

Math 1431 Test 4 Review KEY

1. (a) $y' = \frac{1}{2} \frac{e^x + 4 \cosh(x)}{e^x + 4 \sinh(x)}$
(b) $y' = -\frac{6 \cos(\ln(5-x)^6)}{5-x}$
(c) $y' = 2x(1+x)e^{2x} + 2$
(d) $y' = (2x \cosh(3x) + 3 \sinh(3x))e^{x^2}$
(e) $f'(x) = \frac{2}{x} + 6e^{6x} + \frac{-2}{1 + (5-2x)^2}$
(f) $y' = (\tan x)^{(x^2+7)} \left(2x \ln(\tan x) + \frac{(x^2+7) \sec^2 x}{\tan x} \right)$
(g) $f'(x) = \frac{6x^2}{1+4x^6}$
(h) $f'(x) = \frac{6x}{\sqrt{1-9x^4}}$
(i) $y' = 3 \sinh(3x) + 4 \cosh(4x)$
2. (a) $\ln 4$
(b) $-\frac{1}{5} \ln(2+5 \cot x) - \frac{1}{9} e^{9x} + C$
(c) $\frac{1}{3} \tan(3x) + C$
(d) $\sqrt{2} - 1$
(e) $-\frac{1}{x} - \frac{1}{x^2} + C$
(f) $\frac{3}{4} x^4 + \frac{2}{3} x^3 + 5x + C$
(g) $\frac{14}{3}$
(h) 4
3. $F(b) - F(a)$
4. $\frac{1}{3} \sin(3x) + 3$
5. (a) $-3 \sin(3(2-3x)^3)$
(b) $2 \cos(8x^2 + 1)$
(c) $-5\sqrt{4-5x} - 8x\sqrt{4x^2+1}$
6. (a) 0
(b) 24

7. (a) $f(x) = -\frac{\cos x}{x+1}$
 (b) $f(x) = -8x^4 - 16x^3 - 6x^2 - 12x$
8. (a) 3
 (b) 3
9. 5
10. -1
11. $U_f(P) = 63$
 $L_f(P) = 39$
12. 11
13. 10
14. tangent: $y - 1 = 3(x - 3)$
 normal: $y - 1 = -\frac{1}{3}(x - 3)$
15. 320000 ft^2
16. 20 ft by 20 ft
17. $(-2\sqrt{2}, 4), (2\sqrt{2}, 4)$
18. $100\sqrt{2} \text{ in}^3$
19. $\frac{127}{16}$
20. $-\frac{1}{10}$
21. $\frac{1}{\sqrt{3}} - \frac{2\pi}{135}$
22. (a) $-\frac{1}{2}$, indeterminate form: $\frac{0}{0}$
 (b) L'Hopital's Rule does not apply
 (c) e^4 , indeterminate form: 1^∞
 (d) $\frac{1}{2}$, indeterminate form: $\frac{0}{0}$
 (e) 0, indeterminate form: $\frac{\infty}{\infty}$
 (f) 1, indeterminate form: ∞^0
 (g) e^6 , indeterminate form: 1^∞

- (h) DNE, indeterminate form: $\frac{\infty}{\infty}$
- (i) $e^{3/2}$, indeterminate form: ∞^0
- (j) 4, indeterminate form: $\frac{0}{0}$