

1. (1 pt) Find the derivative of  $f(x) = x^5 \cos x$

$f'(x) =$  \_\_\_\_\_

SOLUTION:

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Using the product rule,

$$f'(x) = 5x^4 \cos(x) - x^5 \sin(x)$$

Answer(s) submitted:

- $(x^4)(5\cos(x) - x\sin(x))$

(correct)

Correct Answers:

- $5x^4 \cos(x) - x^5 \sin(x)$

2. (1 pt)

Let  $f(x) = \frac{5}{2x+3}$ .

$f'(x) =$  \_\_\_\_\_

Answer(s) submitted:

- $(-10) / ((2x+3)^2)$

(correct)

Correct Answers:

- $-5/2 / (2x+3)^2$

3. (1 pt) Let  $f(x) = (7x - 7x^3)(5 + \sqrt{x})$ . Find  $f'(x)$ .  
 $f'(x) =$  \_\_\_\_\_

Answer(s) submitted:

- $(-7/2)(7x^{5/2} + 30x^2 - 3\sqrt{x}) - 10$

(correct)

Correct Answers:

- $(7-3*7*(x)**2)*(5+\sqrt{x})+(7*x-7*x**3)*(1/(2*\sqrt{x}))$

4. (1 pt) If  $f(x) = \cos x - 7 \tan x$ , then  
 $f'(x) =$  \_\_\_\_\_

Answer(s) submitted:

- $-\sin(x) - 7(\sec(x))^2$

(correct)

Correct Answers:

- $-\sin(x) - 7*(\sec(x))^2$

5. (1 pt) If  $f(t) = (t^2 + 6t + 4)(2t^{-2} + 5t^{-3})$ , find  $f'(t)$ .

Answer: \_\_\_\_\_

Answer(s) submitted:

- $-(17t^2 + 76t + 60) / (t^4)$

(correct)

Correct Answers:

- $(2*t+6)*(2*t^(-2) + 5*t^(-3)) + (t^2 + 6*t+4)*(-2*2*t^(-3) -$

6. (1 pt) If

$$f(x) = \frac{7-x^2}{7+x^2}$$

find  $f'(x)$ .

Find  $f'(3)$ .

Answer(s) submitted:

- $-(28x) / ((x^2+7)^2)$
- $-21/64$

(correct)

Correct Answers:

- $(-2*x*(7+x**2) - (7-x**2)*2*x) / ((7+x**2)**2)$
- $-0.328125$

7. (1 pt) If

$$f(x) = \frac{\sqrt{x}-2}{\sqrt{x}+2}$$

find  $f'(x)$ .

Find  $f'(2)$ .

Answer(s) submitted:

- $2/((\sqrt{x} + 2)^2 (\sqrt{x}))$
- $(3/\sqrt{x}(2)) - 2$

(correct)

Correct Answers:

- $(2/\sqrt{x}) / ((\sqrt{x} + 2)**2)$
- $0.121320343559643$

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8. (1 pt) Let  $f(x) = 3x(\sin(x) + \cos(x))$ . Find the following:

1.  $f'(x) =$  \_\_\_\_\_

2.  $f'(\frac{\pi}{4}) =$  \_\_\_\_\_

Answer(s) submitted:

- $3(-x\sin(x) + \sin(x) + x\cos(x) + \cos(x))$
- $3\sqrt{2}$

(correct)

Correct Answers:

- $3[\sin(x) + \cos(x)] + 3x[\cos(x) - \sin(x)]$
- 4.24264

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9. (1 pt) Let  $f(x) = \frac{-3x}{\sin(x) + \cos(x)}$ . Evaluate  $f'(x)$  at  $x = -\pi$ .

$f'(-\pi) =$  \_\_\_\_\_

Answer(s) submitted:

- $3(1+\pi)$

(correct)

Correct Answers:

- 12.4248

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10. (1 pt) If

$$f(x) = \frac{4x^2 \tan x}{\sec x},$$

find  $f'(x)$ .

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Find  $f'(4)$ .

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Answer(s) submitted:

- $4x(2\sin(x) + x\cos(x))$
- $32(\sin(4) + 2\cos(4))$

(correct)

Correct Answers:

- $4(2x^2\sin(x) + x^3\cos(x))$
- -66.0508715851249

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11. (1 pt) If  $f(x) = \frac{6x^5 - 3x^4 + 4x^3}{x^4}$ , find  $f'(x)$ .

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Answer(s) submitted:

- $6 - (4/x^2)$

(correct)

Correct Answers:

- $6 - 4/x^2$

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12. (1 pt) Differentiate

$$f(x) = \tan x(5 \sin x + 7 \cos x).$$

$f'(x) =$  \_\_\_\_\_

Answer(s) submitted:

- $\sin(x)(5-7\tan(x)) + (5\tan(x)+7)\sec(x)$

(correct)

Correct Answers:

- $(\sec(x))^2(5\sin(x) + 7\cos(x)) + \tan(x)(5\cos(x) - 7\sin(x))$

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13. (1 pt) Find an equation for the line tangent to the graph of

$$f(x) = \frac{\sqrt{x}}{6x-6}$$

at the point  $(3, f(3))$ .

$y =$  \_\_\_\_\_

Answer(s) submitted:

- $(1/(2\sqrt{3})) - (x/(12\sqrt{3}))$

(correct)

Correct Answers:

- $\sqrt{3}/(-6+6*3) + -0.0481125224324688*(x-3)$

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14. (1 pt)

Find the equation of the tangent line to the curve

$$y = 5x \cos x$$

at the point  $(\pi, -5\pi)$ .

The equation of this tangent line can be written in the form  $y = mx + b$  where

$m =$  \_\_\_\_\_

and  $b =$  \_\_\_\_\_

Answer(s) submitted:

- -5
- 0

(correct)

Correct Answers:

- -5
- 0

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15. (1 pt) Let  $f(x) = 5 \sec x$ .

Then  $f''(\pi/5)$  is \_\_\_\_\_

Answer(s) submitted:

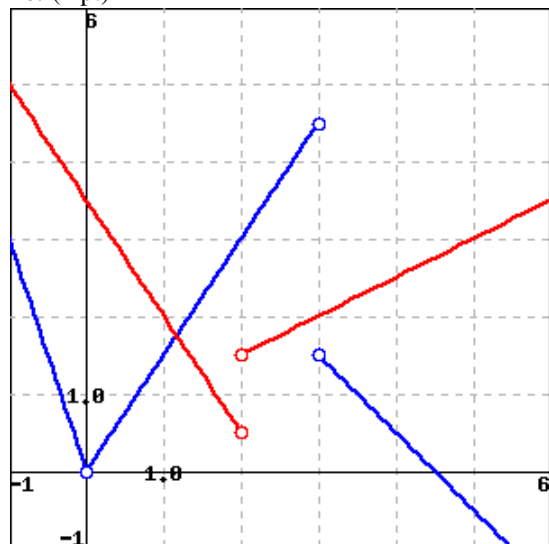
- $(75\sqrt{5}) - 155$

(correct)

Correct Answers:

- 12.7050983124842

16. (1 pt)



**Note: Click on graph for larger version in new browser window.**

The graphs of the function  $f$  (given in blue) and  $g$  (given in red) are plotted above. Suppose that  $u(x) = f(x)g(x)$  and  $v(x) = f(x)/g(x)$ . Find each of the following:

$u'(1) = \underline{\hspace{2cm}}$

$v'(1) = \underline{\hspace{2cm}}$

Answer(s) submitted:

- 3/4
- 21/16

(correct)

Correct Answers:

- 0.75
- 1.3125