# Math 112 - Derivative Skills Practice

## Part I - Compute the derivative. Do not simplify.

1. $y = \sqrt[3]{x} + \dfrac{1}{\sqrt[3]{x}}$
2. $y = \dfrac{\frac{1}{2}x^2 - 4x}{9x + 7}$
3. $y = (x+2)^8 (x+3)^6$
4. $y = \dfrac{-2}{t^{3/4}}$
5. $y = \dfrac{x}{\sqrt{9 - 4x}}$
6. $y = x \cdot \sqrt[4]{1 + x^2}$
7. $y = \left(x + \dfrac{1}{x}\right)^7$
8. $y = \left(x^2 + 6\right)^2 (3x - 7)^8$
9. $y = \left(\dfrac{x^3 - 2x}{5x^4 + 7}\right)^{10}$
10. $y = \sqrt{x} - \dfrac{1}{\sqrt{x}}$
11. $y = \left(1 + x^2 - x^3\right)\left(\sqrt{x} - 2\right)$
12. $f(r) = \dfrac{1 - 3r^2 + 4r^5}{3r + r^3}$
13. $f(t) = t^2 \left(t^4 + t^2 + 1\right)^3 + 6t$
14. $g(v) = 2v - 5\left(7v^3 + 10\right)^{2/3}$
15. $h(v) = (2v - 5)\left(7v^3 + 10\right)^{2/3}$
16. $y = \dfrac{x^2 + 2x}{x^2 + 4x + 2} + 3x^2$
17. $z = (u^2 + 3u + 4)^4$
18. $f(x) = \left(x^4 - 3x^2\right)\left(x^3 - 5x^5\right)^2$
19. $g(x) = \left[\left(x^4 - 3x^2\right)\left(x^3 - 5x^5\right)\right]^2$
20. $R(x) = \dfrac{2}{3(x^4 - x^3 + 2x)^4}$

**Part II - Compute the derivative. Simplify your answer so that there is at most one fraction line and all the factors are of the form $(f(x))^m$, where $f(x)$ is linear or quadratic and $m$ is a positive number.**

1. $s = (2t+3)^5(5t^2-1)^3$
2. $h(x) = \dfrac{(4x+7)^2}{(x^2+5)^3}$
3. $f(x) = (x^2+1)\sqrt{5x+3}$
4. $g(x) = \dfrac{(3x+5)^3}{\sqrt{7x+4}}$