

Sections 3.5-3.7

Consider the following table, and answer the below questions:

$x$	1	2	3	4
$f(x)$	2	4	1	3
$f'(x)$	-6	-7	-8	-9
$g(x)$	2	3	4	1
$g'(x)$	2/7	3/7	4/7	5/7

1. If  $h(x) = \cos(f(x))$  find  $h'(3)$ .
2. If  $h(x) = \arccos(g(x))$  find  $h'(3)$ .
3. If  $h(x) = \sin(x) \cdot \cos(g(x))$  find  $h'(2)$ .
4. If  $h(x) = \ln(f(x))$  find  $h'(4)$ .

Find the derivative of the following: (Make sure you can simplify 'enough'... if you were to be asked to solve  $f'(x) = 0$  you want a factored form of  $f'(x)$  get it to this form as best as you can.)

- |  |  |
|--|--|
| 1. $f(\theta) = \cos \theta \sin \theta$         | 8. $f(x) = \ln(x^2 + 4x + 7 + \sin x)$         |
| 2. $g(x) = \sqrt{(\sin(2x))^3}$                  | 9. $f(x) = \ln(\ln x) + \ln(\ln 2)$            |
| 3. $f(x) = e^{-2x} \cdot \cot x$                 | 10. $f(x) = \cos(\ln x)$                       |
| 4. $h(x) = \sin(\sec x + \tan x)$                | 11. $f(x) = \arctan\left(\frac{x}{1+x}\right)$ |
| 5. $f(x) = \sqrt{\frac{1 - \sec x}{1 - \csc x}}$ | 12. $f(x) = x \arcsin x$                       |
| 6. $g(x) = \frac{\tan^2 x + 1}{\cot^2 x + 1}$    | 13. $f(x) = e^{\arctan x}$                     |
| 7. $h(x) = \cos(\arctan 3x)$                     | 14. $f(x) = \cos(4)^{\arccos x}$               |

Use implicit differentiation to find  $\frac{dy}{dx}$ , assume  $a, b$  and  $c$  are constants.

1.  $xy + x + y = a$
2.  $x^{2/3} + y^{2/3} = a^{2/3}$
3.  $\arctan(x^2y) = xy^2$
4.  $e^{\cos y} = x^3 \arctan y$
5.  $x \ln y + y^3 = \ln x$
6.  $(x - a)^2 + y^2 = b$
7.  $ax + bx^2 + cy + ay^2 = a + \arccos x$
8.  $e^{x^2} + \ln y = 0$