

Gateway Review Sheet

Calculus II, Math 112

Name: _____

1. Write the derivatives of each of the following functions:

(a) $\frac{d}{dx} \sin(x) =$

(b) $\frac{d}{dx} \cos(x) =$

(c) $\frac{d}{dx} \tan(x) =$

(d) $\frac{d}{dx} \csc(x) =$

(e) $\frac{d}{dx} \sec(x) =$

(f) $\frac{d}{dx} \cot(x) =$

(g) $\frac{d}{dx} \arcsin(x) =$

(h) $\frac{d}{dx} \arctan(x) =$

(i) $\frac{d}{dx} \operatorname{arcsec}(x) =$

2. $\int t^5 dt$

$$3. \int \frac{1}{\sqrt{t^5}} dt$$

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

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

$$6. \int \frac{x^3 + 1}{x^2 + 1} dx$$

$$7. \int_2^8 \frac{1}{\sqrt{x}(\sqrt{x}+1)} dx$$

$$8. \int t \sin(3t) dt$$

$$9. \int (1 + e^x)^2 dx$$

$$10. \int_0^{1/2} \frac{1}{\sqrt{1-x^2}} dx$$

$$11. \int \frac{(3x^2 + 14)dx}{x^3 + 7x^2 + 12x}$$

$$12. \int \frac{(3x^2 + 14x + 12)dx}{x^3 + 7x^2 + 12x}$$

$$13. \int \frac{x^2 - x + 1}{x^2 - x} dx$$

$$14. \int \frac{x}{\sqrt[3]{x^2 + 4}} dx$$

$$15. \int_0^{\sqrt{\ln(2)}} x e^{2x^2} dx$$

$$16. \int_0^{\ln(2)} x^2 e^{2x} dx$$

$$17. \int x^3 \ln(x) dx$$

$$18. \int 4x \sec^2(2x) dx$$

$$19. \int z(\ln(z))^2 dz$$

$$20. \int_0^1 (r+1)e^r dr$$

$$21. \int x \sin(3x^2) dx$$

$$22. \int x^3 \sin(3x^2) dx$$

$$23. \int \frac{x^2 - 7x}{3x^3} dx$$

$$24. \int \arcsin(x) dx$$

$$25. \int_{-2}^1 4x\sqrt{2-x} dx$$

$$26. \int \sin^5(2x) \cos(2x) dx$$

27. $\int \sin(2x) \cos(2x) dx$

28. $\int \sin^5(x) dx$

Hint: $\sin^4(x) = (1 - \cos^2(x))^2$.

29. $\int \sin(3x) \cos(2x) dx$

30. $\int (x + 1) \sin(x^2 + 2x + 3) dx$

$$31. \int \frac{1 + e^{2x} - e^{3x}}{e^x} dx$$

$$32. \int_{-3}^2 |x + 1| dx$$

$$33. \int_{1/3}^1 \frac{1}{1 + 3x} dx$$