

Intro Calc – Week 2 HW Key – Tim Leishman

1.  $v = iR$ , Find rate of change  $\frac{dv}{dr}$ , when  $i = 0.4a$  &  $R = 4\Omega$   $\frac{dv}{dr} = \frac{0.4v}{\Omega}$

2.  $p = i^2 R$ , Find rate of change  $\frac{dp}{di}$ , when  $R = 30\Omega$  &  $i = 2a$   $\frac{dp}{di} = \frac{120w}{a}$

3.  $y = x^2(2x + 1)$   $\frac{dy}{dx} = 6x^2 + 2x$

4.  $y = (2x + 3)(5x - 4)$   $\frac{dy}{dx} = 20x + 7$

5.  $y = (x^2 + 3x + 4)(x^3 - 4x)$   $\frac{dy}{dx} = 5x^4 + 12x^3 - 24x - 16$

6.  $y = \frac{(x-1)}{(x^2+x+1)}$   $\frac{dy}{dx} = \frac{-x^2+2x+2}{(x^2+x+1)^2}$

7.  $y = \frac{4x^2+9}{3x^3-4x^2}$   $\frac{dy}{dx} = \frac{-12x^4-81x^2+72x}{(3x^3-4x^2)^2}$

8.  $y = \frac{3x-1}{2x+4}$   $\frac{dy}{dx} = \frac{14}{(2x+4)^2}$  or  $\frac{7}{2(x+2)^2}$

9. Find  $f'_2$  when  $f_x = (x^2 - 4x + 3)(x^3 - 5x)$   $f'_2 = -7$

10. Find  $f'_{-1}$  when  $f_x = \frac{3x-4}{x+2}$   $f'_{-1} = 10$

11. Find the slope of the line tangent to the curve  $y = \frac{x-3}{2-5x}$  @  $(2, \frac{1}{8})$ .  $m_{tan} = \frac{-13}{64}$

12. Find the equation of the line in the previous question @  $(2, \frac{1}{8})$ .  $y = \frac{-13}{64}x + \frac{17}{32}$

13.  $y = x^3(x^3 - x)^3$   $\frac{dy}{dx} = (12x^5 - 6x^3)(x^3 - x)^2$

14.  $y = (3x + 4)^{\frac{3}{4}}(4x^2 + 8)$   $\frac{dy}{dx} = \frac{33x^2+32x+18}{(3x+4)^{\frac{1}{4}}}$

15.  $y = \frac{(x^3+2)^4}{(4x^2-3x)}$   $\frac{dy}{dx} = \frac{(x^3+2)^3(40x^4-33x^3-16x+6)}{(4x^2-3x)^2}$

16.  $y = \frac{(3x+2)^5}{(2x-1)^3}$   $\frac{dy}{dx} = \frac{(3x+2)^4(12x-27)}{(2x-1)^4}$

17.  $4x + 3y = 7$   $y' = \frac{-4}{3}$

18.  $x^2 - y^2 = 9$   $y' = \frac{x}{y}$

19.  $y^4 - y^2x + x^2 = 0$   $y' = \frac{y^2-2x}{4y^3-2xy}$

20.  $3x^2y^2 + 4y^5 + 8x^2y^3 + xy = 5$   $y' = \frac{-6xy^2-16xy^3-y}{6x^2y+20y^4+24x^2y^2+x}$