L-6 Applications Of Derivatives (Worksheet Mod 2 of 3)

Do as directed.

1. Find the equation of the tangent to the curve $y = \frac{x-7}{(x-2)(x-3)}$ at the point where it cuts the x-axis.
2. Find the points on the curve $\frac{x^2}{9} + \frac{x^2}{16} = 1$ at which the tangents are

 a) Parallel to x-axis b) parallel to y-axis

3. Find the equation of tangent to the curve given by $x = a\, sin^3 t\,, y = b\, cos^3 t$ at a point where $t = \frac{\pi}{2}$.

4. Find the equation of the tangent line to the curve $y = x^2 - 2x + 7$ is
   a) Parallel to the line $2x - y + 9 = 0$.
   b) Perpendicular to the line $5y - 15x = 13$.

5. Prove that the curves $x = y^2\ and\ xy = k$ cut at right angles if $8k^2 = 1$.

6. Find the points on the curve $9y^2 = x^3$ where the normal to the curve makes equal intercepts on the coordinate axes.

7. Find the coordinates of the point on the curve $\sqrt{x} + \sqrt{y} = 4$ at which the tangent is equally inclined to the axes.

8. Show that the normal at any point θ to the curve

   $x = a\cos\theta + a\theta\sin\theta, y = a\sin\theta - a\theta\cos\theta$ is at a constant distance from the origin.

9. The slope of the normal to the curve $y = 2x^2 + 3\sin x\ \ at\ x = 0\ is$

   a) 3 b) $\frac{1}{3}$ c) – 3 d) $\frac{-1}{3}$

10. The line $y = mx + 1$ is a tangent to the curve $y^2 = 4x$ if the value of m is

    a) 1 b) 2 c) 3 d) $\frac{1}{2}$