

# Review Problems

September 28, 2016

1. (Fall 2002, Exam 2, #1) Differentiate  $y = \frac{\sin x + \cos x}{x^2}$ .
2. (Fall 2002, Exam 2, #2) Differentiate  $y = \sqrt[5]{x} \tan x$ .
3. (Fall 2002, Exam 2, #7) Find  $\lim_{\theta \rightarrow 0} \frac{\tan(3\theta)}{\theta}$
4. (Fall 2003, Exam 2, #5)  $\lim_{x \rightarrow 0} \frac{\sin(2x)}{\tan(3x)}$
5. (Fall 2003, Exam 2, #9) Evaluate  $\lim_{s \rightarrow \frac{\pi}{3}} \frac{\tan(s) - \sqrt{3}}{s - \frac{\pi}{3}}$
6. (Fall 2005, Exam 2, #4) If  $f(x) = \sec x + \tan x$ , then find  $f'(x)$ .
7. (Fall 2006, Exam 1, #3) Given that  $\sin x = \frac{2}{5}$  and  $\cos x < 0$ , find  $\tan x$ .
8. (Fall 2007, Exam 1, #3) Given that  $\cos \theta = -\frac{4}{9}$  and  $\pi < \theta < \frac{3\pi}{2}$ , find  $\sin \theta$ .
9. (Fall 2007, Exam 2, #7) If  $g(x) = \log_3(x^4)$ , then find  $g'(x)$ .
10. (Fall 2008, Exam 2, #9) Find an equation for the tangent line to the graph of  $y = \frac{x^3}{\ln x}$  at the point  $(e, e^3)$ .
11. (Fall 2009, Exam 1, #3) If  $\pi < \theta < \frac{3\pi}{2}$  and  $\cos \theta = -1/2$ , find  $\sin \theta$ .
12. (Fall 2009, Exam 2, #4) If  $f(x)$  is a differentiable function, compute the derivative of  $\frac{4 + x^2 f(x)}{x^3}$ .
13. (Fall 2009, Exam 2, #5) If  $y = (\tan x)(\sec x)$ , then find  $\frac{dy}{dx}$  at  $\frac{\pi}{3}$ .
14. (Fall 2009, Exam 2, #7) Evaluate the limit  $\lim_{t \rightarrow 0} \frac{\tan(4t)}{t}$ .
15. (Fall 2010, Exam 1, #5) If  $\frac{3\pi}{2} < \theta < 2\pi$  and  $\tan \theta = -1/2$ , find  $\cos \theta$ .
16. (Fall 2010, Exam 2, #6) Compute the slope of the tangent line of the curve  $y = \frac{\tan x}{1 + \sec x}$  at  $\left(\frac{\pi}{3}, \frac{\sqrt{3}}{3}\right)$ .