MTH 1126 Practice Test #1_2 - Solutions

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Pat Rossi Name _____

Instructions

Solutions appear on the SOLUTIONS page.

1. $\int \left(2x^4+6x^3+3x+6\sqrt{x}+2\right)dx = \frac{2}{5}x^5+\frac{3}{2}x^4+\frac{3}{2}x^2+4x^{\frac{3}{2}}+2x+C$
2. $\int \left(2\cos(x)+5\sec^2(x)\right)dx = 2\left[\sin(x)\right]+5\left[\tan(x)\right]+C$
3. $\int_{x=0}^{x=2}\left(2x^3+3x^2+2\right)dx = 20$
4. $\int \left(2x^3+2x\right)^5\left(3x^2+1\right)dx = \frac{1}{12}\left(2x^3+2x\right)^6+C$
5. $\int \cos\left(3x^2\right)\,x\,dx = \frac{1}{6}\sin\left(3x^2\right)+C$
6. $\int \frac{x}{3x^2+6}dx = \frac{1}{6}\ln\left|3x^2+6\right|+C$
7. $\frac{d}{dx}\left[\ln(\cos(x))\right] = -\tan(x)$
8. $\frac{d}{dx}\left[\ln\left(5x^2+5x\right)\right] = \frac{10x+5}{5x^2+5x}$
9. $\frac{d}{dx}\left[\ln\left(x\sqrt{x^2-1}\right)\right] = \frac{1}{x}+\frac{x}{x^2-1}$
10. $\int_{x=0}^{x=1}\left(x^2+1\right)^3\,x\,dx = \frac{15}{8}$
11. $z = \frac{1}{\sqrt{1+(x-2)^2}}$
12. $\int \sec^3(x)\tan(x)\,dx = \frac{1}{3}\sec^3(x)+C$
13. $\int \frac{3t^2}{(2t^3+1)^{\frac{1}{2}}}dt = \left(2t^3+1\right)^{\frac{1}{2}}+C$
14. $\int \frac{\sin x}{\sqrt{\cos x}}dx = -2\left(\cos(x)\right)^{\frac{1}{2}}+C = -2\sqrt{\cos(x)}+C$
15. ~
    (a) $\ln\left(\frac{3}{4}\right) \approx -0.3$
    (b) $\ln(72) \approx 4.3$
    (c) $\ln(81) \approx 4.4$
16. $\int \frac{36x^2-28x}{6x^3-7x^2}dx = 2\ln\left|6x^3-7x^2\right|+C$
17. $\int \frac{e^{\cos(3x)}}{\csc(3x)}dx = -\frac{1}{3}e^{\cos(3x)}+C$

18. $\frac{d}{dx}\left[\ln\sqrt{\frac{3x^2+1}{2x^3+2}}\right] = \frac{3x}{3x^2+1} - \frac{3x^2}{2x^3+2}$

19. ~

    (a) $\ln\left(\frac{9}{4}\right) \approx 0.8$

    (b) $\ln(81) \approx 4.4$

    (c) $\ln 3 \approx 1.1$

20. $\frac{d}{dx}\left[e^{\tan\left(3x^2\right)}\right] = 6x\sec^2\left(3x^2\right)e^{\tan 3x^2}$

21. $\frac{d}{dx}\left[\left[\ln\left(4x^5-3x^2\right)\right]\right] = \frac{20x^4-6x}{4x^5-3x^2}$

22. $\int \frac{x^2+x}{4x^3+6x^2}dx = \frac{1}{12}\ln\left|4x^3+6x^2\right| + C$

23. $\int e^{\left(3x^3+6x^2\right)}\left(3x^2+4x\right)dx = \frac{1}{3}e^{\left(3x^3+6x^2\right)} + C$

24. $\frac{d}{dx}\left[e^{\left(4x^2-3x\right)}\right] = (8x-3)\,e^{\left(4x^2-3x\right)}$

25. $\int \frac{1}{x^2+16}dx = \frac{1}{4}\tan^{-1}\left(\frac{x}{4}\right) + C$

26. $\int \frac{e^{2x}}{1+e^{4x}}dx = \frac{1}{2}\tan^{-1}\left(e^{2x}\right) + C$

27. $\int \frac{e^{2x}}{\sqrt{1-e^{4x}}}dx = \frac{1}{2}\sin^{-1}\left(e^{2x}\right) + C$

28. $\frac{d}{dx}\left[\cos^{-1}(3x)\right] = -\frac{3}{\sqrt{1-9x^2}}$

29. $\int \frac{1}{\sqrt{e^{2x}-5}}dx = \frac{1}{\sqrt{5}}\sec^{-1}\left(\frac{e^x}{\sqrt{5}}\right) + C$

30. $\frac{d}{dx}\left[\operatorname{arccot}\left(3x^2\right)\right] = -\frac{6x}{1+9x^4}$

31. $z = \sqrt{1+(4x)^2} = \sqrt{1+16x^2}$