



HOMEWORK 3

Calculus (1)

First Semester 2015/2016

Question(1): Find $\frac{dy}{dx}$

1. $\sqrt{x} + \sqrt{y} = 3$

2. $y^2 + x \cdot \sin x = \tan y$

3. $\cos(xy) = y^3 \cdot x$

4. $y = \ln(\ln(\ln(x)))$

5. $y = \frac{\log_2 x}{\ln(3)}$

6. $y = \ln(x) \cdot \sec^{-1}(x)$

7. $y = e^{\tan x} + 4^{3x+5}$

8. $y = x^{\tan x} - \log_3(5)$

9. $y = \sin^{-1}(\sec x)$

10. $y = \ln(\log_3(7))$

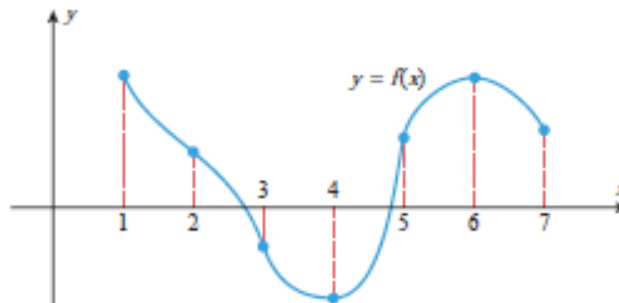
11. $y = \sqrt{\cos^{-1}(3x)}$

12. $y + 2x = \cot^{-1}(x^3)$

Question(2): Find the equation of tangent of $y + xy^3 = x^2 + y^2$ at $(1, 1)$

Question(3): Use the graph of $y = f(x)$ in the accompanying figure to find the following:

- Find the intervals on which f is increasing.
- Find the intervals on which f is decreasing.
- Find the open intervals on which f is concave up.
- Find the open intervals on which f is concave down.
- Find all values of x at which f has an inflection point.
- Find all values of x at which f has a relative maximum point .
- Find all values of x at which f has a relative minimum point.



Question(4): Find the following

- Increasing and decreasing intervals .
- critical points.
- Relative Extrema points.
- Absolute Extrema points.
- Concavity Intervals.
- Inflection points.

1. $y = \sqrt{2-x}$, $x \leq 2$

2. $y = 2 \sin x - x$, $\left[0, \frac{\pi}{2}\right]$

3. $y = x^4 - 4x^3$

4. $y = \frac{2}{x-1}$, $x \neq 1$

5. $y = (x-2)^4$