Calculus/Slopes of Tangents

1 Differentiation

1. Differentiate the following functions:
   (a) $y = x^3 - 4x^2 + 7x - 3$
   (b) $y = x^2 + 3x - 2$
   (c) $y = 2x^3 + 7x^2 - 5x + 9$
   (d) $y = 7 + 3x - x^2$
   (e) $y = x^2 + 5x - x^3$
2. Differentiate the following funcitons:
   (a) $f(x) = 2x^3 - 5x^2 + 17$
   (b) $f(x) = x^2 - 18x + 5$
   (c) $f(x) = x^3 + 14x^2 - 9x - 23$
   (d) $f(x) = 19 + 3x - 5x^2 - x^3$
   (e) $f(x) = 15 + x^2 - 2x^3$

2 Slopes of Tangents ($\frac{dy}{dx}$ is the slope!!)

1. What is the slope of the tangent to $y = x^2 + 3x + 4$ at the point where $x = 2$?
2. What is the slope of the tangent to $f(x) = x^2 + 7x - 3$ at the point $(3, 27)$?
3. Find the slope of the tangent to $y = x^3 + 3x^2 - 5x + 14$ at the point where $x = -1$
4. What is the slope of the tangent to $f(x) = 5 - 3x - x^2$ at the point where $(1, 1)$?
5. Find the slope of the tangent to $y = 6x - 2x^2 - x^3$ at the point where $x = -3$
6. What is the slope of the tangent to $f(x) = 3x^3 + x^2 + 3x + 4$ at the point where $x = 2$?
7. What is the equation of the tangent to $y = x^2 + 2x - 4$ at the point $(1, -1)$?
8. Find the equation of the tangent to $f(x) = x^2 - 5x + 3$ at the point $(2, -3)$
9. What is the equation of the tangent to $y = x^2 + 3x - 5$ at the point where $x = -5$?

10. Find the equation of the tangent to $f(x) = 10 + 3x - 2x^2$ at the point where $x = -1$
11. Calculate the equation of the tangent to $f(x) = 2 - 3x - 3x^2$ at the point $(-2, -4)$
12. What is the equation of the tangent to $y = x^3 + 3x^2 - 6x + 4$ where $x = 3$?
13. Calculate the equation of the tangent to $y = 2x^3 + 5x^2 - 3$ at the point $(1, 4)$
14. At what point does the function $f(x) = x^2 + 3x - 5$ have a slope of 1?
15. At what point does the function $y = 3x^2 - 4x + 7$ have a slope of 2?
16. Find the coordinates where the tangent to the function $y = 2x^3 - 3x^2 - 13x + 4$ has a slope of -1
17. Find the coordinates where the tangent to the function $y = x^3 - 3x^2 - 3x - 2$ has a slope of 21