SAT PREP Name_____

Assignment - Implict and Inverse trigonometric function Date_____

For each problem, use implicit differentiation to find $\frac{dy}{dx}$ in terms of x and y.

1) $4x^2 - 4y^3 = 1$

2) $x = -5y^2 + 3$

3) $5 = 5x^3 + 4y + y^2$

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

5) $1 = 3x^3 + 3y^3 + 4x^3y^3$

6) $-x^3y + 3 = 3x + 2x^2y^2$

For each problem, you are given a table containing some values of differentiable functions $f(x)$, $g(x)$ and their derivatives. Use the table data and the rules of differentiation to solve each problem.

7)

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

Part 1) Given $h_1(x) = f(x) + g(x)$, find $h_1'(4)$

Part 2) Given $h_2(x) = f(x) - g(x)$, find $h_2'(4)$

Part 3) Given $h_3(x) = f(x) \cdot g(x)$, find $h_3'(4)$

Part 4) Given $h_4(x) = \frac{f(x)}{g(x)}$, find $h_4'(4)$

Part 5) Given $h_5(x) = (f(x))^2$, find $h_5'(1)$

Part 6) Given $h_6(x) = f(g(x))$, find $h_6'(1)$

8)

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

Part 1) Given $h_1(x) = f(x) + g(x)$, find $h_1'(1)$

Part 2) Given $h_2(x) = f(x) - g(x)$, find $h_2'(1)$

Part 3) Given $h_3(x) = f(x) \cdot g(x)$, find $h_3'(3)$

Part 4) Given $h_4(x) = \frac{f(x)}{g(x)}$, find $h_4'(4)$

Part 5) Given $h_5(x) = (f(x))^2$, find $h_5'(1)$

Part 6) Given $h_6(x) = f(g(x))$, find $h_6'(4)$

Differentiate each function with respect to *x*.

9) $y = \cos^{-1} 2x^3$

10) $y = \sin^{-1} 3x^3$

11) $y = \tan^{-1} -3x^2$

12) $y = \sin^{-1} x^5$

Answers to Assignment - Implict and Inverse trigonometric function

1) $\frac{dy}{dx} = \frac{2x}{3y^2}$

2) $\frac{dy}{dx} = -\frac{1}{10y}$

3) $\frac{dy}{dx} = -\frac{15x^2}{4 + 2y}$

4) $\frac{dy}{dx} = \frac{6x^2}{-4y - 3}$

5) $\frac{dy}{dx} = \frac{-3x^2 - 4x^2y^3}{3y^2 + 4y^2x^3}$

6) $\frac{dy}{dx} = \frac{3 + 4xy^2 + 3x^2y}{-x^3 - 4x^2y}$

7) $h_1'(4) = f'(4) + g'(4) = 4$

$h_2'(4) = f'(4) - g'(4) = 0$

$h_3'(4) = f(4) \cdot g'(4) + g(4) \cdot f'(4) = 12$

$h_4'(4) = \frac{g(4) \cdot f'(4) - f(4) \cdot g'(4)}{(g(4))^2} = 0$

$h_5'(1) = 2 \cdot f(1) \cdot f'(1) = -16$

$h_6'(1) = f'(g(1)) \cdot g'(1) = -\frac{1}{2}$

8) $h_1'(1) = f'(1) + g'(1) = 4$

$h_2'(1) = f'(1) - g'(1) = 0$

$h_3'(3) = f(3) \cdot g'(3) + g(3) \cdot f'(3) = -6$

$h_4'(4) = \frac{g(4) \cdot f'(4) - f(4) \cdot g'(4)}{(g(4))^2} = 5$

$h_5'(1) = 2 \cdot f(1) \cdot f'(1) = 4$

$h_6'(4) = f'(g(4)) \cdot g'(4) = -4$

9) $\frac{dy}{dx} = -\frac{1}{\sqrt{1 - (2x^3)^2}} \cdot 6x^2$

$= -\frac{6x^2}{\sqrt{1 - 4x^6}}$

10) $\frac{dy}{dx} = \frac{1}{\sqrt{1 - (3x^3)^2}} \cdot 9x^2$

$= \frac{9x^2}{\sqrt{1 - 9x^6}}$

11) $\frac{dy}{dx} = \frac{1}{(-3x^2)^2 + 1} \cdot -6x$

$= -\frac{6x}{9x^4 + 1}$

12) $\frac{dy}{dx} = \frac{1}{\sqrt{1 - (x^5)^2}} \cdot 5x^4$

$= \frac{5x^4}{\sqrt{1 - x^{10}}}$