

## 4.5 day 1 – Required Practice

Evaluate the integral.

#1.  $\int x^2 \sqrt{2x^3 - 3} \, dx$

#2.  $\int x^3 (1 - x^4)^5 \, dx$

#3.  $\int \frac{x^2}{\sqrt{1-x}} \, dx$

#4.  $\int \frac{1}{x^2} \sqrt{1 + \frac{1}{x}} \, dx$

$$\#5. \int \frac{\sin x}{1 + \cos^2 x} dx$$

$$\#6. \int \sec x \tan x \sqrt{1 + \sec x} dx$$

**Showing the u-substitution**

$$\#7. \int 3(3x - 2)^5 dx$$

**Reverse Chain Rule**

$$\#8. \int 3(3x - 2)^5 dx$$

$$\#9. \int \frac{x^2}{\sqrt{4 - x^3}} dx$$

$$\#10. \int \frac{x^2}{\sqrt{4 - x^3}} dx$$

**Showing the u-substitution**

#11.  $\int (2x^2 - 3x)^4 (4x - 3) dx$

#13.  $\int \cos(x^2 + 3x)(6x + 9) dx$

#15.  $\int \cos(5x) dx$

**Reverse Chain Rule**

#12.  $\int (2x^2 - 3x)^4 (4x - 3) dx$

#14.  $\int \cos(x^2 + 3x)(6x + 9) dx$

#16.  $\int \cos(5x) dx$

Evaluate using u-substitution or Reverse Chain Rule (whichever you prefer)

$$\#17. \int 6(1+6x)^4 dx$$

$$\#18. \int \frac{x}{\sqrt{1-x^2}} dx$$

$$\#19. \int e^{-x} \sec^2(e^{-x}) dx$$

$$\#20. \int \ln(e^{2x-1}) dx$$

#### 4.5 day 2 – Required Practice

Evaluate the definite integral.

$$\text{\#1. } \int_1^3 x\sqrt{3x^2 - 2} \, dx$$

$$\text{\#2. } \int_0^{\frac{1}{2}} \frac{\sin^{-1} x}{\sqrt{1-x^2}} \, dx$$

Evaluate the definite integral.

$$\#3. \int_1^2 2x^2 \sqrt{x^3 + 1} \, dx$$

$$\#4. \int_0^2 \frac{x}{\sqrt{1+2x^2}} \, dx$$

$$\#5. \int_1^3 \frac{e^{\left(\frac{3}{x}\right)}}{x^2} \, dx$$

$$\#6. \int_1^9 \frac{1}{\sqrt{x}(1+\sqrt{x})^2} \, dx$$

#### 4.6 – Required Practice

$$\#1. \int \frac{1}{4+x^2} dx$$

$$\#2. \int \frac{x+2}{\sqrt{4-x^2}} dx$$

$$\#3. \int \frac{1}{x^2-4x+7} dx$$

$$\#4. \int \tan(2x) dx$$

$$\#5. \int x^3 \tan(x^4) dx$$

$$\#6. \int \frac{1}{1+e^x} dx$$



Evaluate the integral.

$$\#7. \int \frac{x^4 - 3x^2}{\sqrt{x}} dx$$

$$\#8. \int \frac{x-5}{\sqrt{16-9x^2}} dx$$

$$\#9. \int x^2 \tan(x^3 - 2) dx$$

$$\#10. \int (\tan^2(3x) + 1) dx$$

$$\#11. \int \frac{1}{x^2 + 6x + 12} dx$$

$$\#12. \int \frac{1}{x^2 - 2x + 5} dx$$

$$\#13. \int \frac{x^2 - 4x + 2}{x^2 + 2} dx$$

$$\#14. \int \frac{2}{e^{-x} + 1} dx$$

#### 4.7 day 1 – Required Practice

Evaluate the integral.

#1.  $\int e^{(3x)} dx$

#2.  $\int 3xe^x dx$

#3.  $\int \ln(x) dx$

#4.  $\int x \sin(4x) dx$

$$\#5. \int 2x^3 \cos(x^2) dx$$

$$\#6. \int x^2 \sin(x) dx$$

Evaluate the integral.

#7.  $\int x e^x dx$

#8.  $\int x^3 \ln(x) dx$

#9.  $\int \ln(5x) dx$

#10.  $\int x^2 \cos(3x) dx$

$$\#11. \int t \ln(t+1) dt$$

#### 4.7 day 2 – Required Practice

Evaluate the integral.

#1.  $\int e^{4x} \cos(2x) dx$

The usual method...

$$\#2. \int x^2 e^{2x} dx$$

The tabular method...

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

$$\#4. \int x^6 e^x dx$$



Evaluate the integral.

#5.  $\int e^{5x} \cos(x) dx$

$$\#6. \int x^2 e^{2x} dx$$

$$\#7. \int x^3 \sin(x) dx$$

$$\#8. \int \frac{x^3}{\sqrt{4+x^2}} dx$$

a) by integration by parts using  $u = x^2$

b) by u-substitution using  $u = 4 + x^2$

#### 4.8 – Required Practice

#1.  $\int \sin^3 x \cos^3 x \, dx$

#2.  $\int \tan^2 x \sec^2 x \, dx$

#3.  $\int \cos x \, dx$

#4.  $\int \tan x \, dx$

#5.  $\int \sec x \, dx$

$$\#6. \int \cos^2 x \, dx$$

$$\#7. \int \sin^2 x \, dx$$

$$\#8. \int \tan^4 x \, dx$$

$$\#9. \int \cot^5 x \sin^4 x \, dx$$

Evaluate:

#10.  $\int \sin^3 x \cos^4 x \, dx$

#11.  $\int \sin^7(2x) \cos(2x) \, dx$

#12.  $\int \cos^2(3x) \, dx$

#13.  $\int 6 \sec(4x) \, dx$

$$\#14. \int \tan^3(2x) \sec^3(2x) dx$$

$$\#15. \int \frac{\tan^2(x)}{\sec(x)} dx$$

$$\#16. \int \tan^3(2x) dx$$

#### 4.9 – Required Practice

#1.  $\int \frac{\sqrt{x^2 - 9}}{x} dx$

#2.  $\int \frac{x^3}{\sqrt{16 - x^2}} dx$

$$\#3. \int x^3 \sqrt{x^2 + 4} \, dx$$

$$\#4. \int \frac{\sqrt{x^6 - 4}}{x} \, dx$$



Evaluate the integral.

$$\#5. \int \frac{\sqrt{16-x^2}}{x} dx$$

$$\#6. \int \frac{\sqrt{x^2-25}}{x} dx$$

$$\#7. \int \frac{9x^3}{\sqrt{1+x^2}} dx$$

$$\#8. \int \sqrt{16-4x^2} dx$$

#### 4.10 – Required Practice

#1.  $\int \frac{3x-5}{x^2+6x-7} dx$

#2.  $\int \frac{1}{x^2-5x+6} dx$

$$\#3. \int \frac{x^3 - x + 3}{x^2 + x - 2} dx$$

$$\#4. \int \frac{1}{(x-5)^3 (x^2 + x + 1)^2} dx$$

$$\#5. \int \frac{5x+3}{x^2+x-2} dx$$

$$\#6. \int \frac{3x-5}{x^2+2x-8} dx$$

$$\#7. \int \frac{6x-7}{x^2-3x-4} dx$$

Evaluate the integral.

$$\#8. \int \frac{1}{x^2 - 9} dx$$

$$\#9. \int \frac{5 + x}{2x^2 - 7x - 4} dx$$

$$\#10. \int \frac{x^2 + 12x + 12}{x^3 - 4x} dx$$

**4.11 – Required Practice**

$$\#1. \int_1^{\infty} \frac{1}{x^2} dx$$

$$\#2. \int_1^{\infty} \frac{1}{x} dx$$

$$\#3. \int_0^1 \frac{1}{\sqrt[3]{x}} dx$$



$$\#4. \int_0^3 \frac{2x-1}{x^2-x-2} dx = \int_0^3 \frac{2x-1}{(x+1)(x+2)} dx$$

$$\#5. \int_0^{\infty} \cos(x) dx$$

$$\#6. \int_{-\infty}^1 xe^{2x} dx$$

Evaluate the integral or state that it diverges.

$$\#7. \int_0^4 \frac{1}{\sqrt{x}} dx$$

$$\#8. \int_0^2 \frac{1}{(x-1)^2} dx$$

$$\#9. \int_1^{\infty} \frac{1}{x^3} dx$$

$$\#10. \int_1^{\infty} \frac{3}{\sqrt[3]{x}} dx$$

## Unit 4 Part 2 Test Review

Evaluate the integral or state that it diverges.

#1.  $\int \sin \theta \, d\theta$

#2.  $\int 7x^3(3x^4 + 6)^7 \, dx$

#3.  $\int \frac{1 + \cos x}{\sin x} \, dx$

#4.  $\int x \sin(2x) \, dx$

#5.  $\int_1^2 e^{3x} \, dx$

#6.  $\int_3^{\infty} \frac{1}{x(\ln x)^2} \, dx$

#7.  $\int \sin^3 x \cos x \, dx$

#8.  $\int \frac{1}{(x-4)(x+5)} \, dx$

#9.  $\int \frac{1}{\sqrt{x^2 + 16}} \, dx$

#10.  $\int e^{(x+e^x)} \, dx$

#11.  $\int 5 \csc^2 x \, dx$

#12.  $\int e^x \, dx$

#13.  $\int x^2 \sin(x) \, dx$

#14.  $\int \frac{3}{\sqrt{9 - (x+5)^2}} \, dx$

#15.  $\int_1^3 \frac{2}{x-2} \, dx$

$$\#16. \int 2x^3 dx$$

$$\#17. \int \frac{2}{(x-10)^2 + 36} dx$$

$$\#18. \int \sec x \tan x dx$$

$$\#19. \int x^2 e^x dx$$

$$\#20. \int (4x + 6)e^{(x^2+3x)} dx$$

$$\#21. \int_0^5 \frac{1}{(x-1)^{1/5}} dx$$

$$\#22. \int \frac{3x^2 - 2}{x^3 - 2x - 8} dx$$

$$\#23. \int \sin^3 x \cos^5 x dx$$

$$\#24. \int 2x^{-1} dx$$

$$\#25. \int \sec x dx$$

$$\#26. \int \csc x dx$$

$$\#27. \int_4^{\infty} \frac{x}{x^{7/2}} dx$$

$$\#28. \int \frac{x^3}{\sqrt{16-x^2}} dx$$

$$\#29. \int \sin^2 x dx$$

$$\#30. \int \cos^2 x dx$$

$$\#31. \int \frac{1}{x^2 - 5x - 14} dx$$

$$\#32. \int \frac{1}{x^2 - 12x + 38} dx$$

$$\#33. \int \frac{1 - \sin^2 x}{\cos x} dx$$

$$\#34. \int x e^x dx$$

$$\#35. \int \csc^4 x \cot^3 x dx$$

$$\#36. \int_3^{\infty} x \ln(x^2) dx$$

$$\#37. \int \frac{\sec x}{\tan^2 x + 1} dx$$

$$\#38. \int 7e^{5x} dx$$

$$\#39. \int \cot x dx$$

$$\#40. \int 2x^3 \cos(x^2) dx$$

$$\#41. \int_0^{\infty} \frac{x^2}{(1-x^3)^2} dx$$

$$\#42. \int 3 \sec^2 x dx$$

$$\#43. \int \frac{2t}{(t-3)^2} dt$$

$$\#44. \int \tan x dx$$

$$\#45. \int \csc x \cot x dx$$

$$\#46. \int x \ln(x) dx$$

$$\#47. \int \frac{\sin x + \sec x}{\tan x} dx$$

$$\#48. \int 3x \ln(x^2) dx$$

$$\#49. \int \cos x (1 + \sin^2 x) dx$$

$$\#50. \int (x^3 + e^{4x} + \cos(x)) dx$$