**Useful teaching examples for finding Max/Min values.**

***1. y = x2 – 6x + 8***

***yꞌ = 2x – 6 = 0 for min***

 ***x = 3***

***2. y = x2 + 10x + 9***

 ***yꞌ = 2x + 10 = 0 for min***

 ***x = -5***

***3. y = x2 – 5x + 11***

 ***yꞌ = 2x – 5 = 0 for min***

 ***x = 2.5***

***4. y = x3 – 3x2 – 45x + 26***

***yꞌ = 3x2 – 6x – 45 = 0***

 ***3(x2 – 2x – 15) = 0***

 ***3(x – 5)(x + 3) = 0***

 ***x = 5(min) x = -3(max)***

***5. y = x3 – 6x2 – 36x + 58***

***yꞌ = 3x2 – 12x – 36 = 0***

 ***3(x2 – 4x – 12) = 0***

 ***3(x – 6)(x + 2) = 0***

 ***x = 6(min) x = -2(max)***

***6. y = x3 – x2 – 21x + 78***

***yꞌ = 3x2 – 2x – 21 = 0***

 ***(3x + 7 )(x – 3 ) = 0***

 ***x = 3(min) x = -7(max)***

 ***3***

***7. y = x3 + 2x2 – 7x + 98***

***yꞌ = 3x2 + 4x – 7 = 0***

 ***(3x + 7 )(x – 1 ) = 0***

***x = - 7 (max) x = 1(min)***

 ***3***

***8. y = 4x3 –24x2 – 144x + 4***

 ***yꞌ = 12x2 – 48x – 144 = 0 at max/min***

 ***12(x2 – 4x – 12) = 0***

 ***12(x – 6)(x + 2) = 0***

 ***x = 6 (min), x = - 2(max)***

***9. y = -x(x – 6) 2***

 ***= -x(x2 – 12x + 36)***

 ***= -x3 + 12x2 – 36x***

***yꞌ = -3x2 + 24x – 36***

 ***= -3(x2 – 8x + 12)***

 ***= -3(x – 2)(x – 6)= 0 at TP***

 ***x = 2(min), x = 6 (max)***

***10. y = x(x + 3)2***

 ***= x(x2 + 6x + 9)***

 ***= x3 + 6x2 + 9x***

***yꞌ = 3x2 + 12x + 9 = 0***

 ***3(x2 + 4x + 3) = 0***

 ***3(x + 1)(x + 3) = 0***

***x = - 1(min) x = - 3 (max)***

***11. y = x2( x – 6)***

 ***= x3 – 6x2***

***yꞌ = 3x2 – 12x = 0 at max/min***

 ***3x(x – 4 ) = 0***

 ***x = 0 (max) x = 4(min)***

***12. y = ⅓x3 + ½ x2 – 12x + 9***

 ***yꞌ = x2 + x – 12 = 0 at max/min***

 ***(x – 3)(x + 4) = 0***

 ***x = 3(min) , x = - 4(max)***

***13. y = 4x2 – ⅔x3***

***yꞌ = 8x – 2x2 = 0 at max/min***

 ***= 2x(4 – x) = 0***

 ***x = 0 (min) x = 4 (max)***