East Los Angeles College
Department of Mathematics
Math 261
Practice Test 3

Use implicit differentiation to find the equation of the tangent line to the curve.

1. $x^2 + y^2 = (2x^2 + 2y^2 - x)^2$ at $\left(0, \frac{1}{2}\right)$

2. $2(x^2 + y^2)^2 = 25(x^2 - y^2)$ at $(3,1)$

The equation of motion is given for a particle where s is in meters and t is in seconds where $s(t) = t^4 - 4t^3 + 2$

Determine:

3. Velocity a function of time t.
4. Acceleration as a function of time t.
5. The initial acceleration $a(0)$.
6. Acceleration after 4 seconds.
7. Acceleration when velocity is 0.

The equation of motion is given for a particle where s is in meters and t is in seconds where $s(t) = 2t^3 - 9t^2$

Determine:

8. Velocity a function of time t.
9. Acceleration as a function of time t.
10. The initial acceleration $a(0)$.
11. Acceleration after 4 seconds.
12. Acceleration when velocity is 0.

13. Let $z^3 = 4x^2 - 2y$. If $dx/dt = -3$ and $dy/dt = 5$, determine dz/dt when $x = 2\ and\ y = 4$

14. The volume of a cube is increasing at the rate of $10\ cm^3/min.$ How fast is the surface area increasing when the length of an edge is 30 cm?

Let $f(x) = \tan(x) - sin(x)$

15. Determine the linearization function when $x = \pi$
16. Use the linearization function to approximate $\tan(178^o) - sin(178^o)$

Determine the absolute minimum values and the absolute maximum values of the function over the given intervals.

17. $f(x) = \frac{x^2-4}{x^2+4}$ over $[-4,4]$

Determine the absolute minimum values and the absolute maximum values of the function over the given intervals.

18. $f(x) = sin(x) + cos(x)$ over $\left[0, {}^{\pi}/_{3}\right]$

Evaluate the following limits

19. $\lim_{x\to\infty} (x^4 - x)$

20. $\lim_{x\to\infty} (1 - x)\,(1 + x)^2$

21. $\lim_{x\to-\infty} \frac{6x^2-4x+3}{2x^2-x+5}$

22. $\lim_{x\to-\infty} (x^3 + x)$

23. $\lim_{x\to-\infty} \frac{\sqrt{4x^2+1}}{3x-1}$

24. $\lim_{x\to\infty} \left(\sqrt{4x^2 + 3x} - 2x\right)$

25. $\lim_{x\to\infty} sin\left(\frac{1}{x}\right)$