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Medicine and surgery

19/MHS01/123

MAT 104

1. dy/dx=4x

 dy/dx|at x=1 4(1) =4

X1=1 y1=2

y-y1=m(x-x1)

y-2=4(x-1)

y-2=4x-4

y-4x-2+4=0

y-4x+2=0 (equation of the tangent)

m1m2=-1

m2=-1/4

y-y1=m(x-x1)

y-2=-1/4x-2-1/4=0

y+1/4x-9/4=0

multiplying through by 4

4y+x-9=0 ( equation of the normal)

2. dy/dx=6x-2

dy/dx| at x=2 6(2)-2=10

:.m=10

X1=2 y1=8

y-y1=m(x-x1)

y-8=10(x-2)

y-8=10x-20

y-8-10x+20=0

y-10x+12=0 (equation of the tangent)

m1m2=-1

m2=-1/10

y-y1=m(x-x1)

y-8=-1/10x+1/5

y-8+1/10x-1/5=0

y+1/10x -41/5=0

multiplying through by 10

10y+x-82=0 (equation of the normal)

3. dy/dx=3x^2 / 2

 Dy / dx| at x=1 3(-1)^2 / 2= 3\*1 / 2= 3/2

 :. M=3/2

 X1=-1 y1= - ½

 Y-y1=m(x-x1)

Y+ ½ = 3/2(x+1)

Y+ ½ =3/2x+5/2

Y+ ½ - 3/2x – 5/2=0

Y – 3/2x – 2=0

Multiplying though by 2

2y – 3x – 4 = 0 (equation of the tangent)

M1m2 = -1

M2 = ½

Y – y1 = m(x-x1)

Y + ½ = ½ (x+1)

Y + ½ = ½ x + 3/2

Y + ½ - ½ x + 3/2 =0

Y – ½ x – 1-=0

Multiplying though by 2

2y – x -2 = 0 (equation of the normal)

4. dy/dx=-2x

 Dy/dx| x at -2 -2(-2) =4

:.m=4

X1=-2 y1=-5

y-y1=m(x-x1)

y+2=4(x+5)

y+2=4x+20

y+2-4x-20=0

y-4x-18=0 (equation of the tangent)

m1m2=-1

m2= -1/4

y-y1=m(x-x1)

y+2=-1/4(x+5)

y+2+1/4x+5/4=0

y+1/4x+13/4=0

dividing through by 4

4y+x+13=0 (equation of the normal)

5. d/dx(1/x) using reciprocal rule

= -d/dx[x]

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 X^2

=-1/x^2

Dy/dx| at x=3 -1/3^2= -1/9

:. M=-1/9

X1=3 y1=1/3

y-y1=m (x-x1)

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

y – 1/3 = -1/9x + 1/3

y – 1/3 +1/9x-1/3=0

y+1/9x-2/3=0

multiplying through by 9

9y+x-6=0 (equation of the tangent)

M1m2=-1

M2= -10/9

y-y1=m(x-x1)

y – 1/3 = - 10/9(x-3)

y – 1/3+ 10/9x – 10/3=0

y+ 10/9 – 11/3=0

multiplying though by 9

9y+10x – 33=0 (equation of the normal)