

# MTH 1126 Practice Test #1\_3 - Answers

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## Instructions

Answers appear on the ANSWERS page. Solutions appear on the SOLUTIONS page.

1.  $\int (7x^4 + x^3 + 5x + 10) dx = \frac{7}{5}x^5 + \frac{1}{4}x^4 + \frac{5}{2}x^2 + 10x + C$

2.  $\int (8 \sec(x) \tan(x) + 5 \csc^2(x)) dx = 8 \sec(x) - 5 \cot(x) + C$

3.  $\int_{x=-1}^{x=1} (x^3 + 9x^2 + 3) dx = 12$

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

5.  $\int \sec(x^2) \tan(x^2) x dx = \frac{1}{2} \sec(x^2) + C$

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

7.  $\frac{d}{dx} [\ln(\tan(x))] = \frac{\sec^2(x)}{\tan(x)}$

8.  $\frac{d}{dx} [\ln(8x^3 + 5x)] = \frac{24x^2+5}{8x^3+5x}$

9.  $\frac{d}{dx} [\ln(x \sin(x))] = \frac{1}{x} + \cot(x)$

### Alternativley:

$$\frac{d}{dx} [\ln(x \sin(x))] = \frac{\sin x + x \cos x}{x \sin x}$$

10. Compute:  $\int_{x=0}^{x=1} (1 - x^2)^2 x dx = \frac{1}{6}$

11.  $z = \frac{3}{\sqrt{x^2+9}}$

12.  $\frac{d}{dx} [\ln(e^{x^2} \cdot \sin x)] = 2x + \cot(x)$

13.  $\int \frac{e^x}{7+e^{2x}} dx = \frac{1}{\sqrt{7}} \tan^{-1}\left(\frac{e^x}{\sqrt{7}}\right) + C$

14.  $\frac{d}{dx} [e^{\tan(4x^2)}] = 8x \sec^2(4x^2) e^{\tan(4x^2)}$

15.  $\int e^{\sec(4x)} \sec(4x) \tan(4x) dx = \frac{1}{4} e^{\sec(4x)} + C$

16.  $\int_{x=1}^{x=3} \frac{e^{\frac{3}{x}}}{x^2} dx = \frac{1}{3} (e^3 - e)$

17.  $\frac{d}{dx} [e^{(\sin(x)+\cos(x))}] = e^{(\sin(x)+\cos(x))} \cdot (\cos(x) - \sin(x))$

18.  $z = \sqrt{9x^2 - 1}$

$$19. \int e^{(4x^2-3x)} (16x - 6) dx = 2e^{(4x^2-3x)} + C$$

$$20. \int \frac{\sec^2(x)}{\tan(x)\sqrt{\tan^2(x)-9}} dx = \frac{1}{3} \sec^{-1} \left( \frac{\tan(x)}{3} \right) + C$$

$$21. \int \frac{x^3+1}{(x^4+4x)^2} dx = -\frac{1}{4} (x^4 + 4x)^{-1} + C$$

$$22. \int \frac{x^3+1}{x^4+4x} dx = \frac{1}{4} \ln |x^4 + 4x| + C$$

$$23. \frac{d}{dx} [e^{\sin(x) \cos(x)}] = \cos(2x) e^{\sin(x) \cos(x)}$$

$$24. \frac{d}{dx} [\sec^{-1}(e^x)] = \frac{1}{\sqrt{e^{2x}-1}}$$

25.

(a)  $\ln(2) \approx 0.7$

(b)  $\ln(27) \approx 3.3$

(c)  $\ln(18) \approx 2.9$

(d)  $\ln(\sqrt{6}) \approx 0.55$

$$26. \int \frac{1}{\sqrt{9-2x^2}} dx = \frac{1}{\sqrt{2}} \arcsin \left( \frac{\sqrt{2}x}{3} \right) + C$$

$$27. \int \frac{1}{\sec(x)\sqrt{\sin(x)}} dx = 2(\sin(x))^{\frac{1}{2}} + C$$

$$28. \int \frac{\sin(x) \cos(x)}{\sin^2(x) - \cos^2(x)} dx = \frac{1}{4} \ln |\sin^2(x) - \cos^2(x)| + C$$

$$29. \frac{d}{dx} [\operatorname{arccsc}(x^2)] = -\frac{2}{x\sqrt{x^4-1}}$$