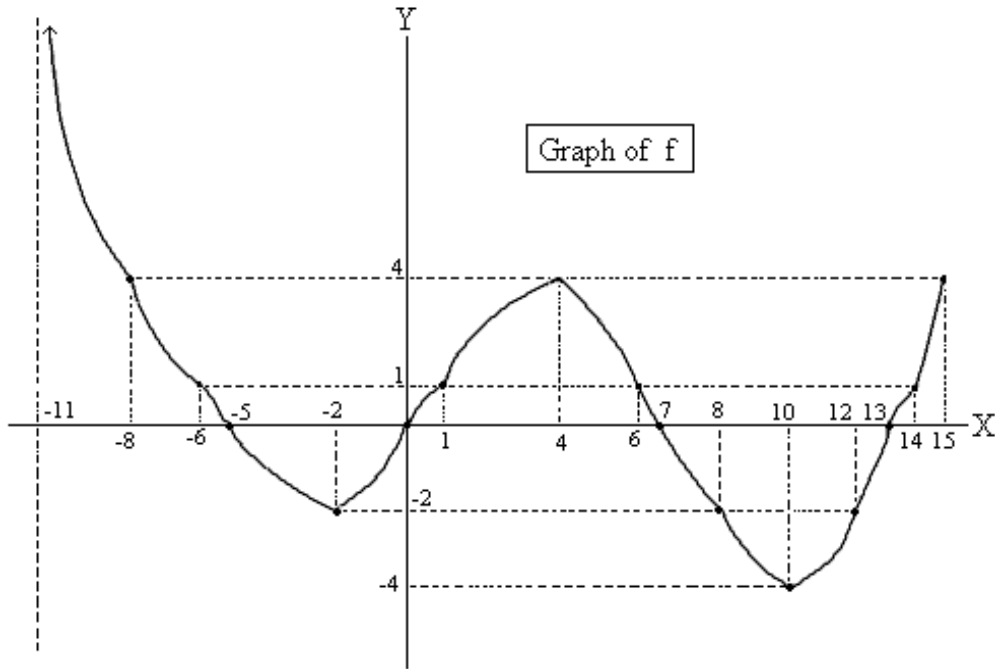


MATH 124.

HOMEWORK 4.

DUE: Friday, February 19.

P1. The complete graph of the real function f is drawn below. Use the graph to answer the questions that follow.



- (1) Write the domain of f in interval notation.
- (2) Write the range of f in interval notation.
- (3) (a) $f(7) = ?$ (b) $f(10) = ?$
- (4) Solve for x : $f(x) = 1$.
- (5) Write $\{x \mid f(x) < 0\}$ in interval notation.
- (6) Write $\{x \mid 1 \leq f(x) \leq 4\}$ in interval notation.
- (7) On what interval(s) is f increasing.

P2. Explain in words a series of one or more transformations which will produce the graph of $y = g(x)$ from the graph of $y = f(x)$.

(1) $g(x) = (x - 4)^2 - 3$, $f(x) = x^2$.

(2) $g(x) = 4 - |x - 3|$, $f(x) = |x|$.

(3) $g(x) = \frac{2x - 3}{x - 1}$, $f(x) = \frac{1}{x}$. (Hint: Do a long division to change the form of $g(x)$.

P3. Use our ideas of shifting, scaling, and flipping to sketch graphs of the following. Also label axes, intercepts, and asymptotes. (Note: you must show your work here.)

(1) $y = x^2 - 4x - 5.$

(2) $y = \sqrt{x+4} - 1.$

(3) $y = |x - 3| - 4.$

P4. Sketch the graph of

$$f(x) = \begin{cases} 1 - x^2 & \text{if } x < 2 \\ 2x - 7 & \text{if } x \geq 2 \end{cases}$$

Show your work. Label axes and intercepts.