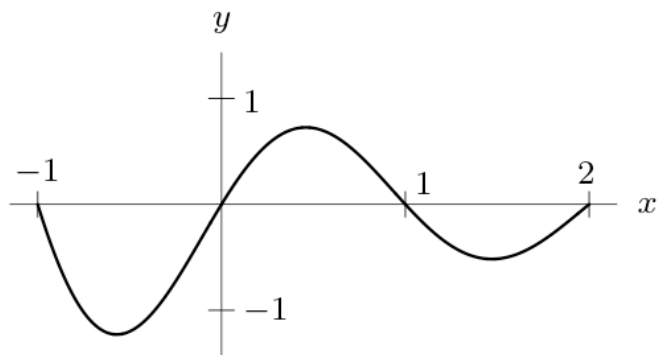


### Math 211, Exam 3 Review Exercises

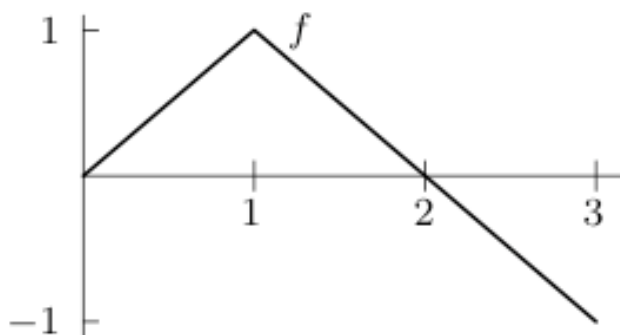
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1. The graph of  $f(x)$  is given in the figure to the right.



- (a) For which values of  $x$  is  $f$  increasing?
  - (b) For which values of  $x$  is  $f$  decreasing?
  - (c) For which values of  $x$  is  $f$  concave up?
  - (d) For which values of  $x$  is  $f$  concave down?
  - (e) Where does  $f'(x)$  change its sign?
  - (f) Where does  $f'(x)$  have a local maximum or minimum?
  - (g) Sketch the graph of  $f'(x)$  on the same axes.
  - (h) Sketch the graph of  $f''(x)$  on the same axes.
2. Find constants  $a$  and  $b$  in the function  $f(x) = axe^{bx}$  such that  $f(1/3) = 1$  is a local maximum.
3. The number of plants in a terrarium is given by the function  $P(c) = -1.2c^2 + 4c + 10$  where  $c$  is the number of mg of plant food added to the terrarium. Find the amount of plant food that produces the highest number of plants.

4. The graph of  $f$  is shown below. If  $F' = f$  and  $F(0) = 3$ , then what is  $F(3)$ ?



5. Be able to find antiderivatives such as those given in the **chapter 6 review exercises**.

6. The graph of  $f$  is shown to the right.

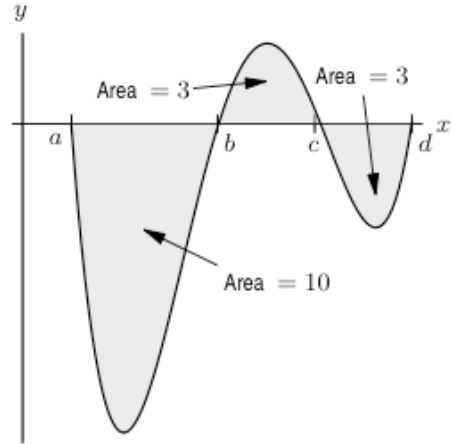
Estimate

$$\int_a^b f(x) dx$$

$$\int_a^c f(x) dx$$

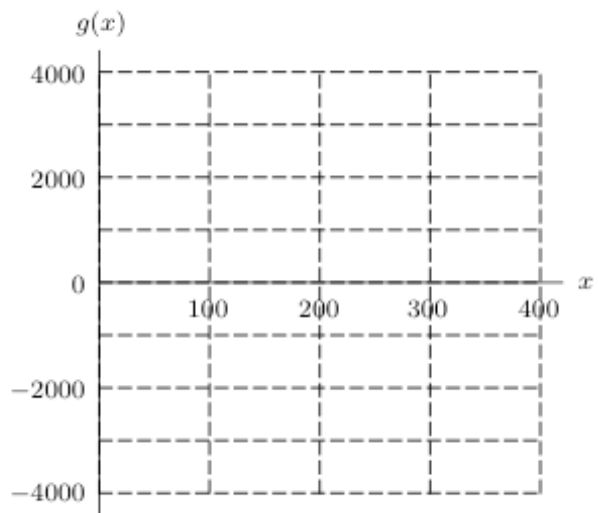
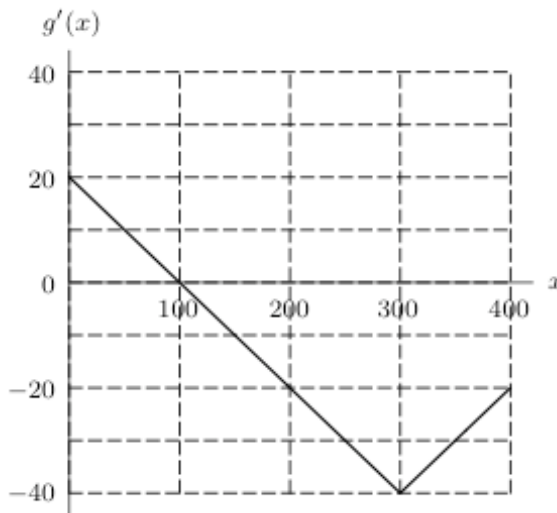
$$\int_a^d f(x) dx$$

$$\int_a^d |f(x)| dx$$



7. Use the fundamental theorem of calculus to determine the value of  $b$  if the area under the graph of  $f(x) = 3x^2 + 1$  between  $x = 0$  and  $x = b$  is 30. Assume  $b > 0$ .

8. The graph of  $g'(x)$  is shown. Sketch the graph of  $g(x)$  assuming  $g(0) = 2000$ .



Then fill in the table below.

$x$	0	100	200	300	400	$x$	100	200	300	400
$g(x)$	2000					$g'(x)$				

Determine if the following are positive or negative.

(i)  $g(50)$

(ii)  $g(150)$

(iii)  $g(350)$

(iv)  $g'(50)$

(v)  $g'(150)$

(vi)  $g'(350)$

(vii)  $g''(50)$

(viii)  $g''(150)$

(ix)  $g''(350)$