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PART II: Questions 11 - 20, Open ended

Answer all TEN questions. You must show all your work in a clear and logical progression and clearly indicate your answer to receive full credit.

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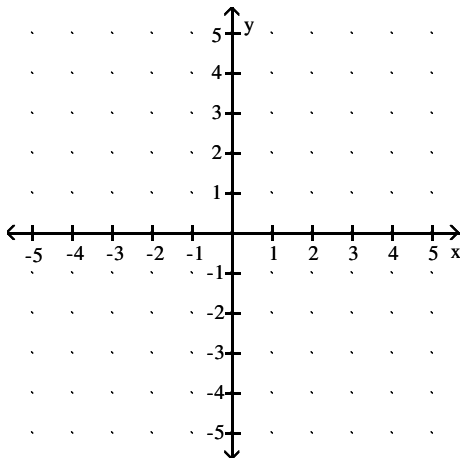
For the function, find the average rate of change of f from 1 to x:

$$\frac{f(x) - f(1)}{x - 1}, x \neq 1$$

11)  $f(x) = 2x^2 - 3x - 1$

Use transformations to graph the function. Determine the domain, range, and horizontal asymptote of the function.

12) Graph the function  $f(x) = 3^x - 2$ . Determine the domain, range, and horizontal asymptote.

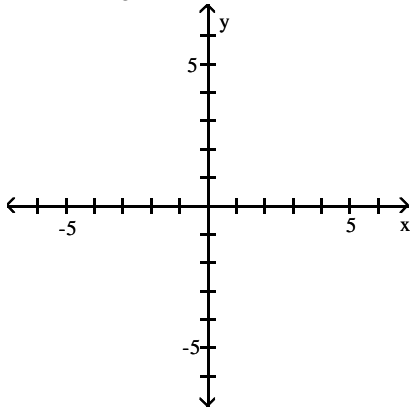


Find all of the zeros of the polynomial function.

$$13) f(x) = 3x^3 + 5x^2 - 17x + 5$$

Graph the function and list at least three (x, y) ordered pairs that lie on the graph.

$$14) y = \log_3 x$$



Solve the system using the inverse matrix method.

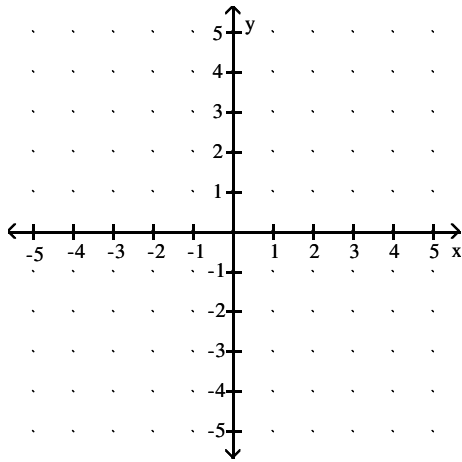
15)

$$\begin{cases} x + 2y + 3z = -5 \\ x + y + z = -6 \\ -x + y + 2z = 1 \end{cases}$$

$$\text{The inverse of } \begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 1 \\ -1 & 1 & 2 \end{bmatrix} \text{ is } \begin{bmatrix} 1 & -1 & -1 \\ -3 & 5 & 2 \\ 2 & -3 & -1 \end{bmatrix}.$$

Find the intercepts and graph the rational function.

$$16) f(x) = \frac{x - 2}{(x + 1)(x - 3)}$$



Solve the system of equations using Cramer's Rule if it is applicable. If Cramer's Rule is not applicable, say so.

$$17) \begin{cases} 4x - 7y = 5 \\ 2x + 5y = -3 \end{cases}$$

**Solve the problem.**

- 18) A culture of bacteria obeys the law of uninhibited growth. If 140,000 bacteria are present initially and there are 609,000 after 6 hours, how long will it take for the population to reach one million? Round your answer to the nearest thousandth.

**Find the sum of the infinite geometric series.**

19)

$$\sum_{k=1}^{\infty} 6 \left( \frac{1}{3} \right)^{k-1}$$

**Solve the problem.**

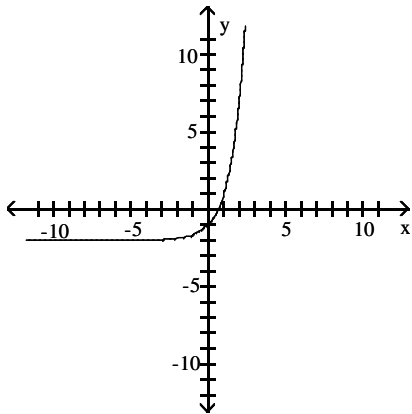
- 20) The owner of a video store has determined that the cost  $C$ , in dollars, of operating the store is approximately given by  $C(x) = 2x^2 - 28x + 620$ , where  $x$  is the number of videos rented daily. Find the lowest cost to the nearest dollar.

Answer Key

Testname: CA-FINALAOE

11)  $2x - 1$

12)



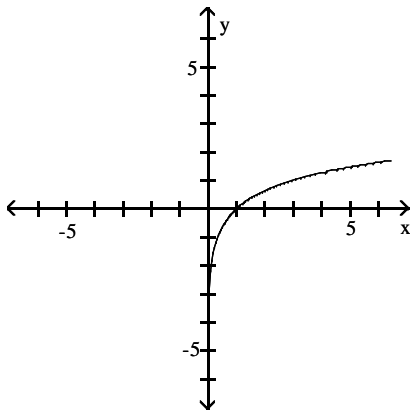
domain:  $(-\infty, \infty)$

range:  $(-2, \infty)$

horizontal asymptote:  $y = -2$

13)  $-1 + \sqrt{6}$ ,  $-1 - \sqrt{6}$ ,  $1/3$

14)



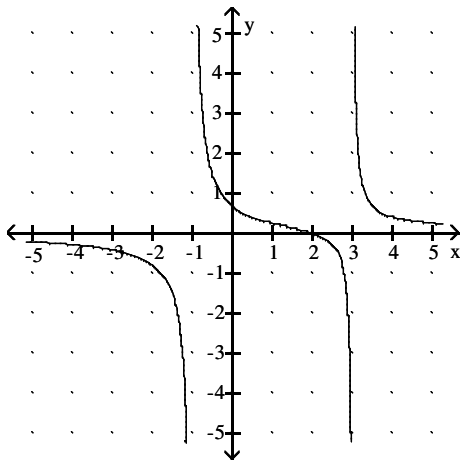
Ordered pairs  $(\frac{1}{3}, -1)$ ,  $(1, 0)$ ,  $(3, 1)$ ,  $(9, 2)$ , etc.

15)  $x = 0$ ,  $y = -13$ ,  $z = 7$

Answer Key

Testname: CA-FINALAOE

16) Intercepts:  $(0, 2/3)$  and  $(2, 0)$



17)  $x = \frac{2}{17}, y = -\frac{11}{17}$

18) 8.024 hours

19) 9

20) \$522