

I. Multiple Choice

_____ 1. $\int \frac{5 dx}{\sqrt{9-x^2}} =$

- A) $5 \ln(9-x^2) + C$
- B) $\frac{5}{2x} (\ln(9-x^2)) + C$
- C) $5 \sin^{-1}(\frac{x}{9}) + C$
- D) $5 \tan^{-1}(\frac{x}{3}) + C$
- E) $5 \sin^{-1}(\frac{x}{3}) + C$

_____ 2. $\int \cos^2(x) dx =$

- (A) $\frac{1}{2}x - \frac{1}{4}\sin(2x) + C$
- (B) $\frac{1}{2}x + \frac{1}{4}\sin(2x) + C$
- (C) $2x - 4\sin(2x) + C$
- (D) $2x + 4\sin(2x) + C$
- (E) $2x - 4\cos(2x) + C$

_____ 3. $\int \tan^2 x \sec^2 x dx =$

- A) $\frac{1}{2}\sec^2(x) + C$
- B) $\frac{1}{2}\tan^2(x) + C$
- C) $\frac{1}{3}\sec^3 x + C$
- D) $3\tan^3 x + C$
- E) $\frac{1}{3}\tan^3(x) + C$

_____ 4. $\int \frac{x dx}{1+x^4} =$

- (A) $\frac{1}{2} \text{Sin}^{-1}(x) + C$
- (B) $\text{Tan}^{-1}(x) + C$
- (C) $\frac{1}{2} \text{Tan}^{-1}(x^2) + C$
- (D) $\frac{1}{4} \ln(x^4) + C$
- (E) $\frac{1}{4}(1+x^4)^{-1} + C$

_____ 5. $\int \text{Sin}^{-1} x dx =$

- A) $\sin(x) - \int \frac{x dx}{\sqrt{1-x^2}}$
- B) $\frac{(\text{Sin}^{-1} x)^2}{2} + C$
- C) $\text{Sin}^{-1}(x) + \int \frac{x dx}{\sqrt{1-x^2}}$
- D) $x \text{Cos}^{-1}(x) - \int \frac{x dx}{\sqrt{1-x^2}}$
- E) $x \text{Sin}^{-1}(x) - \int \frac{x dx}{\sqrt{1-x^2}}$

_____ 6. $\int e^{\cot(x)} \csc^2 x dx =$

- (A) $e^{\cot(x)} + \cot x + C$
- (B) $e^{\cot(x)} - \cot x + C$
- (C) $e^{\cot(x)} + C$
- (D) $-e^{\cot(x)} + C$
- (E) $e^{\cot^2(x)} + C$

II. Free Response

Determine the value of the following integrals:

$$7. \int x e^{2x} dx =$$

$$8. \int x^2 \sin(x) dx =$$

$$9. \int \frac{x dx}{\sqrt{100-x^2}} =$$

$$10. \int \frac{x^3 - 2x^2 - 15x + 2}{x-5} dx =$$

$$11. \int \sin^6 x \cos^3 x dx =$$

$$12. \int e^x \cos x dx =$$

$$13. \int \tan^3(2x) \sec^3(2x) dx =$$

$$14. \int \sec(4x) dx =$$

$$15. \int \sqrt{4+9x} dx =$$

$$16. \int \frac{1}{\sec(\pi x)} dx =$$

$$17. \int e^x \cos e^x dx =$$

$$18. \int (4-2x)^3 dx =$$

$$19. \int (4-2x^2)^2 dx$$

$$20. \int \frac{dx}{x \ln x} =$$