Name: ______________________________ **Card #**: ______________

Clear your desk of everything excepts pens, pencils and erasers. **Show all your work.**
If you have a question raise your hand and I will come to you.

1. **Multiple Choice. Circle the best answer. No partial credit available**

(a) (1 point) Find $\dfrac{dy}{dx}$, where y and x satisfy the implicit equation: $\sqrt{x} + \sqrt{y} = 9$

A. $\dfrac{dy}{dx} = -\sqrt{\dfrac{y}{x}}$

B. $\dfrac{dy}{dx} = \dfrac{\sqrt{x} - 9}{\sqrt{x}}$

C. $\dfrac{dy}{dx} = (9 - \sqrt{x})^2$

D. $\dfrac{dy}{dx} = -\dfrac{1}{2\sqrt{x}}$

E. None of the above.

Solution:

$$\begin{aligned}
\sqrt{x} + \sqrt{y} &= 9 \\
\frac{1}{2\sqrt{x}} + \frac{y'}{2\sqrt{y}} &= 0 \\
\frac{y'}{2\sqrt{y}} &= \frac{-1}{2\sqrt{x}} \\
y' &= -\frac{\sqrt{y}}{\sqrt{x}} \\
y' &= \frac{\sqrt{x} - 9}{\sqrt{x}}
\end{aligned}$$

(b) (1 point) Find the slope of the tangent line of the graph given by $\sqrt{x} + \sqrt{y} = 9$ through the point $(25, 16)$.

A. 16

B. -16

C. $-1/10$

D. $-4/5$

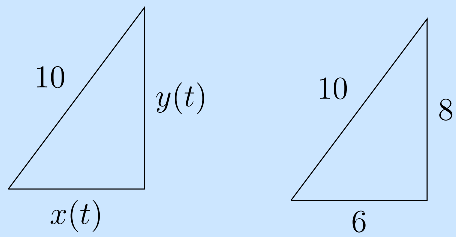
E. None of the above.

Solution: Plut in $x = 25$, and $y = 16$ into the formula from part (a).

Continue on to back side

2. (2 points) The top of a 10 foot ladder, leaning against a vertical wall, is slipping down the wall at a rate of 4 feet per second. How fast is the bottom of the ladder sliding along the ground away from the wall when the bottom of the ladder is 6 feet away from the base of the wall?

Solution: Consider the pictures



$$
\begin{aligned}
y^2 + x^2 &= 10 \\
2y \cdot y' + 2x \cdot x' &= 0 \\
y \cdot y' + x \cdot x' &= 0 \\
(8)(-4) + (6)x' &= 0 \\
x' &= 16/3
\end{aligned}
$$

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