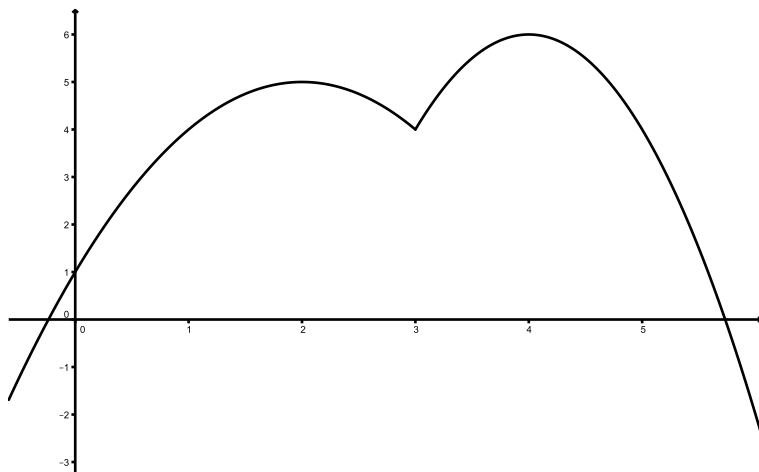


## Math 30 – Workshop #19

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1. The graph of  $y = f(x)$  is shown below.



- (a) For what values of  $x$  is  $f'(x) = 0$ ?
- (b) For what values of  $x$  is  $f'(x)$  undefined?
- (c) Find all intervals where  $f'(x) > 0$ .
- (d) Find all intervals where  $f'(x) < 0$ .
2. Suppose  $g(x)$  is some function and you know that  $g'(x) > 0$  on  $(-\infty, 3)$  and  $g'(x) < 0$  on  $(3, \infty)$ . What must be true about  $g'(3)$ ?
3. Let  $f(x) = \frac{x^2 + 4}{x}$ .
- (a) Determine the intervals on which  $f$  is increasing or decreasing.
- (b) Use this information to locate any local maxima or minima for  $f$ .
4. Let  $g(x) = (x^2 - 9)^2$ .
- (a) Determine the intervals on which  $g$  is increasing or decreasing.
- (b) Use this information to locate any local maxima or minima for  $g$ .
5. Let  $h(x) = x(x^2 - 9)$ .
- (a) Determine the intervals on which  $h(x) > 0$  and on which  $h(x) < 0$ .
- (b) Determine the intervals on which  $h'(x) > 0$  and on which  $h'(x) < 0$ .
- (c) Find all local maxima and minima for  $h$ .
- (d) Use the results from above to sketch a graph of  $h$ .
6. Let  $k(x) = \frac{x^3}{x^2 - 3}$ .
- (a) Determine the intervals on which  $k$  is increasing or decreasing.
- (b) Use this information to locate any local maxima or minima for  $k$ .