

### AP Calc AB Ch 2 Review 3

#### Sample Problems

Calc OK

1. If  $1-x^3 \leq f(x) \leq 1-2x^2$ , find the  $\lim_{x \rightarrow 2} f(x)$

2. Find the average rate of change of  $f(x) = 2x - x^3$  over  $[0, 3]$ .

3. Write the equation of the tangent to  $f(x) = -2x^2 + 4$  at  $x = 1$ . What is the equation of the normal to this?

4. Use IVT to show that  $x^3 - 5x + 1$  has at least 1 solution. Next, find all real solutions.

5. Graph  $f(x) = \lfloor x \rfloor + 1$  on  $-5 \leq x \leq 5$

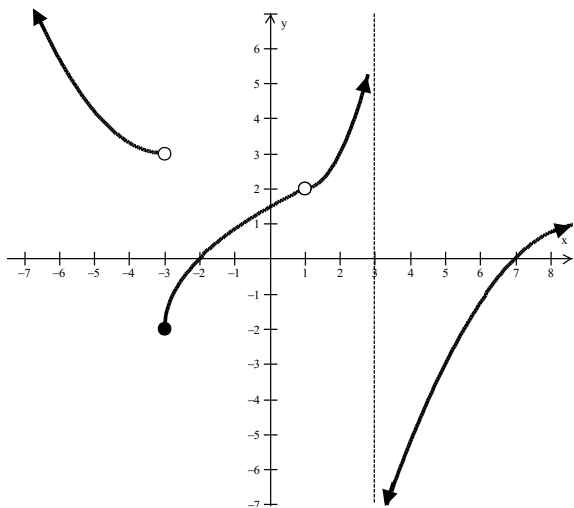
NO Calc

1. Let  $f(x) = 5x^2 - 2x$  and P the point  $(1, 3)$ . Find the slope, the equation of tangent and equation of normal to  $f(x)$  at P.

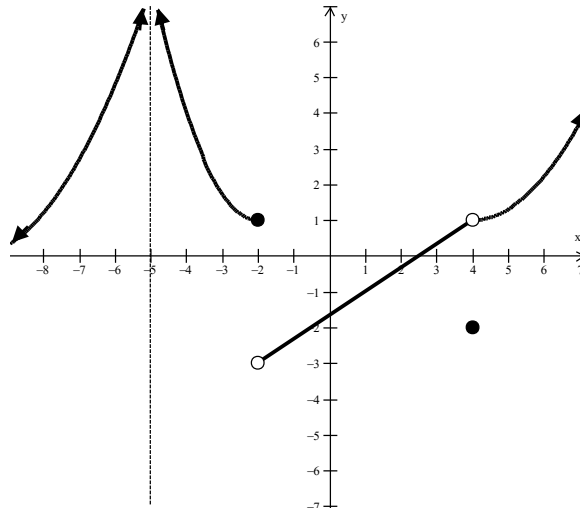
$$2. f(x) = \begin{cases} a - x^3 & x \leq 2 \\ 3x & x > 2 \end{cases}$$

a) find  $\lim_{x \rightarrow 2^-} f(x)$       b) find  $\lim_{x \rightarrow 2^+} f(x)$       c) Find all values of  $a$  that make  $f$  continuous at 2.

3. Below is the graph of  $f(x)$



4. Below is the graph of  $g(x)$



On what intervals is  $f(x)$  continuous? On what intervals is  $g(x)$  continuous?

5. Use the graphs above to find (estimate each):

a) find  $\lim_{x \rightarrow 1} [f(x) \cdot g(x)]$

b) find  $\lim_{x \rightarrow -1} \frac{g(x)}{f(x)}$

c) find  $\lim_{x \rightarrow 4} x + g(x)$

6. The table below shows several measurements of the velocity of a car driving on a straight road.  $v(t)$  is continuous on the interval  $[2, 20]$

$t$ (min)	2	5	8	13	17	20
$v(t)$ (meters/min)	241.3	313.8	465.9	572.1	411.7	287.6

What is the least number of times where  $v(t)$  is exactly 350 meters/min? Justify your answer.

7. The function  $f$  is continuous for  $-3 \leq x \leq 2$ . If  $f(-3) = 2$  and  $f^{-1}(6) = 2$ , which of the following statements must be true?

- a) There exists a  $c$ , where  $-3 \leq c \leq 2$ , such that  $f(c) = 1$
- b) There exists a  $c$ , where  $-3 \leq c \leq 2$ , such that  $f(c) = 3$
- c) There exists a  $c$ , where  $-3 \leq c \leq 2$ , such that  $f(c) = -1$
- d) The function  $f$  has at least one zero on the closed interval  $-3 \leq x \leq 2$
- e)  $\lim_{x \rightarrow 2} f(x)$  exists

8. The function  $g$  is continuous on the closed interval  $[-2, 3]$ . Some values of  $g$  are shown in the table.

$x$	-2	0	1	3
$g(x)$	-5	-8	$k$	-4

The equation  $g(x) = 1$  must have **at least two solutions** on the interval  $[-2, 3]$ , if  $k =$

- a) -4
- b) -2
- c) 0
- d) 1
- e) 2