

Math 2250: Spring 2011
The MegaQuiz, Form: A

Name: _____

Student Number: _____

TA: _____

Date: _____

1. The derivative of $f(x) = 7^{5x+3}$ is

- (a) $(5x + 3)7^{5x+2}$
- (b) $(5) \times 7^{5x+3}$
- (c) $(5 \ln 7)7^{5x+3}$
- (d) $(5x + 3)7^{5x+3}$

2. The derivative of $f(x) = \sec^{-1} x$ (or $f(x) = \operatorname{arcsec} x$) is

- (a) $\frac{1}{1+x^2}$
- (b) $\frac{1}{\sqrt{1-x^2}}$
- (c) $-\frac{1}{\sqrt{x^2-1}}$
- (d) $\frac{1}{x\sqrt{x^2-1}}$
- (e) $\frac{1}{x\sqrt{1-x^2}}$

3. The derivative of $f(x) = \frac{\ln x}{\tan x}$ is

- (a) $\frac{\sec^2 x}{x}$
- (b) $\frac{(1/x)}{\sec^2 x}$
- (c) $\frac{(\tan x)/x - \ln x \sec^2 x}{\tan^2 x}$
- (d) $\frac{\tan x \ln x - (1/x) \sec^2 x}{\tan x}$
- (e) $\frac{\sec x \tan x - \ln x (1/x)}{\tan^2 x}$

4. An certain electronic circuit is modeled by the function $f(x) = 4x^2 + 3x - 1$. The input power source at $x = 2$ volts fluctuates by ± 0.1 volt. What is the resulting range of outputs for the circuit?
- (a) 21 ± 0.17 volts
 - (b) 21 ± 0.017 volts
 - (c) 21 ± 0.019 volts
 - (d) 22 ± 0.05 volts
 - (e) 20 ± 0.19 volts
 - (f) 21 ± 0.19 volts
5. The variables x and y obey $x^2 \sec y = y^3$. dy/dx is given by
- (a) $\frac{2x \cos y}{x^2 \sec y \tan y - 3y^2}$
 - (b) $\frac{2x \sec y}{3y^2 - x^2 \sec y \tan y}$
 - (c) $\frac{3y^2 - x^2 \tan^2 y}{2x \sec y}$
 - (d) $\frac{3y^2 + x^2 \sec y \tan y}{2x \cos y}$
 - (e) $\frac{3y^2 + x^2 \sec y \tan y}{2x \tan y}$
6. The derivative of $f(x) = \arctan(e^x)$ is
- (a) $\frac{1}{1+e^{2x}}e^x$
 - (b) $\frac{1}{\sqrt{1-e^{2x}}}e^x$
 - (c) $\frac{1}{1+x^2}e^x$
 - (d) $\frac{1}{x\sqrt{1-(e^x)^2}}e^x$
7. At a certain value of x , you know $f'(x) = 0$ and $f''(x) = 7$. This point is a
- (a) critical point and local max
 - (b) critical point and local min
 - (c) critical point, but you can't tell if it's a local max or min
 - (d) not a critical point

1. The integral $\int \sec^2 x \, dx$ is
2. The integral $\int \cos x \, dx$ is
3. The integral $\int \frac{1}{1+4x^2}$ is

Answer Key for Exam A

1. The derivative of $f(x) = 7^{5x+3}$ is

(a) $(5x + 3)7^{5x+2}$

(b) $(5) \times 7^{5x+3}$

(c) $(5 \ln 7)7^{5x+3}$

(d) $(5x + 3)7^{5x+3}$

2. The derivative of $f(x) = \sec^{-1} x$ (or $f(x) = \operatorname{arcsec} x$) is

(a) $\frac{1}{1+x^2}$

(b) $\frac{1}{\sqrt{1-x^2}}$

(c) $-\frac{1}{\sqrt{x^2-1}}$

(d) $\frac{1}{x\sqrt{x^2-1}}$

(e) $\frac{1}{x\sqrt{1-x^2}}$

3. The derivative of $f(x) = \frac{\ln x}{\tan x}$ is

(a) $\frac{\sec^2 x}{x}$

(b) $\frac{(1/x)}{\sec^2 x}$

(c) $\frac{(\tan x)/x - \ln x \sec^2 x}{\tan^2 x}$

(d) $\frac{\tan x \ln x - (1/x) \sec^2 x}{\tan x}$

(e) $\frac{\sec x \tan x - \ln x (1/x)}{\tan^2 x}$

4. An certain electronic circuit is modeled by the function $f(x) = 4x^2 + 3x - 1$. The input power source at $x = 2$ volts fluctuates by ± 0.1 volt. What is the resulting range of outputs for the circuit?
- (a) 21 ± 0.17 volts
 - (b) 21 ± 0.017 volts
 - (c) 21 ± 0.019 volts
 - (d) 22 ± 0.05 volts
 - (e) 20 ± 0.19 volts
 - (f) 21 ± 0.19 volts
5. The variables x and y obey $x^2 \sec y = y^3$. dy/dx is given by
- (a) $\frac{2x \cos y}{x^2 \sec y \tan y - 3y^2}$
 - (b) $\frac{2x \sec y}{3y^2 - x^2 \sec y \tan y}$
 - (c) $\frac{3y^2 - x^2 \tan^2 y}{2x \sec y}$
 - (d) $\frac{3y^2 + x^2 \sec y \tan y}{2x \cos y}$
 - (e) $\frac{3y^2 + x^2 \sec y \tan y}{2x \tan y}$
6. The derivative of $f(x) = \arctan(e^x)$ is
- (a) $\frac{1}{1+e^{2x}} e^x$
 - (b) $\frac{1}{\sqrt{1-e^{2x}}} e^x$
 - (c) $\frac{1}{1+x^2} e^x$
 - (d) $\frac{1}{x\sqrt{1-(e^x)^2}} e^x$
7. At a certain value of x , you know $f'(x) = 0$ and $f''(x) = 7$. This point is a
- (a) critical point and local max
 - (b) critical point and local min
 - (c) critical point, but you can't tell if it's a local max or min
 - (d) not a critical point

1. The integral $\int \sec^2 x \, dx$ is

Answer: $\tan x + C$

2. The integral $\int \cos x \, dx$ is

Answer: $-\sin x + C$

3. The integral $\int \frac{1}{1+4x^2}$ is

Answer: $\frac{1}{2} \arctan 2x + C$

Math 2250: Spring 2011
The MegaQuiz, Form: **B**

Name: _____

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1. The variables x and y obey $x^2 \sec y = y^3$. dy/dx is given by

(a) $\frac{2x \cos y}{x^2 \sec y \tan y - 3y^2}$

(b) $\frac{2x \sec y}{3y^2 - x^2 \sec y \tan y}$

(c) $\frac{3y^2 - x^2 \tan^2 y}{2x \sec y}$

(d) $\frac{3y^2 + x^2 \sec y \tan y}{2x \cos y}$

(e) $\frac{3y^2 + x^2 \sec y \tan y}{2x \tan y}$

2. The derivative of $f(x) = \arctan(e^x)$ is

(a) $\frac{1}{1+e^{2x}} e^x$

(b) $\frac{1}{\sqrt{1-e^{2x}}} e^x$

(c) $\frac{1}{1+x^2} e^x$

(d) $\frac{1}{x\sqrt{1-(e^x)^2}} e^x$

3. The derivative of $f(x) = \frac{\ln x}{\tan x}$ is

(a) $\frac{\sec^2 x}{x}$

(b) $\frac{(1/x)}{\sec^2 x}$

(c) $\frac{(\tan x)/x - \ln x \sec^2 x}{\tan^2 x}$

(d) $\frac{\tan x \ln x - (1/x) \sec^2 x}{\tan x}$

(e) $\frac{\sec x \tan x - \ln x (1/x)}{\tan^2 x}$

4. The derivative of $f(x) = 7^{5x+3}$ is
- (a) $(5x + 3)7^{5x+2}$
 - (b) $(5) \times 7^{5x+3}$
 - (c) $(5 \ln 7)7^{5x+3}$
 - (d) $(5x + 3)7^{5x+3}$
5. At a certain value of x , you know $f'(x) = 0$ and $f''(x) = 7$. This point is a
- (a) critical point and local max
 - (b) critical point and local min
 - (c) critical point, but you can't tell if it's a local max or min
 - (d) not a critical point
6. An certain electronic circuit is modeled by the function $f(x) = 4x^2 + 3x - 1$. The input power source at $x = 2$ volts fluctuates by ± 0.1 volt. What is the resulting range of outputs for the circuit?
- (a) 21 ± 0.17 volts
 - (b) 21 ± 0.017 volts
 - (c) 21 ± 0.019 volts
 - (d) 22 ± 0.05 volts
 - (e) 20 ± 0.19 volts
 - (f) 21 ± 0.19 volts
7. The derivative of $f(x) = \sec^{-1} x$ (or $f(x) = \operatorname{arcsec} x$) is
- (a) $\frac{1}{1+x^2}$
 - (b) $\frac{1}{\sqrt{1-x^2}}$
 - (c) $-\frac{1}{\sqrt{x^2-1}}$
 - (d) $\frac{1}{x\sqrt{x^2-1}}$
 - (e) $\frac{1}{x\sqrt{1-x^2}}$

1. The integral $\int \frac{1}{1+4x^2}$ is

2. The integral $\int \cos x \, dx$ is
3. The integral $\int \sec^2 x \, dx$ is

Answer Key for Exam B

1. The variables x and y obey $x^2 \sec y = y^3$. dy/dx is given by

(a) $\frac{2x \cos y}{x^2 \sec y \tan y - 3y^2}$

(b) $\frac{2x \sec y}{3y^2 - x^2 \sec y \tan y}$

(c) $\frac{3y^2 - x^2 \tan^2 y}{2x \sec y}$

(d) $\frac{3y^2 + x^2 \sec y \tan y}{2x \cos y}$

(e) $\frac{3y^2 + x^2 \sec y \tan y}{2x \tan y}$

2. The derivative of $f(x) = \arctan(e^x)$ is

(a) $\frac{1}{1+e^{2x}} e^x$

(b) $\frac{1}{\sqrt{1-e^{2x}}} e^x$

(c) $\frac{1}{1+x^2} e^x$

(d) $\frac{1}{x\sqrt{1-(e^x)^2}} e^x$

3. The derivative of $f(x) = \frac{\ln x}{\tan x}$ is

(a) $\frac{\sec^2 x}{x}$

(b) $\frac{(1/x)}{\sec^2 x}$

(c) $\frac{(\tan x)/x - \ln x \sec^2 x}{\tan^2 x}$

(d) $\frac{\tan x \ln x - (1/x) \sec^2 x}{\tan x}$

(e) $\frac{\sec x \tan x - \ln x (1/x)}{\tan^2 x}$

4. The derivative of $f(x) = 7^{5x+3}$ is

(a) $(5x + 3)7^{5x+2}$

(b) $(5) \times 7^{5x+3}$

(c) $(5 \ln 7)7^{5x+3}$

(d) $(5x + 3)7^{5x+3}$

5. At a certain value of x , you know $f'(x) = 0$ and $f''(x) = 7$. This point is a
- (a) critical point and local max
 - (b) critical point and local min
 - (c) critical point, but you can't tell if it's a local max or min
 - (d) not a critical point
6. An certain electronic circuit is modeled by the function $f(x) = 4x^2 + 3x - 1$. The input power source at $x = 2$ volts fluctuates by ± 0.1 volt. What is the resulting range of outputs for the circuit?
- (a) 21 ± 0.17 volts
 - (b) 21 ± 0.017 volts
 - (c) 21 ± 0.019 volts
 - (d) 22 ± 0.05 volts
 - (e) 20 ± 0.19 volts
 - (f) 21 ± 0.19 volts
7. The derivative of $f(x) = \sec^{-1} x$ (or $f(x) = \operatorname{arcsec} x$) is
- (a) $\frac{1}{1+x^2}$
 - (b) $\frac{1}{\sqrt{1-x^2}}$
 - (c) $-\frac{1}{\sqrt{x^2-1}}$
 - (d) $\frac{1}{x\sqrt{x^2-1}}$
 - (e) $\frac{1}{x\sqrt{1-x^2}}$

1. The integral $\int \frac{1}{1+4x^2}$ is

Answer: $\frac{1}{2} \arctan 2x + C$

2. The integral $\int \cos x \, dx$ is

Answer: $-\sin x + C$

3. The integral $\int \sec^2 x \, dx$ is

Answer: $\tan x + C$

Math 2250: Spring 2011
The MegaQuiz, Form: C

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1. The variables x and y obey $x^2 \sec y = y^3$. dy/dx is given by
 - (a) $\frac{2x \cos y}{x^2 \sec y \tan y - 3y^2}$
 - (b) $\frac{2x \sec y}{3y^2 - x^2 \sec y \tan y}$
 - (c) $\frac{3y^2 - x^2 \tan^2 y}{2x \sec y}$
 - (d) $\frac{3y^2 + x^2 \sec y \tan y}{2x \cos y}$
 - (e) $\frac{3y^2 + x^2 \sec y \tan y}{2x \tan y}$

2. An certain electronic circuit is modeled by the function $f(x) = 4x^2 + 3x - 1$. The input power source at $x = 2$ volts fluctuates by ± 0.1 volt. What is the resulting range of outputs for the circuit?
 - (a) 21 ± 0.17 volts
 - (b) 21 ± 0.017 volts
 - (c) 21 ± 0.019 volts
 - (d) 22 ± 0.05 volts
 - (e) 20 ± 0.19 volts
 - (f) 21 ± 0.19 volts

3. At a certain value of x , you know $f'(x) = 0$ and $f''(x) = 7$. This point is a
 - (a) critical point and local max
 - (b) critical point and local min
 - (c) critical point, but you can't tell if it's a local max or min
 - (d) not a critical point

4. The derivative of $f(x) = 7^{5x+3}$ is
- (a) $(5x + 3)7^{5x+2}$
 - (b) $(5) \times 7^{5x+3}$
 - (c) $(5 \ln 7)7^{5x+3}$
 - (d) $(5x + 3)7^{5x+3}$
5. The derivative of $f(x) = \sec^{-1} x$ (or $f(x) = \operatorname{arcsec} x$) is
- (a) $\frac{1}{1+x^2}$
 - (b) $\frac{1}{\sqrt{1-x^2}}$
 - (c) $-\frac{1}{\sqrt{x^2-1}}$
 - (d) $\frac{1}{x\sqrt{x^2-1}}$
 - (e) $\frac{1}{x\sqrt{1-x^2}}$
6. The derivative of $f(x) = \arctan(e^x)$ is
- (a) $\frac{1}{1+e^{2x}}e^x$
 - (b) $\frac{1}{\sqrt{1-e^{2x}}}e^x$
 - (c) $\frac{1}{1+x^2}e^x$
 - (d) $\frac{1}{x\sqrt{1-(e^x)^2}}e^x$
7. The derivative of $f(x) = \frac{\ln x}{\tan x}$ is
- (a) $\frac{\sec^2 x}{x}$
 - (b) $\frac{(1/x)}{\sec^2 x}$
 - (c) $\frac{(\tan x)/x - \ln x \sec^2 x}{\tan^2 x}$
 - (d) $\frac{\tan x \ln x - (1/x) \sec^2 x}{\tan x}$
 - (e) $\frac{\sec x \tan x - \ln x (1/x)}{\tan^2 x}$

1. The integral $\int \frac{1}{1+4x^2}$ is
2. The integral $\int \sec^2 x dx$ is

3. The integral $\int \cos x \, dx$ is

Answer Key for Exam C

1. The variables x and y obey $x^2 \sec y = y^3$. dy/dx is given by
 - (a) $\frac{2x \cos y}{x^2 \sec y \tan y - 3y^2}$
 - (b) $\frac{2x \sec y}{3y^2 - x^2 \sec y \tan y}$
 - (c) $\frac{3y^2 - x^2 \tan^2 y}{2x \sec y}$
 - (d) $\frac{3y^2 + x^2 \sec y \tan y}{2x \cos y}$
 - (e) $\frac{3y^2 + x^2 \sec y \tan y}{2x \tan y}$

2. An certain electronic circuit is modeled by the function $f(x) = 4x^2 + 3x - 1$. The input power source at $x = 2$ volts fluctuates by ± 0.1 volt. What is the resulting range of outputs for the circuit?
 - (a) 21 ± 0.17 volts
 - (b) 21 ± 0.017 volts
 - (c) 21 ± 0.019 volts
 - (d) 22 ± 0.05 volts
 - (e) 20 ± 0.19 volts
 - (f) 21 ± 0.19 volts

3. At a certain value of x , you know $f'(x) = 0$ and $f''(x) = 7$. This point is a
 - (a) critical point and local max
 - (b) critical point and local min
 - (c) critical point, but you can't tell if it's a local max or min
 - (d) not a critical point

4. The derivative of $f(x) = 7^{5x+3}$ is
 - (a) $(5x + 3)7^{5x+2}$
 - (b) $(5) \times 7^{5x+3}$
 - (c) $(5 \ln 7)7^{5x+3}$
 - (d) $(5x + 3)7^{5x+3}$

5. The derivative of $f(x) = \sec^{-1} x$ (or $f(x) = \operatorname{arcsec} x$) is

(a) $\frac{1}{1+x^2}$

(b) $\frac{1}{\sqrt{1-x^2}}$

(c) $-\frac{1}{\sqrt{x^2-1}}$

(d) $\frac{1}{x\sqrt{x^2-1}}$

(e) $\frac{1}{x\sqrt{1-x^2}}$

6. The derivative of $f(x) = \arctan(e^x)$ is

(a) $\frac{1}{1+e^{2x}} e^x$

(b) $\frac{1}{\sqrt{1-e^{2x}}} e^x$

(c) $\frac{1}{1+x^2} e^x$

(d) $\frac{1}{x\sqrt{1-(e^x)^2}} e^x$

7. The derivative of $f(x) = \frac{\ln x}{\tan x}$ is

(a) $\frac{\sec^2 x}{x}$

(b) $\frac{(1/x)}{\sec^2 x}$

(c) $\frac{(\tan x)/x - \ln x \sec^2 x}{\tan^2 x}$

(d) $\frac{\tan x \ln x - (1/x) \sec^2 x}{\tan x}$

(e) $\frac{\sec x \tan x - \ln x (1/x)}{\tan^2 x}$

1. The integral $\int \frac{1}{1+4x^2}$ is

Answer: $\frac{1}{2} \arctan 2x + C$

2. The integral $\int \sec^2 x dx$ is

Answer: $\tan x + C$

3. The integral $\int \cos x dx$ is

Answer: $-\sin x + C$

Math 2250: Spring 2011
The MegaQuiz, Form: D

Name: _____

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TA: _____

Date: _____

1. The derivative of $f(x) = \sec^{-1} x$ (or $f(x) = \operatorname{arcsec} x$) is

(a) $\frac{1}{1+x^2}$

(b) $\frac{1}{\sqrt{1-x^2}}$

(c) $-\frac{1}{\sqrt{x^2-1}}$

(d) $\frac{1}{x\sqrt{x^2-1}}$

(e) $\frac{1}{x\sqrt{1-x^2}}$

2. The derivative of $f(x) = 7^{5x+3}$ is

(a) $(5x + 3)7^{5x+2}$

(b) $(5) \times 7^{5x+3}$

(c) $(5 \ln 7)7^{5x+3}$

(d) $(5x + 3)7^{5x+3}$

3. The variables x and y obey $x^2 \sec y = y^3$. dy/dx is given by

(a) $\frac{2x \cos y}{x^2 \sec y \tan y - 3y^2}$

(b) $\frac{2x \sec y}{3y^2 - x^2 \sec y \tan y}$

(c) $\frac{3y^2 - x^2 \tan^2 y}{2x \sec y}$

(d) $\frac{3y^2 + x^2 \sec y \tan y}{2x \cos y}$

(e) $\frac{3y^2 + x^2 \sec y \tan y}{2x \tan y}$

4. At a certain value of x , you know $f'(x) = 0$ and $f''(x) = 7$. This point is a
- critical point and local max
 - critical point and local min
 - critical point, but you can't tell if it's a local max or min
 - not a critical point
5. An certain electronic circuit is modeled by the function $f(x) = 4x^2 + 3x - 1$. The input power source at $x = 2$ volts fluctuates by ± 0.1 volt. What is the resulting range of outputs for the circuit?
- 21 ± 0.17 volts
 - 21 ± 0.017 volts
 - 21 ± 0.019 volts
 - 22 ± 0.05 volts
 - 20 ± 0.19 volts
 - 21 ± 0.19 volts
6. The derivative of $f(x) = \arctan(e^x)$ is
- $\frac{1}{1+e^{2x}} e^x$
 - $\frac{1}{\sqrt{1-e^{2x}}} e^x$
 - $\frac{1}{1+x^2} e^x$
 - $\frac{1}{x\sqrt{1-(e^x)^2}} e^x$
7. The derivative of $f(x) = \frac{\ln x}{\tan x}$ is
- $\frac{\sec^2 x}{x}$
 - $\frac{(1/x)}{\sec^2 x}$
 - $\frac{(\tan x)/x - \ln x \sec^2 x}{\tan^2 x}$
 - $\frac{\tan x \ln x - (1/x) \sec^2 x}{\tan x}$
 - $\frac{\sec x \tan x - \ln x (1/x)}{\tan^2 x}$

1. The integral $\int \cos x \, dx$ is
2. The integral $\int \sec^2 x \, dx$ is
3. The integral $\int \frac{1}{1+4x^2}$ is

Answer Key for Exam D

1. The derivative of $f(x) = \sec^{-1} x$ (or $f(x) = \operatorname{arcsec} x$) is
 - (a) $\frac{1}{1+x^2}$
 - (b) $\frac{1}{\sqrt{1-x^2}}$
 - (c) $-\frac{1}{\sqrt{x^2-1}}$
 - (d) $\frac{1}{x\sqrt{x^2-1}}$
 - (e) $\frac{1}{x\sqrt{1-x^2}}$

2. The derivative of $f(x) = 7^{5x+3}$ is
 - (a) $(5x + 3)7^{5x+2}$
 - (b) $(5) \times 7^{5x+3}$
 - (c) $(5 \ln 7)7^{5x+3}$
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 - (a) $\frac{2x \cos y}{x^2 \sec y \tan y - 3y^2}$
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 - (c) $\frac{3y^2 - x^2 \tan^2 y}{2x \sec y}$
 - (d) $\frac{3y^2 + x^2 \sec y \tan y}{2x \cos y}$
 - (e) $\frac{3y^2 + x^2 \sec y \tan y}{2x \tan y}$

4. At a certain value of x , you know $f'(x) = 0$ and $f''(x) = 7$. This point is a
 - (a) critical point and local max
 - (b) critical point and local min
 - (c) critical point, but you can't tell if it's a local max or min
 - (d) not a critical point

5. An certain electronic circuit is modeled by the function $f(x) = 4x^2 + 3x - 1$. The input power source at $x = 2$ volts fluctuates by ± 0.1 volt. What is the resulting range of outputs for the circuit?

- (a) 21 ± 0.17 volts
- (b) 21 ± 0.017 volts
- (c) 21 ± 0.019 volts
- (d) 22 ± 0.05 volts
- (e) 20 ± 0.19 volts
- (f) 21 ± 0.19 volts

6. The derivative of $f(x) = \arctan(e^x)$ is

- (a) $\frac{1}{1+e^{2x}} e^x$
- (b) $\frac{1}{\sqrt{1-e^{2x}}} e^x$
- (c) $\frac{1}{1+x^2} e^x$
- (d) $\frac{1}{x\sqrt{1-(e^x)^2}} e^x$

7. The derivative of $f(x) = \frac{\ln x}{\tan x}$ is

- (a) $\frac{\sec^2 x}{x}$
- (b) $\frac{(1/x)}{\sec^2 x}$
- (c) $\frac{(\tan x)/x - \ln x \sec^2 x}{\tan^2 x}$
- (d) $\frac{\tan x \ln x - (1/x) \sec^2 x}{\tan x}$
- (e) $\frac{\sec x \tan x - \ln x (1/x)}{\tan^2 x}$

1. The integral $\int \cos x \, dx$ is

Answer: $-\sin x + C$

2. The integral $\int \sec^2 x \, dx$ is

Answer: $\tan x + C$

3. The integral $\int \frac{1}{1+4x^2}$ is

Answer: $\frac{1}{2} \arctan 2x + C$

Math 2250: Spring 2011
The MegaQuiz, Form: **E**

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1. At a certain value of x , you know $f'(x) = 0$ and $f''(x) = 7$. This point is a
 - (a) critical point and local max
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 - (c) critical point, but you can't tell if it's a local max or min
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2. The derivative of $f(x) = 7^{5x+3}$ is
 - (a) $(5x + 3)7^{5x+2}$
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 - (a) $\frac{1}{1+x^2}$
 - (b) $\frac{1}{\sqrt{1-x^2}}$
 - (c) $-\frac{1}{\sqrt{x^2-1}}$
 - (d) $\frac{1}{x\sqrt{x^2-1}}$
 - (e) $\frac{1}{x\sqrt{1-x^2}}$

4. An certain electronic circuit is modeled by the function $f(x) = 4x^2 + 3x - 1$. The input power source at $x = 2$ volts fluctuates by ± 0.1 volt. What is the resulting range of outputs for the circuit?
- (a) 21 ± 0.17 volts
 - (b) 21 ± 0.017 volts
 - (c) 21 ± 0.019 volts
 - (d) 22 ± 0.05 volts
 - (e) 20 ± 0.19 volts
 - (f) 21 ± 0.19 volts
5. The derivative of $f(x) = \frac{\ln x}{\tan x}$ is
- (a) $\frac{\sec^2 x}{x}$
 - (b) $\frac{(1/x)}{\sec^2 x}$
 - (c) $\frac{(\tan x)/x - \ln x \sec^2 x}{\tan^2 x}$
 - (d) $\frac{\tan x \ln x - (1/x) \sec^2 x}{\tan x}$
 - (e) $\frac{\sec x \tan x - \ln x (1/x)}{\tan^2 x}$
6. The variables x and y obey $x^2 \sec y = y^3$. dy/dx is given by
- (a) $\frac{2x \cos y}{x^2 \sec y \tan y - 3y^2}$
 - (b) $\frac{2x \sec y}{3y^2 - x^2 \sec y \tan y}$
 - (c) $\frac{3y^2 - x^2 \tan^2 y}{2x \sec y}$
 - (d) $\frac{3y^2 + x^2 \sec y \tan y}{2x \cos y}$
 - (e) $\frac{3y^2 + x^2 \sec y \tan y}{2x \tan y}$
7. The derivative of $f(x) = \arctan(e^x)$ is
- (a) $\frac{1}{1+e^{2x}} e^x$
 - (b) $\frac{1}{\sqrt{1-e^{2x}}} e^x$
 - (c) $\frac{1}{1+x^2} e^x$
 - (d) $\frac{1}{x\sqrt{1-(e^x)^2}} e^x$

1. The integral $\int \cos x \, dx$ is
2. The integral $\int \frac{1}{1+4x^2}$ is
3. The integral $\int \sec^2 x \, dx$ is

Answer Key for Exam E

1. At a certain value of x , you know $f'(x) = 0$ and $f''(x) = 7$. This point is a
 - (a) critical point and local max
 - (b) critical point and local min
 - (c) critical point, but you can't tell if it's a local max or min
 - (d) not a critical point

2. The derivative of $f(x) = 7^{5x+3}$ is
 - (a) $(5x + 3)7^{5x+2}$
 - (b) $(5) \times 7^{5x+3}$
 - (c) $(5 \ln 7)7^{5x+3}$
 - (d) $(5x + 3)7^{5x+3}$

3. The derivative of $f(x) = \sec^{-1} x$ (or $f(x) = \operatorname{arcsec} x$) is
 - (a) $\frac{1}{1+x^2}$
 - (b) $\frac{1}{\sqrt{1-x^2}}$
 - (c) $-\frac{1}{\sqrt{x^2-1}}$
 - (d) $\frac{1}{x\sqrt{x^2-1}}$
 - (e) $\frac{1}{x\sqrt{1-x^2}}$

4. An certain electronic circuit is modeled by the function $f(x) = 4x^2 + 3x - 1$. The input power source at $x = 2$ volts fluctuates by ± 0.1 volt. What is the resulting range of outputs for the circuit?
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5. The derivative of $f(x) = \frac{\ln x}{\tan x}$ is

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- (b) $\frac{(1/x)}{\sec^2 x}$
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- (a) $\frac{2x \cos y}{x^2 \sec y \tan y - 3y^2}$
- (b) $\frac{2x \sec y}{3y^2 - x^2 \sec y \tan y}$
- (c) $\frac{3y^2 - x^2 \tan^2 y}{2x \sec y}$
- (d) $\frac{3y^2 + x^2 \sec y \tan y}{2x \cos y}$
- (e) $\frac{3y^2 + x^2 \sec y \tan y}{2x \tan y}$

7. The derivative of $f(x) = \arctan(e^x)$ is

- (a) $\frac{1}{1+e^{2x}} e^x$
- (b) $\frac{1}{\sqrt{1-e^{2x}}} e^x$
- (c) $\frac{1}{1+x^2} e^x$
- (d) $\frac{1}{x\sqrt{1-(e^x)^2}} e^x$

1. The integral $\int \cos x \, dx$ is

Answer: $-\sin x + C$

2. The integral $\int \frac{1}{1+4x^2}$ is

Answer: $\frac{1}{2} \arctan 2x + C$

3. The integral $\int \sec^2 x \, dx$ is

Answer: $\tan x + C$