Name: _____ **Section:** _____

Names of collaborators: _____

1. Practice with Differentiation

Now we have formulas for all the derivatives of functions in our catalogue of functions, and we have rules for finding derivatives of constant multiples, sums, differences, products, quotients, and compositions of functions. This means we can differentiate extremely complicated functions, as long as we have the patience to do so. For examples of using several differentiation rules on one function see 3.4 Examples 5 & 6 (p 202), and see 3.4 Examples 8 & 9 (p 203) for using the chain rule multiple times on one function.

Exercises

1. $\frac{d}{dx}\left(\sqrt[3]{x^2} + 11x^5 - x^\pi\right) =$

2. $\frac{d}{dx}\ \sin^2 5x =$

3. $\frac{d}{dt}\ e^{-5t}\cos 3t =$

4. $\frac{d}{dx}\ \ln(x^4 \sin^2 x) =$

5. $\dfrac{d}{dy}\ \dfrac{(y-1)^4}{(y^2+2y)^5} =$

6. $\dfrac{d}{du}\ \dfrac{u^2-u}{\sqrt{u}}\ =$

7. $\frac{d}{dt}\ P(v(t))\ =$

8. $\frac{d}{dx}\ f(x)\sec^2(x)\ =$

9. $\frac{d}{dx}\ (\cot(f(x))+\sqrt{\pi})\ =$

10. $\frac{d}{dw}\ \cos^{-1}(w^2)\ =$

11. $\frac{d}{dx}\ \ln(\sqrt{x}\cos(x))\ =$

12. $\frac{d}{dx}\ 3^{8x-11}\ =$

13. $\frac{d}{dx}\ \arcsin(x^3)\ =$

14. $\frac{d}{dv}\ (\log_2 v)^3\ =$

15. $\frac{d}{d\theta}\ \theta^2 \sec\theta \tan\theta\ =$

16. $\frac{d}{du}\ \sqrt{u}(u^2+7)\ =$

17. $\frac{d}{dt}\ e^t(e^t+e^{-t})\ =$

18. $\frac{d}{dx}\ \pi \sin(\pi x)\ =$

19. $\frac{d}{dw}\ w^{3/4}Z(w)\ =$