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 Course: Maths 104

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1) Find a) equation of tangent b) equation of normal
 1) $y = 2x^2$ at point $(1, 2)$ 2) $y = 3x^2 - 2x$ at point $(2, 8)$
 3) $y = x^{3/2}$ at point $(-1, -1/2)$ 4) $y = 1+x-x^2$ at point $(-2, -5)$
 5) $y = 1/x$ at point $(3, 1/3)$

Assignment

Normal

max $m = -1$

$m_2 = -1/4$

$-1/4(x-1) = y-2$

$-(x-1) = 4y-8$

$4y+x-9 = 0$

(equation of normal)

Tangent
 $y = 2x^2$ at $x=1$
 $dy/dx = 4x$
 $m = 4(1) = 4$
 $m(x-a) = (y-b)$
 $4(x-1) = (y-2)$
 $4x-4 = y-2$
 $y+2 = y-4x+2 = 0$

$y = 2^{3/2}$ at point $(-1, -1/2)$
 $dy/dx = 3x^2$ $m = 3$

gradients of normal = $-1/3$

equation of tangents

$3(x+1) = (y+1/2)$

$3x+3 = y+1/2$

$y-3x-2.5 = 0$

equation of normal

$-1/3(x+1) = (y+1/2)$

$-x-1 = 3y+3/2$

$3y+x+2.5 = 0$

3) $y = 3x^2 - 2x$ at point $(2, 8)$
 $dy/dx = 6x-2$
 $m = 6(2) - 2 = 8$
 $m = 4$

gradients of normal

max $m = -1$

$m_2 = -1/4$

$m(x-a) = (y-b)$
 $4(x-2) = (y-8)$

$4x-8 = y-8$

equation of normal

$-1/4(x-2) = (y-8)$

$-x+2 = 4y-32$

$4y+x-34 = 0$

4) $y = 1+x-x^2$ at point
 $dy/dx = -2x+1$

$m = -4+1 = -3$

$m_2 = 1/3$ (equation of normal)

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

$-3x-6 = y+5$

equation of normal

$1(x+2) = 3(y+5)$

$3y-x+13 = 0$

5) $y = 1/x$
 $dy/dx = -1/x^2$ $m = (3, 1/3)$

$m = -1/9$ $m_2 = 9$

equation of tangents

$m(x-a) = (y-b)$
 $9(x-3) = (y-1/3)$

$-1(x-3) = 3(y-1/3)$

equation of normal

$9(x-3) = (y-1/3)$

$9x-27 = y-1/3$

$y-9x+80 = 0$
 $3y-27x+80 = 0$