

## Exam #2

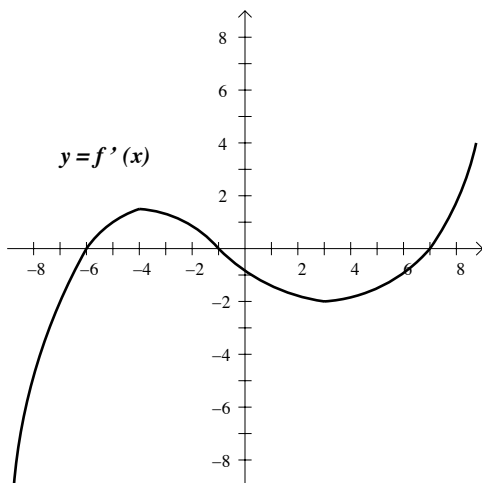
1. Compute the following derivative:

$$\frac{d}{dt} \left( 2t^{-3/2} \sin 5t + 1500\pi \right)$$

2. Let  $g(x) = 3x^5 + 15x^4 - 40x^3$ . Find the interval(s) on which  $g(x)$  is concave up and the interval(s) on which  $g(x)$  is concave down. Identify the  $x$ -values at which  $g(x)$  has a point of inflection.
3. Find the global maximum and global minimum (the  $y$ -values) of the function  $q(x) = \frac{x^2 - 1}{x^2 + 1}$  over the interval  $[-2, 3]$ .
4. A 75-foot robot dinosaur is moving at 11 feet per second towards a 100-foot lamp. How fast is the tip of the shadow of the robot moving toward the lamp?
5. Find the equation of the tangent line at  $(1, 3)$  to the curve

$$y^2 - 5x - y \cos(x - 1) = 1$$

6. If  $\ell(x) = \sqrt{\frac{\tan x}{x^3}}$ , compute  $\ell'(x)$ .
7. For the function  $y = x^8 - 2x^4$ , find the  $x$ -values where the tangent line to the function is a horizontal line.
8. The graph of  $f'(x)$  is given below.



- (a) On what interval(s) is  $f(x)$  increasing?
- (b) For what  $x$ -value(s) does  $f(x)$  attain a local minimum?
- (c) For what  $x$ -value(s) does  $f(x)$  have a point of inflection?