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19. (5 points) Library/Union/setDervChainRule/ur\_dr\_5\_18.pg  
Let  $f(x) = 2e^{x\cos(x)}$ . Find  $f'(x)$ .

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

Correct Answers:

- $2 * e^{[x * \cos(x)]} * [\cos(x) - x * \sin(x)]$

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Let  $f(x) = x^3 + 2x - 1$  and let  $g$  be the inverse function to  $f$ . Find  $g(2)$  and  $g'(2)$ .

- A.  $g(2) = 11, g'(2) = 1/10$
- B.  $g(2) = 1, g'(2) = 5$
- C.  $g(2) = 1, g'(2) = 1/5$
- D.  $g(2) = 11, g'(2) = 10$
- E.  $g(2) = -1, g'(2) = 2$

Correct Answers:

- C

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Let  $p(x) = ax^2 + bx$ . Find values of  $a$  and  $b$  so that  $p'(2) = 2$  and  $p''(1) = 2$ .

- A.  $a = 2, b = 1$
- B.  $a = 1, b = 2$
- C.  $a = 1, b = -2$
- D.  $a = 2, b = -6$
- E.  $a = 2, b = 2$

Correct Answers:

- C

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Suppose that  $y(t)$  solves  $y'(t) = ky(t)$ , where  $k$  is a constant. If  $y(0) = 3$  and  $y(2) = 9$ , what is  $y(6)$ ?

- A. 72
- B. 42
- C. 81
- D. 27
- E. 9

Correct Answers:

- C

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Find  $f'(x)$  if  $f(x) = 2 \tan^{-1}(\sqrt{x}) = 2 \arctan(\sqrt{x})$ .

- A.  $f'(x) = \frac{2}{1-x}$
- B.  $f'(x) = \frac{2}{1+x}$
- C.  $f'(x) = \frac{1}{\sqrt{x}(1+x)}$
- D.  $f'(x) = \frac{1}{\sqrt{x}(1-x)}$
- E.  $f'(x) = \frac{2}{\sqrt{x}(1+x)}$

*Correct Answers:*

- C

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**17. (5 points)** Library/Valdosta/APEX\_Calculus/2.4/APEX\_2.4\_26.pg  
Compute the derivative of the given function.

$$g(t) = -2t^7 e^t + 2 \sin t \cos t$$

$$g'(t) = \underline{\hspace{2cm}}.$$

*Correct Answers:*

- $-2 t^6 (7 + t) e^t + 2 (\cos(t))^2 - 2 (\sin(t))^2$

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If the function  $f$  satisfies  $f'(3) = 4$  and  $f(3) = 5$  and  $g(x) = (x^2 + 1)f(x)$ , find  $g'(3)$ .

- A. 60
- B. 50
- C. 70
- D. 40
- E. 30

*Correct Answers:*

- C

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What is  $\lim_{x \rightarrow 0} \frac{\sin(7x) \cos(2x^2)}{2x}$ ?

- A. 7
- B.  $1/2$
- C.  $7/2$
- D. 0
- E. 1

*Correct Answers:*

- C

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Let  $f(x) = \frac{\sin x}{2+x^2}$ . What is  $f'(0)$ ?

- A.  $-1$
- B.  $2$
- C.  $1/2$
- D.  $0$
- E.  $1$

*Correct Answers:*

- C

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The height in meters of a ball at time  $t$  seconds is given by  $h(t) = -5t^2 + 80$ . Find the velocity of the ball at the instant when it hits the ground.

- A.  $-50$  meters per second
- B.  $-35$  meters per second
- C.  $-40$  meters per second
- D.  $-30$  meters per second
- E.  $-45$  meters per second

*Correct Answers:*

- C

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What is the slope of the tangent line to the graph of the curve given by the equation  $y^6 - x^3y = 2$  at the point  $(-1, 1)$ ?

- A.  $7/3$
- B.  $3/5$
- C.  $3/7$
- D.  $0$
- E.  $1/2$

*Correct Answers:*

- C

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Find the value of  $a$  so that the tangent line to the graph of  $f(x) = \ln(x^2 + a)$  at the point  $(1, f(1))$  has slope  $1/2$ .

- A.  $0$
- B.  $1$
- C.  $3$
- D.  $-1$
- E. None of the above

*Correct Answers:*

- C

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**20. (5 points)** Library/ASU-topics/setDerivativeBasicFunctions/3-4-85.pg

A person  $x$  inches tall has a pulse rate approximately given by the function

$$y = 600x^{-1/2}.$$

The instantaneous rate of change of the pulse rate for a person that is:

(A) 30 inches tall = \_\_\_\_\_

(B) 61 inches tall = \_\_\_\_\_

*Correct Answers:*

- -1.82574185835055
- -0.629689573440472

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Two cars start moving from the same point. One travels south at 80 mi/h and the other travels west at 60 mi/h. At what rate is the distance between the cars increasing three hours later?

- A. 50 mi/h
- B. 150 mi/h
- C. 100 mi/h
- D. 200 mi/h
- E. None of the above

*Correct Answers:*

- C

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Let  $f$  and  $g$  be two functions, and  $h(x) = f(g(x))$ . If  $g(2) = 3$ ,  $g'(2) = 5$ ,  $f(2) = 7$ ,  $f'(2) = 1$ ,  $f(3) = -1$  and  $f'(3) = -2$ , what is  $h'(2)$ ?

- A. -1
- B. 3
- C. -10
- D. 5
- E. 38

*Correct Answers:*

- C

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**18. (5 points)** Library/UMN/calculusStewartCCC/s\_3\_3\_30.pg

Suppose that  $f(\frac{\pi}{2}) = -8$  and  $f'(\frac{\pi}{2}) = 7$ , and let  $g(x) = f(x) \sin x$  and  $h(x) = \frac{\cos x}{f(x)}$ . Answer the following questions.

1. Find  $g'(\frac{\pi}{2})$ .

Answer:  $g'(\frac{\pi}{2}) =$  \_\_\_\_\_

2. Find  $h'(\frac{\pi}{2})$ .

Answer:  $h'(\frac{\pi}{2}) =$  \_\_\_\_\_

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*Correct Answers:*

- $7\sin(\pi/2) + 8\cos(\pi/2)$
- $[-8\sin(\pi/2) + 7\cos(\pi/2)] / [(-8)^2]$

**16. (5 points)** Library/ASU-topics/setDerivativeFunction/3-3-05.pg

Suppose that

$$f(x+h) - f(x) = -8hx^2 - 7hx + 4h^2x - 5h^2 + 7h^3.$$

Find  $f'(x)$ .

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

Correct Answers:

- $-8x^2 + -7x$

The size of a population is given by the function  $P(t) = 1000 \cdot e^{0.04t}$ . Find the time  $t$  when the population is 3000. Round your answer to one decimal place.

- A. 24.2
- B. 36.1
- C. 27.5
- D. 17.2
- E. 34.7

Correct Answers:

- C

Find the instantaneous rate of change of the volume of a sphere with respect to its radius  $r$  when  $r = \sqrt{3}$ . Recall that the volume of a sphere is  $V = \frac{4}{3}\pi r^3$ .

- A.  $3\pi$
- B.  $4\pi$
- C.  $12\pi$
- D.  $6\pi$
- E. None of the above

Correct Answers:

- C

Let  $f(x) = |2x - 4|$ . Find all the points  $c$  where  $f'(c)$  does not exist.

- A. 0
- B. 1
- C. 2
- D. 0 and 2
- E. There are no such points.

Correct Answers:

- C