

## HW 20 Answer Key

$$1. y' = \frac{1}{\ln x} \cdot \frac{1}{x} - e(\ln x)^{-2} \cdot \frac{1}{x} + e \cdot \frac{1}{x} + 0 + \frac{1}{e} \cdot \frac{1}{x} + 0 + (\ln x)e^x + e^x \cdot \frac{1}{x}$$

$$2. f'(x) = \sec^2(\ln(1+x^2)) \cdot \frac{1}{1+x^2} \cdot (2x) + \frac{1}{1+\cos^2 x} \cdot 2\cos x (-\sin x) - 5(\ln(1+x^2))^{-2} \cdot \frac{1}{1+x^2} (2x)$$

$$3. y' = \frac{4}{7} \left( \frac{1}{x^2+1} \right) (2x) + \sec^2 x - \frac{1}{2(1+\sqrt{x})} \cdot \frac{1}{2\sqrt{x}}$$

$$4. \frac{dy}{dx} = 5^x \cdot (\ln 5)$$

$$5. \frac{dy}{dx} = (\tan x)^x \left( \frac{x \sec^2 x}{\tan x} + \ln(\tan x) \right)$$

$$6. f'(x) = e^{-\sin x} \cdot (-\cos x) - e(\sin(e^x))^{-2} \cdot \cos(e^x) e^x$$

$$7. g''(x) = \frac{1}{2x\sqrt{\ln x}} + \frac{1}{2x}$$

8. Absolute Max Value  $f(-1) = e$

$$9. -\frac{9}{x} - \ln|x| + C$$

$$10. \frac{8}{3}$$

$$11. 1 - \ln|e-1|$$

$$12. 2$$

$$13. -\frac{1}{3} \ln|\cos(3x)| + C$$

$$14. -\frac{1}{4} \ln\left(\frac{7}{3}\right) \quad \text{OR} \quad \frac{1}{4} \ln\left(\frac{3}{7}\right)$$

$$15. \frac{2}{3} + \ln 3$$

$$16. \frac{1}{2} \ln 5 \quad \text{OR} \quad \ln \sqrt{5}$$

$$17. \frac{e^{-3x}}{-3} + 2x + \frac{e^{3x}}{3} + C$$

$$18. f(x) = -\frac{1}{4(1-2e^{-2x})} - \frac{5}{4}$$

$$19. y = 2x + 2$$

$$20. y = -\frac{2}{9}x + \frac{2\ln 3}{9} + \frac{1}{9}$$