Chapter 02_Assignment

Ex 10: Find $y'(x)$

a/ $y = f(u) = u^5, u = x^4 + 3x^2 - 2$

b/ $y = f(z) = \frac{1}{z}, z = x^2 + 1$

c/ $f(u) = \cos(u), u = a^3 + x^3$

Chapter 02_Assignment

Ex 11: Find f' in terms of g'

a/ $f(x) = g(\sin 2x)$

b/ $f(x) = g\left(e^{1-3x}\right)$

Chapter 02_Assignment

Ex 12: A table of values for f, f', g and g' is given

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

a/ If $h(x) = f\left(g(x)\right)$, find $h'(1)$

b/ If $H(x) = g\left(f(x)\right)$, find $H'(1)$

Chapter 02_Assignment

Ex 12: A table of values for f, f', g and g' is given

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

c/ If $F(x) = f(f(x))$, find $F'(2)$

d/ If $G(x) = g(g(x))$, find $G'(3)$

Chapter 02_Assignment

Ex 13:

If $h(x)=\sqrt{4+3f(x)}$, where $f(1)=7, f'(1)=4$

Find $h'(1)$.

Chapter 02_Assignment

Ex 14:

Find $\frac{dy}{dt}$ for

a/ $y = x^3 + x + 2$, find $\frac{dy}{dt}$ with $\frac{dx}{dt} = 2$ and $x = 1$

b/ $y = \ln x$, find $\frac{dy}{dt}$ with $\frac{dx}{dt} = 1$ and $x = e^2$

c/ $y = \tan\sqrt{t}$, find $\frac{dy}{dt}$ with $t = \frac{\pi^2}{16}$

Chapter 02_Assignment

Ex 15: Find y' by implicit differentiation

a/ $x^4 + y^4 = 16x + y$

b/ $\sqrt{x} + \sqrt{y} = 4$

c/ $x^3 + xy = y^2$

Chapter 02_Assignment

Ex 16: Let $(L): x^3 + y^3 = 6xy$

a/ Find $\frac{dy}{dx}$

b/ Find an equation of tangent to the curve (L) at the point $(3,3)$

Chapter 02_Assignment

Ex 17:

Suppose $y = \sqrt{2x+1}$ where x, y are functions of t.

a/ If $\frac{dx}{dt} = 3$, find $\frac{dy}{dt}$ when $x = 4$

b/ If $\frac{dx}{dt} = 5$, find $\frac{dy}{dt}$ when $x = 12$

Chapter 02_Assignment

Ex 18:

Suppose $4x^2 + 9y^2 = 36$ where x, y are functions of t.

a/ If $\frac{dy}{dt} = \frac{1}{3}$, find $\frac{dx}{dt}$ when $x = 2, y = \frac{2}{3}\sqrt{5}$

b/ If $\frac{dx}{dt} = 3$, find $\frac{dy}{dt}$ when $x = -2, y = \frac{2}{3}\sqrt{5}$

Chapter 02_Assignment

Ex 19:

a/ If a snowball melts so that its surface area decreases at a rate of 1 cm^2 /min, find the rate at which the diameter decreases when the diameter is 10 cm ?

b/ A man starts walking north at 4 ft/s from a point P. Five minutes later a woman starts walking south at 5 ft/ s from a point 500 ft due east of P . At what rate are the people moving apart 15 minutes after the woman starts walking ?

Chapter 02_Assignment

Ex 20:

a/ If a ball is thrown into the air with a velocity of 40 ft/s, its height (in feet) after seconds is given by $y = 40t - 16t^2$

Find the velocity when $t = 2$.

b/ The equation of motion is $s(t) = 3\sin t - 4\cos t + 1$ for a particle, where is in meters and t is in seconds. Find the acceleration $\left(m/s^2\right)$ after 3 seconds.

Chapter 02_Assignment

Ex 21:

Find the linearization L(x) of the function at *a*.

a/ $f(x) = \dfrac{1}{\sqrt{2+x}}, a = 2.$

b/ $f(x) = \sqrt[3]{5-x}, a = -3.$

Chapter 02_Assignment

Ex 22: Find y' by implicit differentiation

a/ $x^3 + y^3 = 1$

b/ $x^2 + xy - y^2 = 4$

c/ $y\cos x = x^2 + y^2$

d/ $\sqrt{xy} = 1 + x^2 y$

Chapter 02_Assignment

Ex 23: Find $y'(x_0)$ by implicit differentiation

a/ $x^3 + y^3 = 1$ **at** $x_0 = 1$

b/ $x^2 + xy - y^2 = 4$ **at** $x_0 = 2$