

Calculus A

Summer Practice Problems

Preparation: Successful completion of Precalculus A

Purpose of the Practice Problems: To provide students the opportunity to review the basic concepts and skills learned in Algebra and Precalculus so they are better prepared to begin their work in Calculus. This work will not be collected, graded, or reviewed in September.

Where to find help: <http://www.algebra.com>

<http://www.mathpower.com>

A. Find the given information for each function. Then sketch the graph.

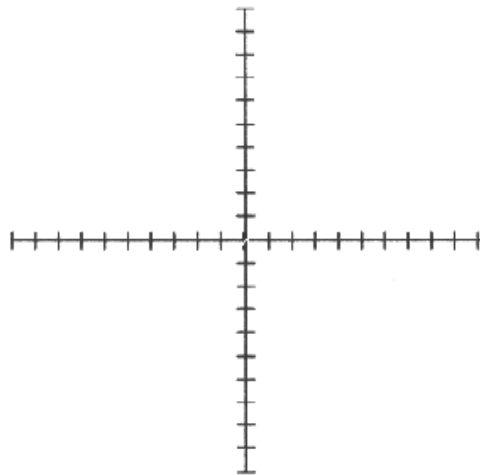
1. $f(x) = \tan x$

Domain: _____

Range: _____

Zeros: _____

Asymptotes: _____



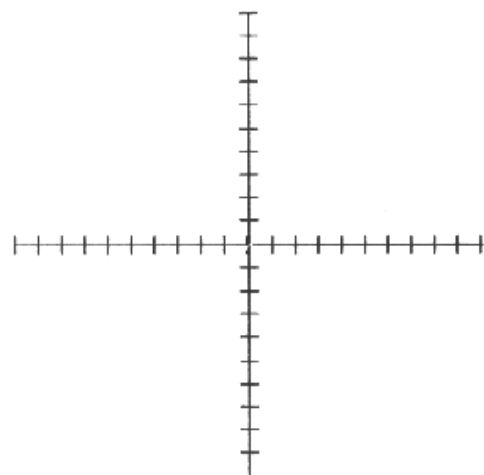
2. $f(x) = 2^x$

Domain: _____

Range: _____

Zeros: _____

Asymptotes: _____



3. $f(x) = \log_2 x$

Domain: _____

Range: _____

Zeros: _____

Asymptotes: _____

4. $f(x) = \frac{x^2 - 4}{x^2 - 5x - 14}$

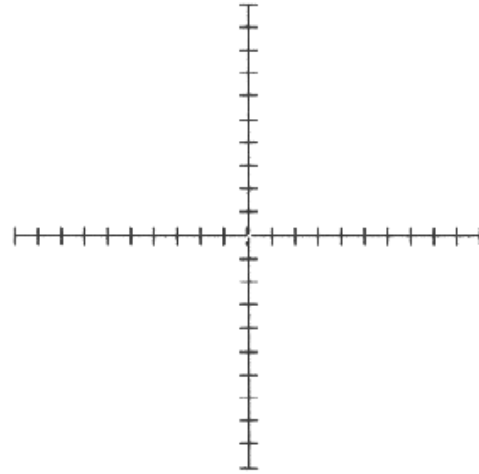
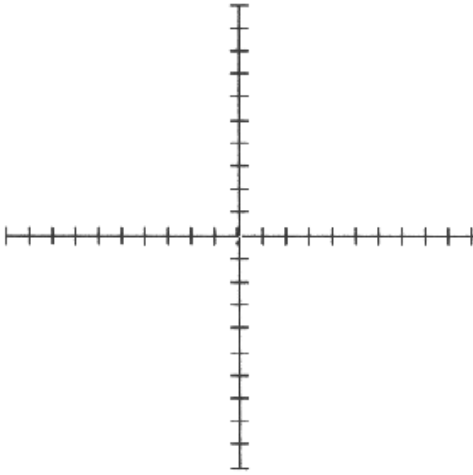
Domain: _____

Range: _____

Zeros: _____

Asymptotes: _____

asymptotes. _____



B. Let $f(x) = 4x$, $g(x) = x^2$, $h(x) = x + 5$, and $j(x) = 2x$. Find the following:

5. $(f + h)(x)$

6. $(j - f)(x)$

7. $f(g(h(x)))$

8. $g(h(j(x)))$

9. $\left(\frac{f}{g}\right)(x)$

10. $g(f(h(2)))$

C. Follow the stated directions. Make sure to show ALL work.

11. Find the intercepts:

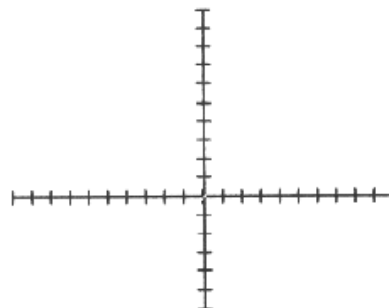
a. $y = -4x^2 + 4x - 1$

b. $y = \frac{2x - 1}{3 - x}$

12. Find all the points where $y = -x^2 + 4x$ and $y = x^2$ intersect.

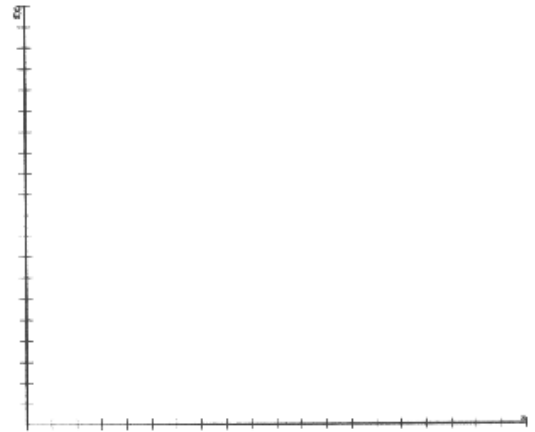
13. Create an equation whose graph has intercepts at $(-5, 0)$, $(0, 0)$, and $(5, 0)$.

14. Sketch the graph of the equation $y = x^2 - 3x + 2$. Label the intercepts & the vertex.



15. A business had annual retail sales of \$224,000 in 1989 and \$186,500 in 1992. Assume the annual decrease in sales follows a linear pattern.

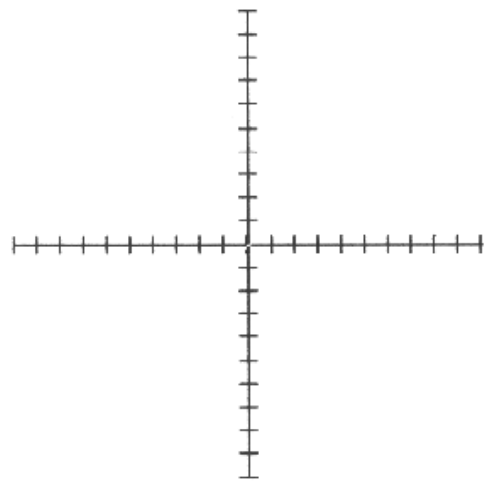
- Write a linear equation giving sales S , in terms of the year t , where $t = 0$ corresponds to 1989.
- Graph the model.
- Use the model to estimate the annual retail sales in 1994.
- In what year, will there no longer be sales?



16. Given $f(x) = 3x - 7$, find $f(x+1) + f(2)$.

17. If $g(x) = x^2 + 3x - 1$, find $\frac{g(x + \Delta x) - g(x)}{\Delta x}$.

18. Given the graph of $y = x^4$,
sketch the graph of $y = (x - 2)^4 + 6$.



19. Let $f(x) = \begin{cases} |x|, & x < 2 \\ x - 3, & x \geq 2 \end{cases}$

Evaluate:

a. $f(-3)$

b. $f(-2)$

c. $f(0)$

d. $f(2)$

20. The daily consumption C (in gallons) of diesel fuel on a farm is modeled by:

$$C = 30.3 + 21.6 \sin\left(\frac{2\pi t}{365} + 10.9\right),$$

where t is the time in days, with $t = 1$ corresponding to January 1.

a. What is the period of the model? Is it what you expected? Explain.

b. What is the average daily fuel consumption? Which term of the model did you use? Explain.

c. Use a graphing calculator to graph the model. Using the graph, approximate the time of year when consumption exceeds 40 gallons per day.

