

Name: _____
Honors Pre-Calculus Summer Assignment

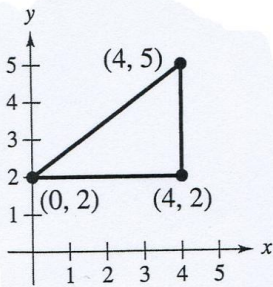
Due 2nd week of school – Date TBD

For problems #1 and #2, determine the quadrant(s) in which (x, y) is located so that the condition(s) is (are) satisfied.

1. $x > 0$ and $y < 0$

2. $xy > 0$

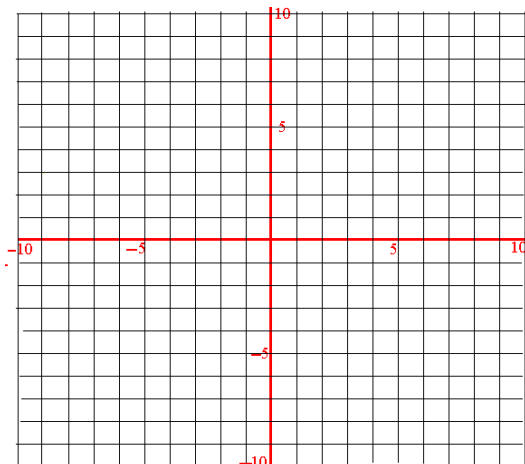
3. (a) Find the length of each side of the right triangle and (b) show that these lengths satisfy the Pythagorean Theorem.



4. Write the standard form of the equation of the specified circle. Center: $(6, -4)$; radius: 3

5. Find the center and radius, and sketch the circle.

$$(x - 1)^2 + (y + 3)^2 = 4$$



center:

radius:

For problems 6 and 7, solve the equation (if possible).

6. $\frac{100-4x}{3} = \frac{5x+6}{4} + 6$

7. $\frac{7}{2x+1} - \frac{8x}{2x-1} = -4$

8. Find the x and y intercepts of the graph of the equation $y = \frac{3x-1}{4x}$

For problems 9 through 12, solve each equation algebraically.

9. $(x + 2)^2 = x^2 - 6x + 1$

10. $\frac{2}{x+2} = 3$

11. $|x - 3| = 4$

12. $\sqrt{x - 2} = 3$

For problems 13 and 14, solve the quadratic equation by factoring. Check your solutions in the original equation.

13. $10x^2 + 7x - 12 = 0$

14. $(x + a)^2 - b^2 = 0$

15. Solve the equation by taking square roots. List both the exact solutions and the decimal solutions rounded to the nearest hundredth.

$(3x - 1)^2 + 6 = 0$

For problems 16 and 17, solve the quadratic equation by completing the square.

16. $x^2 + 4x - 32 = 0$

17. $9x^2 - 18x + 3 = 0$

18. Use the Quadratic Formula to solve the equation.

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

19. Solve the inequality and sketch the solution on the real number line.

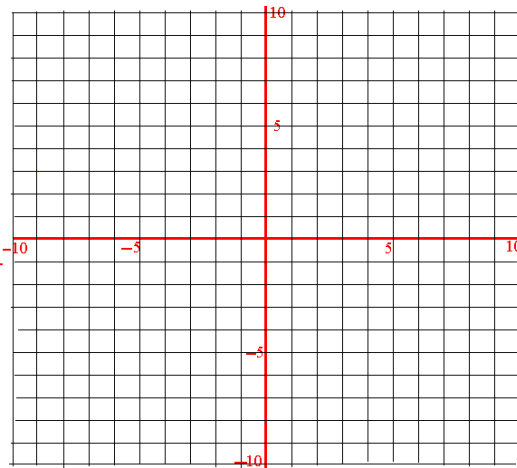
$$-4 < \frac{2x - 3}{3} < 4$$

20. Determine the intervals on which the polynomial is entirely negative and those on which it is entirely positive.

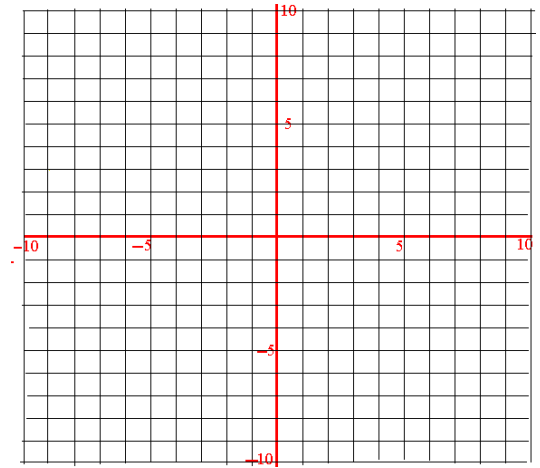
$$x^2 - 4x - 5$$

For problems 21 and 22, graph $f(x)$ without the use of a calculator and find the domain of x in the expression.

21. $f(x) = \sqrt{x - 5}$

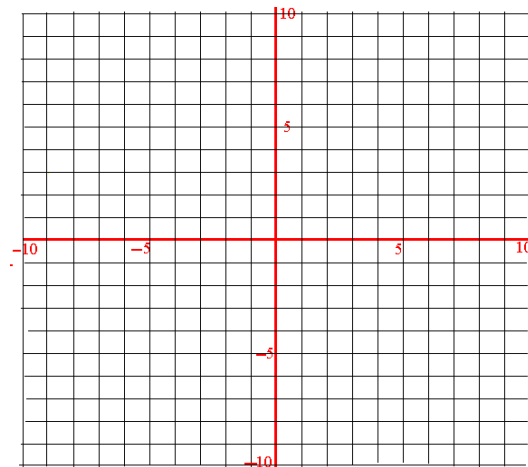


22. $f(x) = \sqrt{x^2 - 4}$

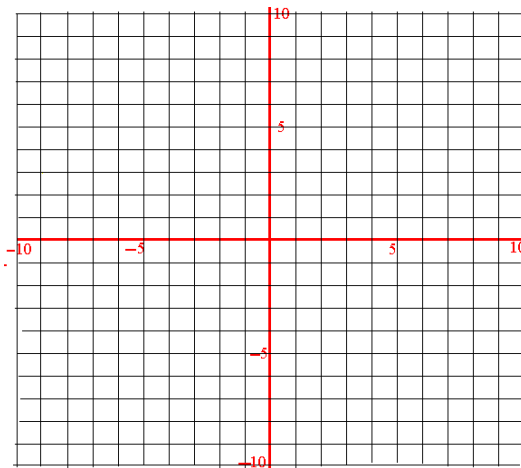


For problems 23 and 24, sketch the graph of the solution of the system of inequalities.

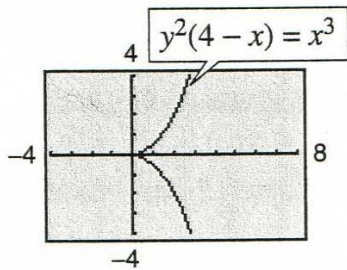
$$23. \begin{cases} x + y \leq 1 \\ -x + y \leq 1 \\ y \geq 0 \end{cases}$$



$$24. \begin{cases} x < y^2 \\ x > y + 2 \end{cases}$$

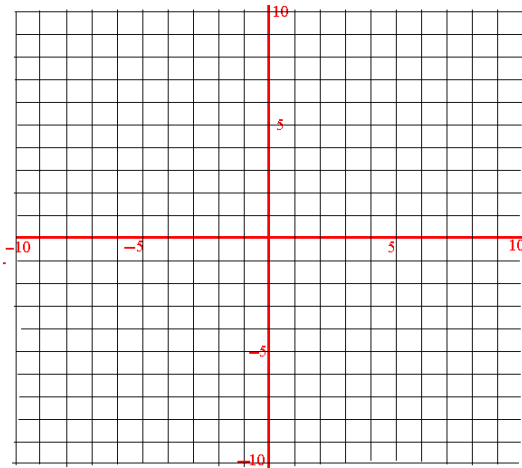


25. Does the below graph represent y as a function of x ? Explain using complete sentences.



26. Evaluate $f(x) = |x + 2| - 15$ for $f(t - 6)$ and simplify.

27. Graph, then state the domain and range of $f(x) = \begin{cases} x^2 - 1, & \text{if } x \leq -2 \\ 5, & \text{if } -2 < x < 3 \\ x + 1, & \text{if } x \geq 3 \end{cases}$



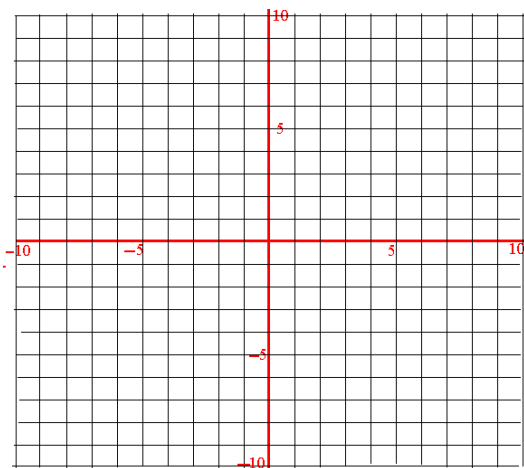
Domain:

Range:

28. An electronics company produces a car stereo for which the variable cost is \$5.60 and the fixed costs are \$24,000. The product sells for \$99.50. Write the total cost C as a function of the number of units produced and sold, x . Write the profit P as a function of the number of units produced and sold, x .

For problems 31-33, (a) identify the parent function f , (b) describe the sequence of transformation from f to g , and (c) sketch the graph of g .

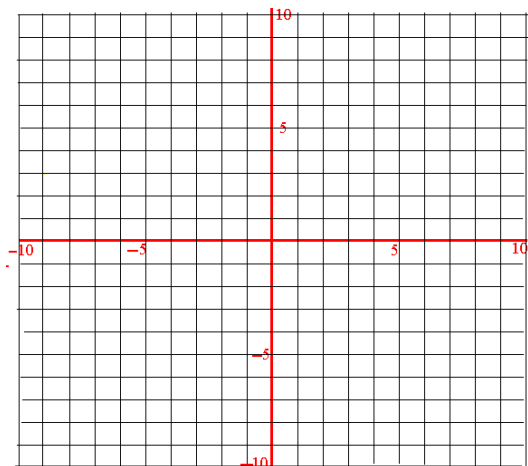
29. $g(x) = -2(x - 5)^3 + 3$



Parent Function:

Sequence of transformations:

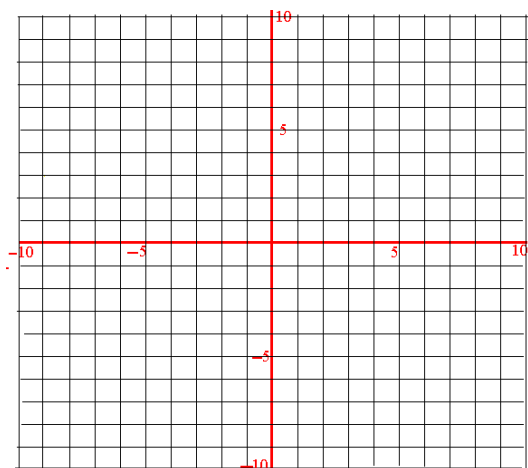
30. $g(x) = \sqrt{-x - 7}$



Parent Function:

Sequence of transformations:

31. $g(x) = 4|x + 2| - 3$



Parent Function:

Sequence of transformations:

32. Use the functions $f(x) = x^2$ and $g(x) = \sqrt{2 - x}$ to find the specified function and its domain.

(a) $(f - g)(x)$

(c) $(f \cdot g)(x)$

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

(d) $(g \circ f)(x)$

For problems 33-35, determine whether the function has an inverse function, and if so, find the inverse function. (Recall, for a function to have an inverse, it must be one-to-one.)

33. $f(x) = x^3 + 8$

34. $f(x) = x^2 + 6$

35. $f(x) = \frac{3x\sqrt{x}}{8}$

36. Evaluate the function at each specified value of the independent variable, and simplify.

$$f(x) = x^2 + 1$$

(a) $f(b^3)$

(d) $f(x + h) - f(x)$

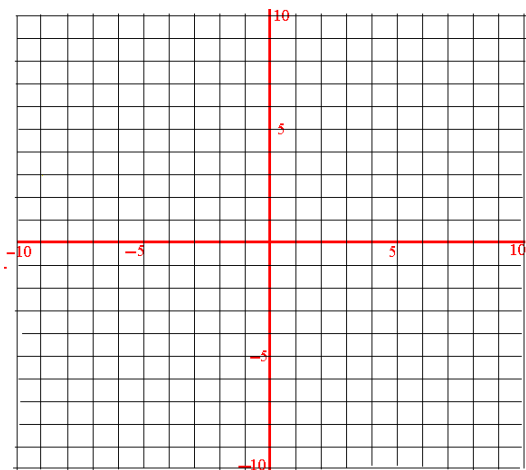
(b) $f(x - 1)$

(c) $f(x + h)$

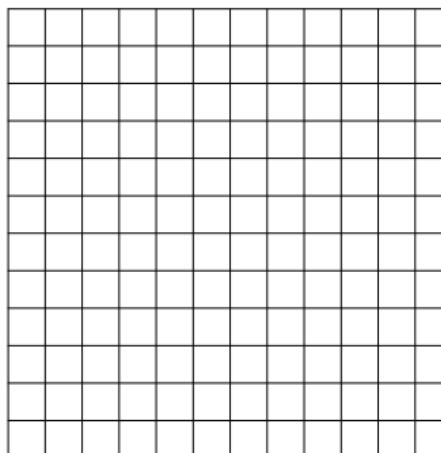
(e) $\frac{f(x+h)-f(x)}{h}$

For problems 37-42, graph each function without the use of a calculator. Then state the domain and range.

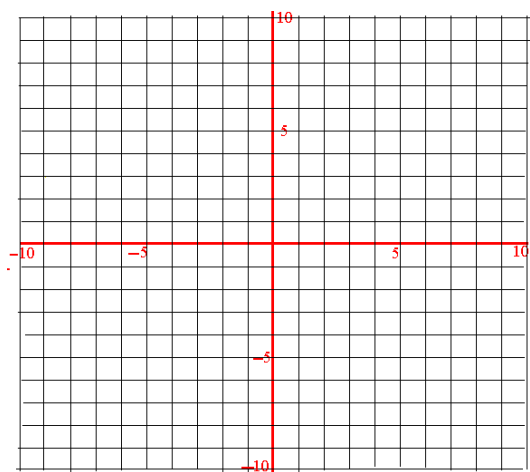
37. $f(x) = \frac{x-1}{x+2}$



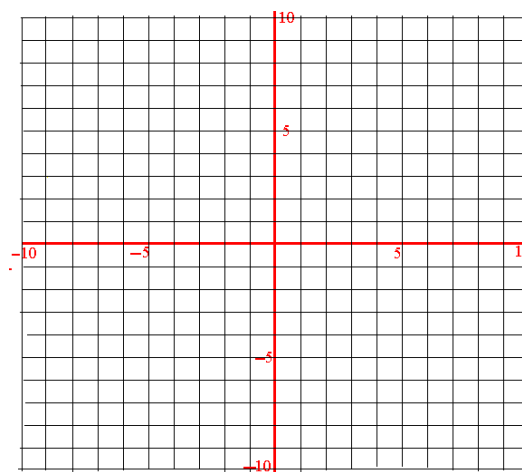
40. $f(x) = -2\cos 2x + 1$



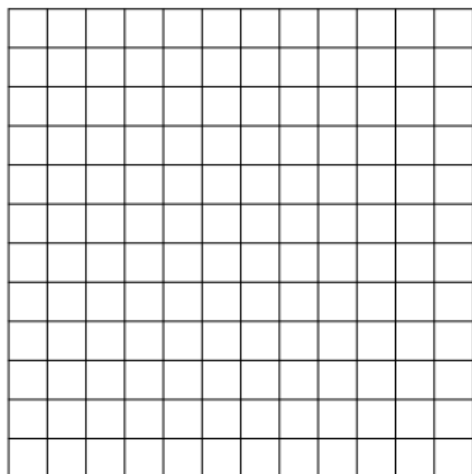
38. $f(x) = \frac{x^2}{x^2+1}$



41. $f(x) = x^2 - x - 6$



39. $f(x) = 2\sin\left(x + \frac{\pi}{2}\right) + 1$



42. $f(x) = \frac{2x+1}{x^2-4}$

