Jan Mikhail Alexei Ong **MATH_203_WINTER_2020**

Assignment Assignment_6 due 02/22/2020 at 11:59pm EST

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1. (1 point)

Differentiate $y = \sec x \tan x$.

$y' =$ _____

Correct Answers:

- `(sec(x))^3+sec(x)*(tan(x))^2`

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2. (1 point)

For what values of x in $[0, 2\pi]$ does the graph of $y = \frac{\cos x}{2+\sin x}$ have a horizontal tangent? List the smaller value of x first.

$x =$_____

$x =$_____

Correct Answers:

- `7*pi/6`
- `11*pi/6`

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3. (1 point)

An object with weight W is dragged along a horizontal plane by a force acting along a rope attached to the object. If the rope makes an angle t with the plane, then the magnitude of the force is $F = \frac{\mu W}{\mu \sin t + \cos t}$, where μ is a constant called the coefficient of friction. Let $W = 50$ lb and $\mu = .6$.

(a) Find the rate of change of F with respect to t.
(b) When is this rate of change equal to zero? Round your answer to the nearest hundredth.

$F'(t) =$ _____

$t =$_____ rad.

Correct Answers:

- `30*(sin(t)-.6*cos(t))/(.6*sin(t)+cos(t))^2`
- `0.54`

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4. (1 point) Let

$$f(x) = \sqrt{\cos(e^{x^5 \sin(x)})}$$

$f'(x) =$ _____

Correct Answers:

- `-1/2*(cos(2.71828182845905^(x^5*sin(x))))^(-1/2) * sin(2.71828182845905^(x^5*sin(x))) * 2.71828182845905^(x^5*sin(x)) * (5*x^(5-1)*sin(x) + x^5*cos(x))`

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5. (1 point) Let

$$f(x) = -6e^{x \cos x}$$

$f'(x) =$ _____

Correct Answers:

- `-6*2.71828^[x*cos(x)]*[cos(x)-x*sin(x)]`

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6. (1 point) If

$$f(x) = \cos(\sin(x^4)),$$

then $f'(x) =$ _____

Correct Answers:

- `-sin(sin(x^4))*cos(x^4)*4*x^3`

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7. (1 point) Let

$$f(x) = \sin \frac{1}{x}.$$

$f'(x) =$ _____.

Let

$$g(x) = \frac{1}{\sin x}.$$

$g'(x) =$ _____.

Correct Answers:

- `-cos(1/x)/(x*x)`
- `-cos(x)/sin(x)**2`

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8. (1 point) Match the functions and their derivatives:

___1. $y = \cos(\tan(x))$
___2. $y = \sin(x)\tan(x)$
___3. $y = \cos^3(x)$
___4. $y = \tan(x)$

A. $y' = \sin(x) + \tan(x)\sec(x)$
B. $y' = -3\cos^3(x)\tan(x)$
C. $y' = -\sin(\tan(x))/\cos^2(x)$
D. $y' = 1 + \tan^2(x)$

Correct Answers:

- `C`
- `A`
- `B`
- `D`

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9. (1 point)

Differentiate $y = \sqrt{x + \sqrt{x + \sqrt{x}}}$.

$y' =$ _____

Correct Answers:

- `(1/2)(x+(x+x^(1/2))^(1/2))^(-1/2) (1+(1/2)(x+x^(1/2))^(-1/`

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10. (1 point) Let $f(x) = \dfrac{\tan(x) - 4}{\sec(x)}$. Find the following:

1. $f'(x)$ = _____
2. $f'(4)$ = _____

Correct Answers:

- `([sec(x)]^2*sec(x)-[tan(x)-4]*sec(x)*tan(x))/([sec(x)]^2)`
- `-3.68085`