

# NetMath Assignment We 9

9.  $g(x) = 3(4-9x)^4$

$g'(x) = 12(4-9x)^3 \cdot -9$

$= 108(4-9x)^3$

14.  $f(x) = \sqrt{x^2-4x+2}$

$f'(x) = \frac{1}{2}(x^2-4x+2)^{-1/2} \cdot 2x-4$

$= \frac{2x-4}{2\sqrt{x^2-4x+2}}$

19.  $f(t) = \left(\frac{1}{t-3}\right)^2 = ((t-3)^{-1})^2$

$f'(t) = 2\left(\frac{1}{t-3}\right) \cdot \frac{-1}{(t-3)^2} = \frac{-2}{(t-3)^3}$

25.  $y = x\sqrt{1-x^2} = x(1-x^2)^{1/2}$

$y' = x \cdot \frac{1}{2}(1-x^2)^{-1/2} \cdot 2x + (1-x^2)^{1/2}$

$y' = \frac{-2x^2}{2\sqrt{1-x^2}} + \frac{\sqrt{1-x^2}}{1} \cdot \frac{\sqrt{1-x^2}}{\sqrt{1-x^2}} = \frac{-x^2 + (1-x^2)}{\sqrt{1-x^2}} = \frac{1-2x^2}{\sqrt{1-x^2}}$

common den.

27.  $y = \frac{x}{\sqrt{x^2+1}} = \frac{(x^2+1)(1) - (x) \cdot \frac{1}{2}(x^2+1)^{-1/2} \cdot 2x}{x^2+1}$

$= \frac{\sqrt{x^2+1} - x^2(x^2+1)^{-1/2}}{x^2+1} = \frac{(x^2+1)^{1/2}(\sqrt{x^2+1} - x^2)}{x^2+1} = \frac{1}{(x^2+1)^{3/2}}$

45.  $g(x) = 5 \tan(3x)$

$5 \sec^2(3x) \cdot 3 = 15 \sec^2 3x$

52.  $g(x) = \frac{\cos x}{\csc x} = \frac{\cos x}{\frac{1}{\sin x}} = \cos x \sin x = \frac{\cos x \cos x + \sin x (-\sin x)}{\cos^2 x - \sin^2 x}$

56.  $\cos^2 8\theta = f(\theta)$

$2 \cos 8\theta \cdot -\sin 8\theta \cdot 8$

$= -16 \cos 8\theta \sin 8\theta$

63.  $y = \sin(\tan^2 x)$

$\cos(\tan^2 x) \cdot (\sec^2 x) \cdot 2$

$= 2 \cos(\tan^2 x) \sec^2 x$

78.  $y = \cos 3x$

$y' = -\sin 3x \cdot 3 = -3 \sin 3x$

$y'\left(\frac{\pi}{4}\right) = -3 \sin 3\left(\frac{\pi}{4}\right) = -3 \sin \frac{3\pi}{4}$

$= -3\left(\frac{\sqrt{2}}{2}\right) = \frac{3\sqrt{2}}{2}$

$y + \frac{\sqrt{2}}{2} = \frac{3\sqrt{2}}{2} \left(x - \frac{\pi}{4}\right)$

89.  $\sin x^2 = y$

$y' = \cos x^2 \cdot 2x = 2x \cos(x^2)$

$y'' = 2x(-\sin(x^2) \cdot 2x) + \cos(x^2)(2) = 2(-2x^2 \sin x^2 + \cos x^2)$

$\frac{1-2x^2}{\sqrt{1-x^2}}$