .

16. If $f(x) = 6\log_2(x-4)$, what is its inverse function?

17. Exactly solve $2 \cdot 7^x x^3 + 16 \cdot 7^x x^2 = 18x \cdot 7^x$ for x .

18. A radioactive sample decays 32% after 2 hours.

a. What is its half-life?

b. How much of a 2 mg sample will remain after 24 hours?

19. Find the domain, intercepts, horizontal asymptote, vertical asymptote(s), and hole(s) of the

function $f(x) = \frac{(x^3 + 125)(x^2 - 8x + 16)}{x^3 + 2x^2 - 25x - 50}$.

20. $P(t) = 28 \cdot 5^{4t}$ is the population of aphids after t weeks in an ecosystem.

a. What is the initial population?

b. When will the population reach 437,500 aphids?

21. Which of the following satisfies an exponential growth or decay model? If yes, then state if it is a growth or a decay model.

a. $f(x) = 6xe^x$

b. $f(x) = \frac{3^{5x+6}}{2}$

c. $f(x) = \frac{4}{e^{6x}}$

22. Exactly solve $5 \cdot 2^{x+5} + 6 = 9$ for x .

$$23. \lim_{x \rightarrow -\infty} \frac{8x^3 + 5x^2 - 11}{x^6 + 7x^2 + 3} =$$

24. The number, $P(t)$, of critters in an ecosystem is counted at certain times and the data is given in the table. Determine the exponential growth model.

| | | | |
|--------|----|----|------|
| t | 0 | 2 | 6 |
| $P(t)$ | 12 | 60 | 1500 |

25. Solve $\log_2(x-2) - 2 = -\log_2(x+1)$ for x .

26. Suppose a bacterial colony doubles its population every 36 hours. What is the exponential growth model?