Name_____

Date_____

Calculus Independent Study Path

Unit Test 3.1

1. Differentiate
$$y = \sin\left(\cos\left[(x^2 + 3x)^{40}\right]\right)$$
with respect to x.

2. Find $\frac{dy}{dx}$:
$$x + \sin y = y + \cos x.$$

3. Find a tangent line to
$$y = \cos(\sin 3x)$$
passing through the point (0,1).

4. Find $D_x \sin^2 x$, $D_x \sin^3 x$, and $D_x \sin^4 x$. What is $D_x \sin x^n$?

5. Find $\frac{dy}{dx}$:
$$\sin x = \cos(\sin y)$$

6. Find $\frac{ds}{dr}$:
$$1 = (\tan sr)$$

7. Prove the product rule for rational exponents by implicitly differentiating $y^n = x^m$ (where n and m are integers).