

Round to 3 decimal places. Show all work.

1. If  $h$  is the function defined by  $h(x) = \ln(e^x + x^e)$ , what is the slope of the line tangent to  $h$  at  $x = 2$ ?

- (A) 0.072  
(B) 0.666  
(C) 1.000  
(D) 1.029  
(E) 1.169
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2. Let  $f$  be the function given by  $f(x) = 3\ln(2x)$  and let  $g$  be a function given by  $g(x) = x^3 + 2x$ . At what value of  $x$  do the graphs of  $f$  and  $g$  have parallel tangent lines?

- (a) -0.781                      (b) -0.301                      (c) 0.521  
(d) 0.782                      (e) 1.000
- 

3. If  $f(x) = \frac{x}{\ln(3x)}$ , then what is the interval of decreasing?

2. (1, 3)    (b) (1,  $3e$ )    (c)  $\left(0, \frac{1}{3}\right)$     (d)  $\left(0, \frac{1}{3}e\right)$     (e)  $\left(1, \frac{1}{3}e\right)$
-

4.  $\lim_{x \rightarrow 1} \frac{\ln x^2}{x^2 - 1}$  is

- (a) -1                      (b) 0                      (c) 1                      (d)  $e$                       (e) undefined
- 

(a) The equation of the line **normal** to  $y = 2x\sqrt{x^2 + 8} + 2$  at  $(0, 2)$  is

- (a)  $x - 4\sqrt{2}y = -8\sqrt{2}$   
(b)  $x + 4\sqrt{2}y = 8\sqrt{2}$   
(c)  $4\sqrt{2}x + y = 2$   
(d)  $4\sqrt{2}x - y = -2$   
(e)  $x + 4\sqrt{2}y = 2$
- 

6. If  $e^{x+y} = y$ , then  $\frac{dy}{dx} =$

- (a)  $\frac{e^{x+y}}{1 - e^{x+y}}$                       (b)  $\frac{e^{x+y}}{1 + e^{x+y}}$                       (c)  $\frac{e^{x+y}}{e^{x+y} - 1}$   
(d)  $e^{x+y}$                       (e)  $2e^{x+y}$
- 

7. Let  $f(x) = \frac{e^x}{x}$  on  $x \in (0, \infty)$ . The minimum value attained by  $f(x)$  is

- (a) 1                      (b)  $e$                       (c)  $\frac{1}{e}$                       (d)  $e - 1$                       (e)  $\frac{1}{e^2}$
-

PreCalculus Honors '15-16

Name: \_\_\_\_\_

Dr. Quattrin

Rational Functions Test -- CALCULATOR ALLOWED

Round to 3 decimal places.

Score \_\_\_\_\_

Show all work.

1. Find domain and zeros of  $y = \left(-\frac{1}{2}x^2\right)\sqrt{16-x^2}$ . Show the algebraic work to support the zeros.

2. Find the extreme points of  $y = \left(-\frac{1}{2}x^2\right)\sqrt{16-x^2}$ . Show the algebraic work to support the critical values.

3. Find domain and zeros of  $y = \left(x - \frac{1}{2}x^2\right)e^{-x}$ . Show the algebraic work to support the zeros.

4. Find the extreme points of  $y = \left(x - \frac{1}{2}x^2\right)e^{-x}$ . Show the algebraic work to support the critical values.

PreCalculus Honors '15-16

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Dr. Quattrin

Rational Functions Test – NO CALCULATOR ALLOWED

Show all work.

4.  $\frac{d}{dx} \left[ \ln \sqrt[7]{e^{5x^4}} \right]$

5.  $D_x \left[ (4x-3)^5 (5x^2+3)^6 \right]$

7. Find the traits and **sketch**  $y = \left(-\frac{1}{2}x^2\right)\sqrt{16-x^2}$  .

Domain:

Range:

Y – Int:

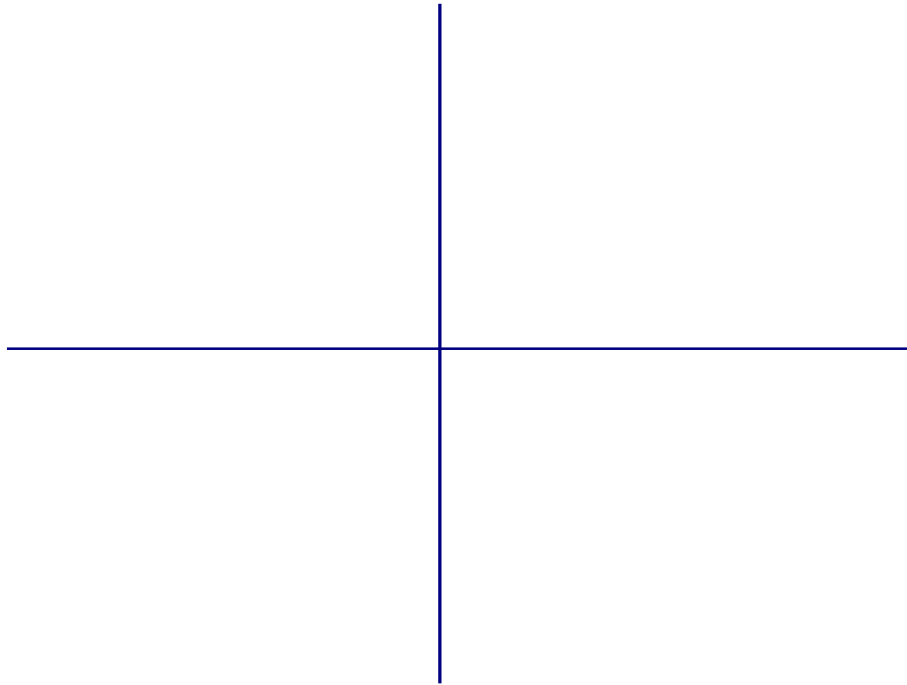
End Behavior:

Vas:

POEs:

Zeros:

Extreme Values:



8. Find the traits and **sketch** of  $y = \left(x - \frac{1}{2}x^2\right)e^{-x}$ .

Domain:

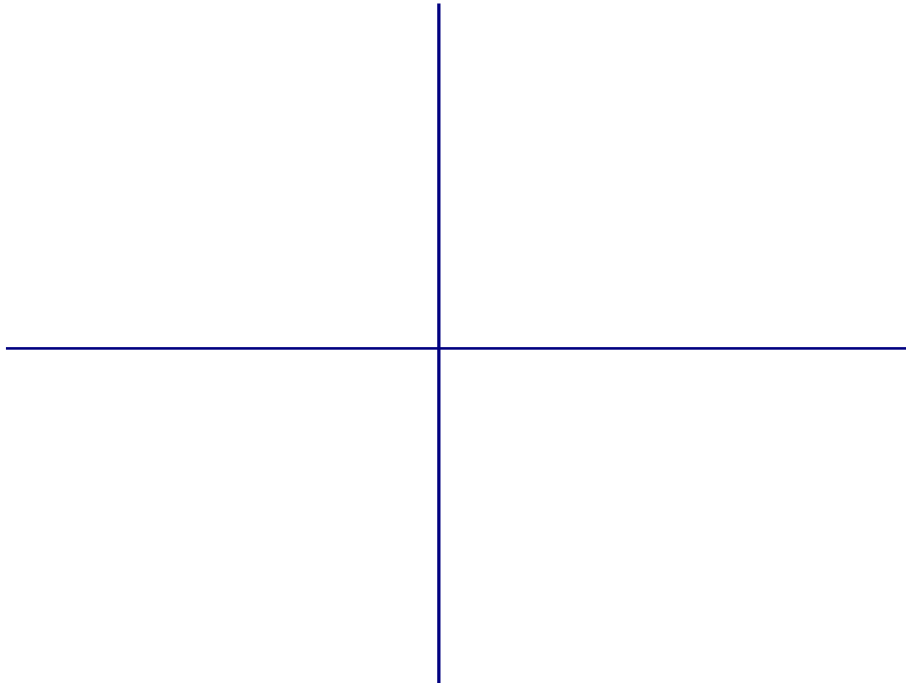
Range:

Y – Int:

End Behavior:

Zeros:

Extreme Values:



9. Find the traits and **sketch** of  $y = \begin{cases} \left(-\frac{1}{2}x^2\right)\sqrt{16-x^2}, & \text{if } x \leq 0 \\ \left(x - \frac{1}{2}x^2\right)e^{-x}, & \text{if } 0 \leq x \end{cases}$ .

Domain:

Range:

$Y$  – Int:

End Behavior:

Zeros:

Extreme Values:

Discontinuities:

Non-Differentiabilities:

