Unless otherwise stated, NO DECIMAL ANSWERS!

Name: _____

Math 180 - Homework #1

Write the ANSWERS ONLY on this page. Do your calculations/work elsewhere, then NEATLY transfer your answers to this page.

Differentiate the following (2pts. each):

	ANSWER
1. $y = x^7 + x^3$	$y' = 7x^6 + 3x^2$
2. $y = 5x^8$	$y' = 40x^7$
3. $y = 6\sqrt{x}$	$y' = 3x^{-1/2} = \frac{3}{\sqrt{x}}$
4. $y = x^7 + 3x^5 + 1$	$y' = 7x^6 + 15x^4$
5. $y = \frac{3}{x}$	$y' = -3x^{-2} = -\frac{3}{x^2}$
6. $y = x^4 - \frac{4}{x}$	$y' = 4x^3 + 4x^{-2} = 4x^3 + \frac{4}{x^2}$
7. $y = \frac{3}{4}x^{\frac{4}{3}} + \frac{4}{3}x^{\frac{3}{4}}$	$y' = x^{1/3} + x^{-1/4}$
8. $y = \frac{1}{\sqrt[4]{x}}$	$y' = -\frac{1}{4}x^{-5/4} = -\frac{1}{4x^{5/4}}$
9. $f(x) = 5$	$f'(x) = 0$
10. $f(x) = \frac{5x}{2} - \frac{2}{5x}$	$f'(x) = \frac{5}{2} + \frac{2}{5}x^{-2}$
11. $f(t) = t^{10} - 10t^9$	$f'(t) = 10t^9 - 90t^8$
12. $g(t) = 3\sqrt{t} - \frac{3}{\sqrt{t}}$	$g'(t) = \frac{3}{2}t^{-1/2} + \frac{3}{2}t^{-3/2}$
13. $h(t) = 3\sqrt{2}$	$h'(t) = 0$
14. $g(P) = 4P^{0.7}$ (Decimals in answer OK for this problem only)	$g'(P) = 2.8P^{-0.3}$
15. $h(x) = \frac{3}{2}x^{\frac{3}{2}} - 6x^{\frac{2}{3}}$	$h'(x) = \frac{9}{4}x^{1/2} - 4x^{-1/3}$

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Differentiate the following (2pts. each):

ANSWER

16. $\frac{d}{dx}(x^4 - 2x^2)$ $\quad (4x^3 - 4x)\,dx$

17. $\frac{d}{dt}\left(t^{\frac{5}{2}} + 2t^{\frac{3}{2}} - t^{\frac{1}{2}}\right)$ $\quad \left(\frac{5}{2}t^{3/2} + 3t^{1/2} - \frac{1}{2}t^{-1/2}\right)dt$

18. $\frac{d}{dn}\left(n^{-5}\right)$ $\quad (-5n^{-6})\,dn$

19. $\frac{d}{dt}\left(2\sqrt{t}\right)$ $\quad \left(t^{-\frac{1}{2}}\right)dt = \left(\frac{dt}{\sqrt{t}}\right)$

20. $\frac{d}{dx}\left(\frac{x^3 - 4x^2 + 3}{x}\right)$ (Hint: Reduce/Simplify fraction to 3 individual terms each with a single ± exponent, then differentiate each term separately) $\quad \left(2x - 4 - 3x^{-2}\right)dx = \left(2x - 4 - \frac{3}{x^2}\right)dx$

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Integrate the following (2pts. each):

ANSWER

21. $\int x(1 + x^3)dx$ (Hint: Distribute FIRST, then integrate) $\quad \frac{1}{2}x^2 + \frac{1}{5}x^5 + C$

22. $\int x^{\frac{1}{3}}(2 - x)^2\,dx$ (Hint: FOIL, then distribute, THEN integrate) $\quad 3x^{4/3} - \frac{12}{7}x^{7/3} + \frac{3}{10}x^{10/3} + C$

23. $\int \frac{x^6 + 2x^2 - 1}{x^2}dx$ (Hint: Reduce/Simplify fraction to 3 individual terms each with a single ± exponent, then integrate each term separately) $\quad \frac{1}{5}x^5 + 2x + x^{-1} + C = \frac{1}{5}x^5 + 2x + \frac{1}{x} + C$

24. $\int\left(x^{-3} + \sqrt{x} - 3x^{\frac{1}{4}} + x^2\right)dx$ $\quad -\frac{1}{2}x^{-2} + \frac{2}{3}x^{3/2} - \frac{12}{5}x^{5/4} + \frac{1}{3}x^3 + C$

25. $\int_2^3 (1 - \frac{1}{2}x)dx$ **ANSWER AS A FRACTION. NO DECIMALS!** $\quad -\frac{1}{4}$

26. $\int_{-10}^{-5} 6dx$ $\quad 30$

27. $\int_{-3}^{0} \left(x^2 - 4x + 7\right)dx$ $\quad 48$

28. $\int_4^9 \left(2x\sqrt{x}\right)\,dx$ (Hint: Simplify to a SINGLE fractional exponent, then integrate) **ANSWER AS A FRACTION. NO DECIMALS!** $\quad \frac{844}{5} = 168\frac{4}{5} = 168.8$

29. $\int_1^3 \frac{1}{x^2}dx$ **ANSWER AS A FRACTION. NO DECIMALS!** $\quad \frac{2}{3}$

30. $\int_{-1}^{0} \frac{x^2 - x + 3}{\sqrt[3]{x}}dx$ (Hint: Reduce/Simplify fraction to 3 individual terms each with a single ± exponent, then integrate each term separately) **ANSWER AS A FRACTION. NO DECIMALS!** $\quad -\frac{219}{40} = -5\frac{19}{40} = -5.475$