**Tutor-USA.com Worksheet**
**Calculus – Differentiation – Simplest Cases**

**Name:** _____
**Date:** _____ **Period:** _____ **Score:** _____

**Find the derivative of the function.**

1) $y = x^{13}$

$y' = 13x^{12}$

2) $y = x^{\frac{3}{2}}$

$y' = -\frac{3}{2}x^{-5/2} = \frac{-3}{2\sqrt{x^5}}$

3) $y = x^{2a}$

$y' = 2ax^{2a-1}$

4) $u = t^2$

$u' = 2t$

5) $y = \sqrt[3]{u}$ $\quad y = u^{1/3}$

$y' = \frac{1}{3}u^{-2/3} = \frac{1}{3\sqrt[3]{u^2}}$

6) $y = \sqrt[3]{x^{-5}}$ $\quad y = x^{-5/3}$

$y' = \frac{-5}{3}x^{-8/3} = \frac{-5}{3\sqrt[3]{x^8}}$

7) $y = \sqrt[5]{\frac{1}{x^8}}$ $\quad y = x^{-8/5}$

$y' = \frac{-8}{5}x^{-13/5} = \frac{-8}{5\sqrt[5]{x^{13}}}$

8) $y = 2x^a$

$y' = 2ax^{a-1}$

9) $y = \sqrt[q]{x^3}$ $\quad y = x^{3/q}$

$y' = \frac{3}{q}x^{3/q-1}$

10) $y = \sqrt[n]{\frac{1}{x^m}}$ $\quad y = x^{-m/n}$

$y' = \frac{-m}{n}x^{-m/n-1}$