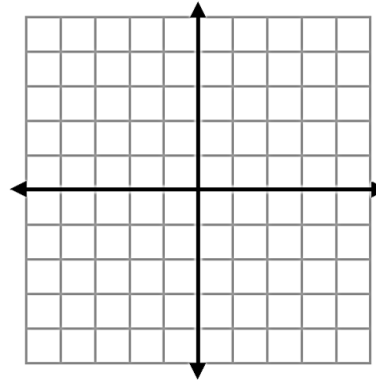
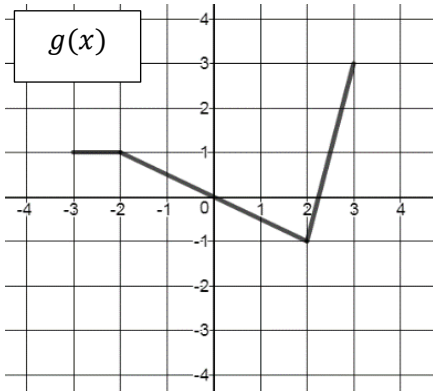
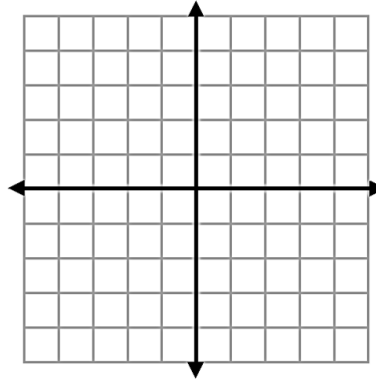
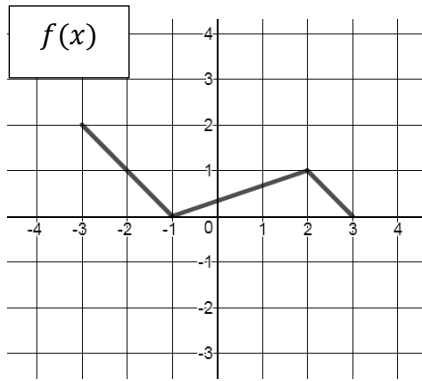


Name \_\_\_\_\_

Period \_\_\_\_\_

### Calculus Unit 3A Test Review

1. The graphs of  $f(x)$  and  $g(x)$  with the domain  $[-3, 3]$  are composed of line segments shown below.
- a. Sketch the graphs of  $f'(x)$  and  $g'(x)$  on the right side grid.



- b. Name the x-coordinate of each point of non-differentiability of  $f(x)$  over  $(-3, 3)$ : \_\_\_\_\_
- c. Name the x-coordinate of each point of non-differentiability of  $g(x)$  over  $(-3, 3)$ : \_\_\_\_\_

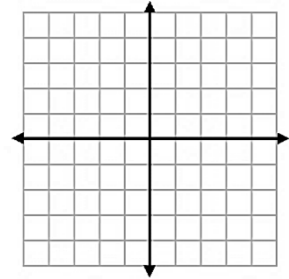
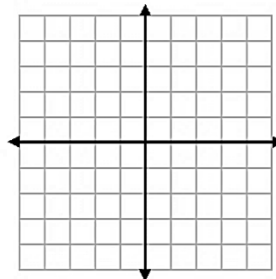
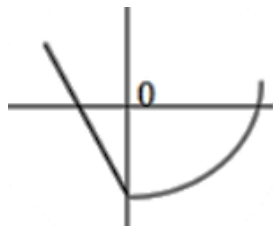
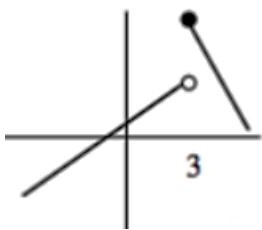
2. Is the function differentiable at the given point? Explain using calculus vocabulary.

a.  $f(x)$  at  $x=3$

b.  $f(x)$  at  $x=0$

c.  $f(x) = \sqrt[3]{x^2}$  at  $x=0$

d.  $f(x) = \sqrt[3]{x-1}$  at  $x=1$



Differentiable? \_\_\_\_\_

Differentiable? \_\_\_\_\_

Differentiable? \_\_\_\_\_

Differentiable? \_\_\_\_\_

Explain: \_\_\_\_\_

Explain: \_\_\_\_\_

Explain: \_\_\_\_\_

Explain: \_\_\_\_\_

**For 3-10: Calculate the first derivatives  $f'(x)$  and simplify. Show your work.**

3.  $f(x) = 14 + 5x^{\frac{2}{5}} - \frac{x^3}{3}$

4.  $y = (x-4)^3(3x+2)^4$  Write  $f'(x)$  in factored form.

5.  $f(x) = \frac{x+3}{7x-4}$

6.  $y = 4x^3 - \frac{2}{3}x^{\frac{3}{2}} + 27$

7.  $f(x) = x^2\sqrt{x^2+5}$

8.  $f(x) = 3x^3(4x^2-5)$

9.  $y = \frac{x^2 - 6x + 2}{x^2}$

10.  $f(x) = (2x+5)(3x-2)^2$  Write  $f'(x)$  in factored form.

11. Write the equation of the tangent line to the function  $f(x) = 3x^2 - 2x + 1$  at  $x = 2$ . Show your work.

$f'(x) =$  \_\_\_\_\_  $m =$  \_\_\_\_\_

Tangent line: \_\_\_\_\_

12. Write the equation of the normal line to the function  $f(x) = \frac{x^2 - 4}{2x + 3}$  at  $x = 1$ . Show your work.

$f'(x) =$  \_\_\_\_\_  $m =$  \_\_\_\_\_

Normal line: \_\_\_\_\_

13. Use the table data and the rules of differentiation to solve each problem. Show your work.

$x$	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
2	8	2	$1/3$	$-3$
3	3	$-4$	$2\pi$	5

a.  $h(x) = f(x) \cdot g(x)$ . Find  $h'(3)$  \_\_\_\_\_

b.  $h(x) = \frac{f(x)}{g(x)}$ . Find  $h'(2)$  \_\_\_\_\_

c.  $h(x) = f(g(x))$ . Find  $h'(2)$  \_\_\_\_\_

d.  $h(x) = 2f(x)$ . Find  $h'(2)$  \_\_\_\_\_