MTH232

Integration

Project 3– Exercises

> NAME: _____
> SECTION: _____
> INSTRUCTOR: _____

Exercise 1:

a.) If $f = \tan^4 2x$, then the <u>MATLAB</u> command diff(f) equals
(1) Circle one:
1. `8*tan(2*x)^3*sec(2*x)^2`
2. `4*tan(2*x)^3*(2+2*tan(2*x)^2)`
3. `4*tan(2*x)^3*(2+2*tan(2*x))^2`
4. `tan(2*x)^2*3*x^2`
5. none of the above

b.) Mathematically, which of the answers in $(\mathbf{a})$ above are equivalent?
(2) Circle one:
1. 1 and 2
2. 2 and 3
3. 2 and 4
4. 1 and 3
5. none of the above

Exercise 2:

a.) $\int \ln x\,dx$. Which of the integration techniques should you use to find the antiderivative?
(3) Circle one:
1. Trigonometric substitution **2.** Substitution (reverse of the chain rule) **3.** Integration by parts **4.** MATLAB **5.** Explicit integral cannot be found

b.) $\int \ln x\,dx$ equals
(4) Circle one:
1. $\ln(x)^2/2$ **2.** $1/x$ **3.** $x \ln x - x$ **4.** $\ln(x)^2/x$ **5.** none of the above

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Exercise 3:

a.) $\int \frac{1}{\sqrt{1-4x^2}} dx$. Which of the integration techniques should you use to find the antiderivative?
(5) Circle one:
1. Trigonometric substitution **2.** Substitution (reverse of the chain rule) **3.** Integration by parts **4.** MATLAB **5.** Explicit integral cannot be found

b.) $\int \frac{1}{\sqrt{1-4x^2}} dx$ equals
(6) Circle one:
1. $1/2 \sinh^{-1} 2x$ **2.** $1/2 \arcsin 2x$ **3.** $2/3(1+x^2)^{3/2}$ **4.** $(1+x^2)^{1/2}$ **5.** none of the above

Exercise 4:

a.) $\int xe^{x^2} dx$. Which of the integration techniques should you use to find the antiderivative?
(7) Circle one:
1. Trigonometric substitution **2.** Substitution (reverse of the chain rule) **3.** Integration by parts **4.** MATLAB **5.** Explicit integral cannot be found

b.) $\int xe^{x^2} dx$ equals
(8) Circle one:
1. xe^{x^2} **2.** $2xe^{x^2}$ **3.** e^{x^2} **4.** $1/2e^{x^2}$ **5.** None of the above

Exercise 5:

a.) $\int \frac{x}{\sqrt{1+x^2}} dx$. Which of the integration techniques should you use to find the antiderivative?
(9) Circle one:
1. Trigonometric substitution **2.** Substitution (reverse of the chain rule) **3.** Integration by parts **4.** MATLAB **5.** Explicit integral cannot be found

b.) $\int \frac{x}{\sqrt{1+x^2}} dx$ equals
(10) Circle one:
1. $(1+x^2)^{1/2}$ **2.** $\sinh^{-1} x$ **3.** $2/3(1+x^2)^{3/2}$ **4.** $\arcsin x$ **5.** none of the above

Exercise 6:

a.) $\int \frac{1}{\sqrt{1+x^2}} dx$. Which of the integration techniques should you use to find the antiderivative?
(11) Circle one:
1. Trigonometric substitution **2.** Substitution (reverse of the chain rule) **3.** Integration by parts **4.** MATLAB **5.** Explicit integral cannot be found

b.) $\int \frac{1}{\sqrt{1+x^2}} dx$ equals

(12) Circle one:

1. $2/3(1+x^2)^{3/2}$ **2.** $sinh^{-1}x$ or $\ln|(1+x^2)^{1/2} + x|$ **3.** $\arcsin x$ **4.** $(1+x^2)^{1/2}$ **5.** none of the above

Exercise 7:

a.) $\int x^3 \sin x dx$. Which of the integration techniques should you use to find the antiderivative?

(13) Circle one:

1. Trigonometric substitution **2.** Substitution (reverse of the chain rule) **3.** Integration by parts **4.** MATLAB **5.** Explicit integral cannot be found

b.) $\int x^3 \sin x dx$ equals

(14) Circle one:

1. $-1/3\sin^2 x \cos(x)(-2/3)\cos x$ **2.** $-x^4/4\cos x$ **3.** $-x^3 \cos x + 3x^2 \sin x - 6\sin x + 6x \cos x$ **4.** $x^3 \cos x - 3x^2 \sin x + 6\sin x - 6x \cos x$ **5.** none of the above

Exercise 8:

a.) $\int \sin^3 x dx$. Which of the integration techniques should you use to find the antiderivative?

(15) Circle one:

1. Trigonometric substitution **2.** Substitution (reverse of the chain rule) after replacing trig function **3.** Integration by parts **4.** MATLAB **5.** Explicit integral cannot be found

b.) $\int \sin^3 x dx$ equals

(16) Circle one:

1. $-1/3\sin^2 x \cos(x) - 2/3\cos x$ **2.** $-x^4/4\cos x$ **3.** $-x^3 \cos x + 3x^2 \sin x - 6\sin x + 6x \cos x$ **4.** $x^3 \cos x - 3x^2 \sin x + 6\sin x - 6x \cos x$ **5.** none of the above

Exercise 9:

a.) $\int \sin(x^3) dx$. Which of the integration techniques should you use to find the antiderivative?

(17) Circle one:

1. Substitution (reverse of the chain rule) **2.** Integration by parts **3.** Trigonometric substitution **4.** Explicit integral cannot be found – MATLAB estimates it in terms of the "LommelS1" function

b.) $\int \sin(x^3) dx$ equals

(18) Circle one:

1. $-1/3\sin^2 x \cos(x) - 2/3\cos x$ **2.** $-x^4/4\cos x$ **3.** $-x^3 \cos x + 3x^2 \sin x - 6\sin x + 6x \cos x$ **4.** $x^3 \cos x - 3x^2 \sin x + 6\sin x - 6x \cos x$ **5.** none of the above

Exercise 10:

a.) $\int_0^\pi \sin(x^3)dx$. Which of the integration techniques should you use to evaluate the definite integral?
(19) Circle one:
1. Substitution (reverse of the chain rule) **2.** Integration by parts **3.** Trigonometric substitution **4.** Explicit integral cannot be found – MATLAB estimates it in terms of the "LommelS1" function

b.) $\int_0^\pi \sin(x^3)dx \approx$ **(20) Circle one:**
1. 0.4158 **2.** 1.3333 **3.** 0.4999 **4.** 12.1567 **5.** none of the above