

CALCULUS

NAME: _____

WS on CHAIN RULE

PERIOD: _____ DATE: _____

Find the derivatives of the following:

1. $y = (3x - 8)^4$

2. $y = (3x^2 + 2)^5$

3. $y = 4(x^2 + x - 1)^{10}$

4. $y = \frac{-1}{(x^2 - 5x - 6)^2}$

5. $y = \sqrt[3]{\frac{2t}{t^2 - 4}}$

6. $y = x^3(5x - 1)^4$

7. $y = \sqrt[3]{3x^3 - 4x + 2}$

8. $y = \sqrt{\frac{3x}{2x - 3}}$

9. $y = (x^2 + 2x - 6)^2(1 - x^3)^2$

For each of the following, find the equation of the tangent line at the indicated point.

10. $y = \sqrt{x^2 + 2x + 8}$ at (2, 4)

11. $y = \sqrt[3]{3x^3 + 4x}$ at (2, 2)

12. $y = \sqrt{\frac{3x - 1}{2x + 1}}$ at (-1, 2)

Given the following information, find the value of the derivative of the functions at $x = 3$.

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
3	1	8	-3	-5
6	3	-2	4	5
8	-1	3	π	4
1	2	-6	5	0

13. $(f(x))^2$ 14. $\frac{1}{\sqrt[3]{g(x)}}$ 15. $f(g(x))$ 16. $\sqrt{f(x) + g(x)}$ 17. $(f(x))^3 g(x)$

18. $\frac{f(x)}{f(x) + g(x)}$ 19. $g(f(x))$ 20. $f(f(x))$ 21. $g(g(x))$

22. The table below gives some values of the derivative of some function f . Complete the table by find (if possible) the derivatives of each of the following transformations of f .

a) $g(x) = f(x) - 2$ b) $h(x) = 2f(x)$ c) $r(x) = f(-3x)$ d) $s(x) = f(2x + 1)$

x	-2	-1	0	1	2	3
$f'(x)$	4	$\frac{2}{3}$	$-\frac{1}{3}$	-1	-2	-4
$g'(x)$						
$h'(x)$						
$r'(x)$						
$s'(x)$						

CALCULUS
WORKSHEET 1 ON CHAIN RULE

Find the derivative of the following:

1) $f(x) = (x^2 + 3x)^2$

2) $f(x) = \sqrt{x^2 + 3x}$

3) $f(x) = (7 - 4x^2)^{\frac{2}{3}}$

4) $y = -5\sqrt{x^2 - 4x + 1}$

5) $y = x^2(2x - 3)^4$

6) $y = x\sqrt{4 - x^2}$

7) $y = \left(\frac{2x - 1}{2x + 1}\right)^5$

8) $y = \frac{x}{\sqrt{x^2 - 1}}$

9) $y = (x^2 - 4)\sqrt{x + 2}$

10) $y = 11(3x + 7)^5$

11) $y = \frac{3}{(-2x + 1)^4}$

12) $y = \frac{3x}{(6x^2 - 1)}$

13) $y = (2x + 1)^5(3x^2 + 4x)^7$

14) $y = \frac{3x}{(6x^2 - 1)^4}$

15) $y = \cos(x^2)$

16) $y = \cos^2(x)$

17) $y = e^{3x^2 + 7}$

18) $y = \frac{1}{e^x}$

19) $y = (e^x)^2$

20) $y = e^{2x}$

21) $y = e^{x \sin x}$

22) $y = \sec(2x + 4)$

23) $y = 2\sec^2(2x + 4)$

24) $y = \cos(x^2 + 5x)$

25) $y = \sin^2(3x + 2)$

26) $y = \tan^3 \sqrt{x}$

27) $y = (2x - 7) \sin 4x$

28) $y = \sqrt{x \cot\left(\frac{x}{2}\right)}$

29) $y = (1 + \cos^3(4x))^5$

30) $y = (x^2 + 2x - 6)^2(1 - x^3)^2$