David Royster **MA113F20**
Assignment Exam02 due 10/13/2020 at 10:00pm EDT

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19. **(5 points)** `Library/Union/setDervChainRule/ur_dr_5_18.pg`
Let $f(x) = 2e^{x\cos(x)}$. Find $f'(x)$.

$f'(x) =$ ______________________

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. $g(2) = -1$, $g'(2) = 2$

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. $a = 2$, $b = 2$

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

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

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

17. **(5 points)** `Library/Valdosta/APEX_Calculus/2.4/APEX_2.4_26.pg`
Compute the derivative of the given function.

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

$g'(t) =$____________.

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

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

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

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

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

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

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. $1/2$

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

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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 = ______________

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

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

18. **(5 points)** `Library/UMN/calculusStewartCCC/s_3_3_30.pg`
Suppose that $f\left(\frac{\pi}{2}\right) = -8$ and $f'\left(\frac{\pi}{2}\right) = 7$, and let $g(x) = f(x)\sin x$ and $h(x) = \dfrac{\cos x}{f(x)}$. Answer the following questions.

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1. Find $g'(\pi/2)$.
Answer: $g'(\pi/2) =$ ______
2. Find $h'(\pi/2)$.
Answer: $h'(\pi/2) =$ ______

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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 $f'(x)$.

$f'(x) =$ ______

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

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 $V = \dfrac{4}{3}\pi r^3$.

- A. 3π
- B. 4π
- C. 12π
- D. 6π
- E. None of the above

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.

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