For the exam, you should know by heart or be able to determine very quickly the following derivatives:

Function	**Derivative**
$f(x) = c$ where c is a constant	$f'(x) =$
$f(x) = x$	$f'(x) =$
$f(x) = x^n$	$f'(x) =$
$f(x) = e^x$	$f'(x) =$
$f(x) = a^x$	$f'(x) =$
$f(x) = \sin(x)$	$f'(x) =$
$f(x) = \cos(x)$	$f'(x) =$
$f(x) = \tan(x)$	$f'(x) =$
$f(x) = \sec(x)$	$f'(x) =$
$f(x) = \csc(x)$	$f'(x) =$
$f(x) = \cot(x)$	$f'(x) =$
$f(x) = \arcsin(x)$	$f'(x) =$
$f(x) = \arccos(x)$	$f'(x) =$
$f(x) = \arctan(x)$	$f'(x) =$
$f(x) = \ln(x)$	$f'(x) =$
$f(x) = \log_a(x)$	$f'(x) =$

You should also know how to take derivatives of combinations of functions using the following rules:

Function	**Name of Rule**	**Derivative**
$y = cf(x)$	Constant Multiple Rule	$y' =$
$y = f(x) + g(x)$	Sum Rule	$y' =$
$y = f(x) - g(x)$		$y' =$
$y = f(x)g(x)$		$y' =$
$y = \dfrac{f(x)}{g(x)}$		$y' =$
$y = f\big(g(x)\big)$		$y' =$

BE CAREFUL. These rules only work if f and g are _____ .

With quotients, we also need to check that $g(x)$ is not equal to _____ .

You should also be able to use these rules to find derivatives of more complicated functions that you don't have to memorize. For example:

1. $$\frac{d}{dx}\big(f(x)g(x)h(x)\big) =$$

2. $$\frac{d}{dx}\left(f\left(g\left(h(x)\right)\right)\right) =$$

3. $$\frac{d}{dx}\left(\frac{f(x)g(x)}{h(x)}\right) =$$