

14. Let  $f$  be a function that is differentiable on the open interval  $(1, 10)$ . If  $f(2) = -5$ ,  $f(5) = 5$ , and  $f(9) = -5$ , which of the following must be true?

I.  $f$  has at least 2 zeros

II. The graph of  $f$  has at least one horizontal tangent

III. For some  $c$ ,  $2 < c < 5$ ,  $f'(c) = 3$ .

All 3

15. The minimum value of the slope of the curve  $y = x^5 + x^3 - 2x$  is:

-2

16. A rectangle with its base on the  $x$ -axis is to be inscribed under the graph of  $y = 2 - x^2$ . Find the height of the rectangle if the area is the largest possible area.

$h = \frac{4}{3}$

17. You are planning to make an open rectangular box from a 10cm x 18cm piece of cardboard by cutting congruent squares from the corners and folding up the sides. What are the dimensions of the box of largest volume you can make this way.

$$h = 2.063 \text{ cm}$$

$$l = 13.874 \text{ cm}$$

$$w = 5.874 \text{ cm}$$