Office Hour. Questions please.

(not necessarily 1500)

I am open for free tutoring appointment on Mondays, Wednesdays, Fridays. Weekend appointments are possible as well.
There is a mistake in the textbook in §3.8. For the example on video game of a rocket firing a missile, the point \((3, \frac{8}{3})\) is NOT on the orbit \(4x^2 + 25y^2 = 100\). Also there is no way to obtain a fraction with denominator 200 as the \(y\)-intercept of the tangent. Thanks to Helly Panchal who reported this.

\[
\frac{dy}{dx} = -\frac{9}{50}.
\]

\[
y - \frac{8}{3} = -\frac{9}{50} (x - 3)
\]

\[
y = -\frac{9}{50} x + \frac{27}{50} + \frac{8}{3}
\]

\[
\frac{81 + 400}{150} = \frac{481}{150}
\]

\[
4 \cdot 3^2 + 25 \cdot \frac{64}{9} \quad \emptyset \quad 100.
\]

\[
\frac{4 \times 81}{9} + \frac{1600}{9} = \frac{4 \times (81 + 400)}{9} = \frac{4 \times 481}{9}
\]

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\[x^2 + 2xy - 3y^2 = 0. \quad \text{Find normal at } (1, 1)\]

Find intersection of the normal \& the curve.

\[2x + 2(x'y + xy') - 6yy' = 0.\]
\[2x + 2y + (2x - 6y)y' = 0.\]
\[x = 1, \quad y = 1 \Rightarrow 2 + 2 + (2 - 6)y' = 0, \quad \Rightarrow y' = 1\]

Slope of normal \(= -\frac{1}{1} = -1\).

\[y - 1 = -(x - 1) \Rightarrow y = -x + 2.\]
\[x^2 + 2x(-x + 2) - 3(-x + 2)^2 = 0\]
\[x^2 - 2x^2 + 4x - 3(x^2 - 4x + 4) = 0\]
\[-x^2 + 4x - 3x^2 + 12x - 12 = 0\]
\[-4x^2 + 16x - 12 = 0\]
\[x^2 - 4x + 3 = 0, \quad \Rightarrow x = 1 \text{ or } x = 3.\]

\[y = 1 \text{ or } y = -1\]

The other intersection is \((3, -1)\).