Harry Potter and the Deathly Derivatives

Inspired by:

Lord Voldemort is dead and the Death Eaters have disbanded. But all is still not well in the magical world. A small group of former Death Eaters have formed an evil band called the Deathly Derivatives who torture Muggles and wizards with Calculus. First they immobilize you [with the Incarcerous spell] and then force you to find derivatives using Calculus. Too bad they don't teach AP Calculus at Hogwarts! [Or any mathematics for that matter] Find the derivatives of the following and use their solutions to unlock the spell that binds you.

Find the derivatives of the functions given on the back of this page. The answer to each problem will match a letter that will allow you to find the spell to overthrow the "DEATHLY DERIVATIVES"

[From Google Images]

Do all work on a separate piece of paper. Show ALL steps.

1. $\sqrt{x^2 + 7}$

Y. $\cos(3x)[\sin(3x)]^{-2/3}$

2. $\sin^2(3x)$

D. $6\sin(3x)\cos(3x)$

3. $\dfrac{\cos(3x)}{\sin(3x)}$

S. 0

4. $\sec^2(3x)$

A. $3\sec^2(3x)$

5. $\dfrac{1}{\sqrt{x^2 + 7}}$

O. $-x(x^2 + 7)^{-3/2}$

6. $\tan(3x)$

X. $3\cos^2(3x) - 3\sin^2(3x)$

7. $\sin(3x)$

M. $-3\csc^2(3x)$

8. $\sin(3x)\cos(3x)$

I. $\dfrac{x}{\sqrt{x^2 + 7}}$

9. $\sqrt[3]{\sin(3x)}$

U. $3\cos(3x)$

10. $\sin^2(3x) + \cos^2(3x)$

T. $6\sec^2(3x)\tan(3x)$

___ ___ ___ ___ ___ ___ ___ ___
10   4   7   2   1   5   7   10

        ___ ___ ___ ___ ___ ___ ___
        3   6   8   1   3   7   10