Circle your Instructor: Faudree, Williams, Zirbes _____ / 15

Name: _____

This is a 30 minute quiz. There are 15 problems. Books, notes, calculators or any other aids are prohibited. Calculators and notes are not allowed. **Your answers should be simplified unless otherwise stated.** There is no partial credit. If you have any questions, please raise your hand.

Circle your final answer.

For each function below, find the definite or indefinite integral.

1. $\int_{-1}^{0} 16v^4 - 7v^3 + 2\,dv$ $= \frac{16}{5}v^5 - \frac{7}{4}v^4 + 2v \Big|_{-1}^{0} = 0 - \left[-\frac{16}{5} - \frac{7}{4} - 2\right]$

$= \frac{64 + 35 + 40}{20} = \frac{139}{20}$

2. $\int e^{2u}du.$ $= \frac{1}{2}e^{2u} + C$

3. $\int \frac{9x^2-3}{x^3-x}dx$ $= \int \frac{9x^2-3}{u} \cdot \frac{du}{3x^2-1} = \int \frac{3}{u}\,du = 3\ln|u| + C$

$u = x^3 - x$ $= 3\ln|x^3 - x| + C$

$du = (3x^2-1)\,dx$

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

5. $\int \frac{e^{\sqrt[4]{x}-1}}{2x^{3/4}}dx$ $= 2\int e^u du = 2e^u + C = 2e^{\sqrt[4]{x}-1} + C$

$u = x^{1/4} - 1$

$du = \frac{1}{4}x^{-3/4}dx$

6. $\int \frac{4\cos x}{(\sin x)^2}dx$ $= \int 4u^{-2}du = -4u^{-1}+C = \frac{-4}{\sin(x)} + C$

$u = \sin x$

$du = \cos(x)$

or $\int 4\cot x \csc x\, dx = -4\csc x + C$

7. $\int_{-1/2}^{1/2} \frac{6}{\sqrt{1-x^2}}dx$ $= 6\arcsin(x)\Big|_{-1/2}^{1/2} = 6\arcsin(1/2) - 6\arcsin(-1/2)$

$= 6\cdot\frac{\pi}{6} - 6\left(-\frac{\pi}{6}\right)$

$= 2\pi$

8. $\int \frac{4x}{\sqrt{1-x^2}}dx$

$u = 1-x^2$

$du = -2x\,dx$

$= -2\int u^{-1/2}\,du = -4u^{1/2} + C$

$= -4\sqrt{1-x^2} + C$

9. $\int \frac{1}{(3x-2)^{2/3}}dx$

$= \int (3x-2)^{-2/3}\,dx = \frac{1}{3}\cdot\frac{3}{1}(3x-2)^{1/3} + C$

$= (3x-2)^{1/3} + C$

10. $\int x^2 e^{-3x^3}dx$

$u = -3x^3$

$du = -9x^2\,dx$

$= -\frac{1}{9}\int e^u\,du = -\frac{1}{9}e^{-3x^3} + C$

11. $\int e^{2x}\sin(e^{2x})dx$

$u = e^{2x}$

$du = 2e^{2x}\,dx$

$= \int \frac{1}{2}\sin(u)\,du = -\frac{1}{2}\cos(u) + C$

$= -\frac{1}{2}\cos(e^{2x}) + C$

12. $\int_0^1 (3-5^x)\,dx$ $= 3x - \frac{5^x}{\ln(5)}\Big|_0^1 = 3 - \frac{5}{\ln(5)} - \left(0 - \frac{1}{\ln(5)}\right)$

$= 3 - \frac{4}{\ln(5)}$

13. $\int \left(\sqrt[3]{3x} + \frac{x^5}{4} - \frac{3}{x^4}\right) dx$ $= \int \sqrt[3]{3}\, x^{1/3} + \frac{1}{4}x^5 - 3x^{-4}\,dx$

$= \frac{3\sqrt[3]{3}}{4} x^{4/3} + \frac{1}{24}x^6 + x^{-3} + C$

14. $\int \frac{x^5 - 2x^2}{\sqrt[3]{x}} dx$ $= \int x^{14/3} - 2x^{5/3}\,dx = \frac{3}{17}x^{17/3} - \frac{3}{4}x^{8/3} + C$

15. $\int \sin\theta(2\cot\theta + \sec\theta)d\theta$ $= \int 2\cos\theta + \tan\theta\, d\theta$

$= 2\sin\theta - \ln|\cos\theta| + C$