

1. (1 pt) Let

$$f(x) = \sqrt{2x^2 + 4x + 4}$$

$$f'(x) = \underline{\hspace{2cm}}$$

$$f'(5) = \underline{\hspace{2cm}}$$

Answer(s) submitted:

- $(x+1) / ((\sqrt{x^2/2} + x + 1))$
- $6\sqrt{2/37}$

(correct)

Correct Answers:

- $(0.5 * (2 * x^2 + 4 * x + 4)^{-0.5}) * (2 * 2 * x + 4)$
- $(0.5 * (2 * 5^2 + 4 * 5 + 4)^{-0.5}) * (2 * 2 * 5 + 4)$

2. (1 pt) Let $f(x) = (5x + 6)^{-1}$.

$$f'(x) = \underline{\hspace{2cm}}$$

$$f'(3) = \underline{\hspace{2cm}}$$

Answer(s) submitted:

- $(-5) / ((5x+6)^2)$
- $-(5/441)$

(correct)

Correct Answers:

- $(-1 * (5 * x + 6)^{-1-1}) * (5)$
- $(-1 * (5 * 3 + 6)^{-1-1}) * (5)$

3. (1 pt) Let

$$y = \sqrt{6 - 2 \tan x}$$

$$\frac{dy}{dx} = \underline{\hspace{2cm}}$$

Answer(s) submitted:

- $-((\sec^2(x)) / (\sqrt{6 - (2 \tan(x))}))$

(correct)

Correct Answers:

- $-2/2 * (\sec(x))^2 * (6 - 2 * \tan(x))^{-.5}$

4. (1 pt) Let $f(x) = 2 \sin(2x - 2)$. Find $f'(x)$.

$$f'(x) = \underline{\hspace{2cm}}$$

Answer(s) submitted:

- $4 \cos(2 - 2x)$

(correct)

Correct Answers:

- $2 * 2 * \cos(2 * x - 2)$

5. (1 pt) Let $f(x) = 7 \sin^2 x$.

$$f'(x) = \underline{\hspace{2cm}}$$

Answer(s) submitted:

- $7 \sin(2x)$

(correct)

Correct Answers:

- $7 * 2 * (\sin(x))^{(2 - 1)} * \cos(x)$

6. (1 pt) Match the functions and their derivatives:

___1. $y = \cos^3(x)$

___2. $y = \cos(\tan(x))$

___3. $y = \tan(x)$

___4. $y = \sin(x) \tan(x)$

A. $y' = -3 \cos^3(x) \tan(x)$

B. $y' = \sin(x) + \tan(x) \sec(x)$

C. $y' = 1 + \tan^2(x)$

D. $y' = -\sin(\tan(x)) / \cos^2(x)$

Answer(s) submitted:

- A
- D
- C
- B

(correct)

Correct Answers:

- A
- D
- C
- B

7. (1 pt) Let

$$f(x) = 4 \csc(2x)$$

$$f'(x) = \underline{\hspace{2cm}}$$

Answer(s) submitted:

- $-8 \cot(2x) \csc(2x)$

(correct)

Correct Answers:

- $-4 * 2 / (\tan(2 * x) * \sin(2 * x))$

8. (1 pt) Let

$$f(x) = (-4x^2 + 3)^4(6x^2 + 6)^{12}$$

$$f'(x) = \underline{\hspace{2cm}}$$

Answer(s) submitted:

- $17414258688x(x^2+1)^{11} (4x^2 - 3)^3 (16x^2 - 5)$

(correct)

Correct Answers:

$$\bullet (-4x^2+3)^3 \cdot (6x^2+6)^{11} \cdot (-768x^3 + 240x)$$

9. (1 pt) Let

$$f(x) = 8\cos(\sin x)$$

$$f'(x) = \underline{\hspace{2cm}}$$

Answer(s) submitted:

$$\bullet -8\sin(\sin(x))\cos(x)$$

(correct)

Correct Answers:

$$\bullet -8\sin(\sin(x))\cos(x)$$

10. (1 pt) If $f(t) = (6t - \frac{6}{t})^{\frac{2}{5}}$, find $f'(t)$.

Answer(s) submitted:

$$\bullet (2((6/t^2)+6))/(9(6t - (6/t))^{(7/9)})$$

(correct)

Correct Answers:

$$\bullet 2/9 \cdot (6t - 6/t)^{(2/9-1)} \cdot (6 + 6/(t^2))$$

11. (1 pt) Let

$$f(x) = \frac{9x}{\sqrt{9-2x}}$$

$$f'(x) = \underline{\hspace{2cm}}$$

Answer(s) submitted:

$$\bullet -(9(x-9)) / ((9-2x)^{(3/2)})$$

(correct)

Correct Answers:

$$\bullet (9 \cdot (9-2x) + 9 \cdot 2x/2) / (9-2x)^{(3/2)}$$

12. (1 pt) Let

$$y = (5 + \cos^2 x)^6$$

$$\frac{dy}{dx} = \underline{\hspace{2cm}}$$

Answer(s) submitted:

$$\bullet -12\sin(x)\cos(x)((\cos^2(x) + 5)^5)$$

(correct)

Correct Answers:

$$\bullet -2\cos(x)\sin(x) \cdot 6 \cdot (5 + (\cos(x))^2)^{(6-1)}$$

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

$$y = \sin(7x) + \cos(6x)$$

at the point $(\frac{\pi}{6}, y(\frac{\pi}{6}))$. Tangent line:

$$y = \underline{\hspace{2cm}}$$

Answer(s) submitted:

$$\bullet ((-7\sqrt{3})/2) + ((7\pi)/(4\sqrt{3})) - (3/2)$$

(correct)

Correct Answers:

$$\bullet \sin(7\pi/6) + \cos(6\pi/6) + (7\cos(7\pi/6) - 6\sin(6\pi/6))(x - \pi/6)$$

14. (1 pt) Let $f(x) = 4x^2 \cos(6x)$.

Then $f'(x)$ is _____

and $f'(3)$ is _____

$f''(x)$ is _____

and $f''(3)$ is _____

Answer(s) submitted:

$$\bullet 8x(\cos(6x) - 3x\sin(6x))$$

$$\bullet 24(\cos(18) - 9\sin(18))$$

$$\bullet 8(1 - 18x^2)\cos(6x) - 12x\sin(6x)$$

$$\bullet -8(36\sin(18) + 161\cos(18))$$

(correct)

Correct Answers:

$$\bullet 2 \cdot 4x^2 \cos(6x) - 4 \cdot (x^2) \sin(6x) \cdot 6$$

$$\bullet 178.06084630054$$

$$\bullet 2 \cdot 4 \cos(6x) - 4 \cdot 4x \sin(6x) \cdot 6 - 4 \cdot (x^2) \cos(6x) \cdot (6^2)$$

$$\bullet -634.203593148133$$

15. (1 pt) A table of values for f , g , f' , and g' is given below.

x	f(x)	g(x)	f'(x)	g'(x)
1	3	2	2	1
2	1	2	2	2
3	1	2	3	3

(A) If $h(x) = f(g(x))$, then $h'(1) = \underline{\hspace{2cm}}$

(B) If $H(x) = g(f(x))$, then $H'(2) = \underline{\hspace{2cm}}$

Answer(s) submitted:

$$\bullet 2$$

$$\bullet 2$$

(correct)

Correct Answers:

$$\bullet 2$$

$$\bullet 2$$

16. (1 pt) Suppose that

$$f(x) = \frac{5x}{(1-4x)^4}.$$

Find an equation for the tangent line to the graph of f at $x = 2$.

Tangent line: $y =$ _____

Answer(s) submitted:

- $(320/16807) - (125x/16807)$

(correct)

Correct Answers:

- $-0.00743737728327483*(x-2) + 0.0041649312786339$

17. (1 pt) A Cepheid variable star is a star whose brightness alternately increases and decreases. Suppose that Cephei Joe is a star for which the interval between times of maximum brightness is 4.6 days. Its average brightness is 4.1 and the brightness changes by ± 0.65 . Using this data, we can construct a mathematical model for the brightness of Cephei Joe at time t , where t is measured in days:

$$B(t) = 4.1 + 0.65 \sin(2\pi t/4.6)$$

(a) Find the rate of change of the brightness after t days.

Rate of change = _____

(b) Find, correct to two decimal places, the rate of increase after one day.

Rate of increase = _____

Answer(s) submitted:

- $0.888\cos(1.36591t)$
- 0.180669

(correct)

Correct Answers:

- $0.65*2*\pi/4.6*\cos(2*\pi*t/4.6)$
- $0.65*2*\pi/4.6*\cos(2*\pi/4.6)$

18. (1 pt) Find the 20 th derivative of $y = \cos(3x)$.

Answer: _____

Answer(s) submitted:

- $3486784401\cos(3x)$

(correct)

Correct Answers:

- $(3**(20))*\cos(3*x)$