

Round to 3 decimal places. Show all work.

1. Which of the following sign patterns apply to the equation

$$f(x) = x^4 - 2x^2 - 8?$$

I. 
$$\begin{array}{cccccccc} & + & 0 & - & 0 & + & 0 & - & 0 & + \\ y & \longleftarrow & & & & & & & & \longrightarrow \\ x & & -2 & & -\sqrt{2} & & \sqrt{2} & & 2 & \end{array}$$

II. 
$$\begin{array}{ccccccc} & - & 0 & + & 0 & - & 0 & + \\ f'(x) & \longleftarrow & & & & & & \longrightarrow \\ x & & -1 & & 0 & & 1 & \end{array}$$

III. 
$$\begin{array}{ccccccc} & + & 0 & - & 0 & + \\ f(x) & \longleftarrow & & & & & \longrightarrow \\ x & & -2 & & 2 & & \end{array}$$

- a) I only                      b) II only                      c) III only  
 d) I and II only              e) II and III only

2. Give the approximate location of a local maximum for the function

$$f(x) = 2x^3 + 2x^2 - 4x$$

- a) (-1.215, -1.262)    b) (-1.215, 4.174)    c) (0.549, -1.211)  
 d) (-1.215, 4.224)    e) (0.549, -1.262)

3. A particle is moving such that its velocity is described by  $v(t) = t^2 - t^4$ .

When does the particle reach its maximum acceleration?

- a)  $t = 0$                       b)  $t = \frac{1}{\sqrt{2}}$                       c)  $t = -\frac{1}{\sqrt{2}}$
- d)  $t = \frac{1}{\sqrt{6}}$                       e)  $t = -\frac{1}{\sqrt{6}}$
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4. Find the locations of the **absolute** extreme values of  $g(x) = x^3 - 3x^2 + 1$  on the interval  $x \in [-1, 4]$ .

- a) Absolute maximum at  $x = 0$ , Absolute minimum at  $x = 2$
- b) No absolute maximum, Absolute minimum at  $x = 1$
- c) Absolute maximum at  $x = 0$  and  $4$ , Absolute minimum at  $x = -1$  and  $2$
- d) Absolute maximum at  $x = 4$ , Absolute minimum at  $x = 0$ ,  $2$
- e) Absolute maximum at  $x = 4$ , Absolute minimum at  $x = -1$  and  $2$
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5. The minimum value of  $f(x) = \frac{2}{\sqrt{x}} + 3\sqrt{x}$  is

- a)  $\frac{2\sqrt{6}}{3}$       b)  $\frac{2}{3}$       c)  $\frac{\sqrt{6}}{3}$       d)  $2\sqrt{6}$       e) *dne*
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6. Find the  $x$ -value of the point on the graph of  $y = x^2 + x + 2$  on  $x \in [1, 3]$  at which the tangent to the graph has the same slope as the line through  $(1, 4)$  and  $(3, 15)$ .

- (a)  $x = \frac{1}{2}$   
(b)  $x = \frac{5}{4}$   
(c)  $x = \frac{3}{2}$   
(d)  $x = 2$   
(e)  $x = \frac{9}{4}$
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7. Given this sign pattern  $f'(x)$   $\leftarrow \begin{array}{ccc} - & 0 & + \\ & -3 & 1 \end{array} \rightarrow$ , which of the following might be the sign pattern of  $f(x)$ ?

a)  $f(x)$   $\leftarrow \begin{array}{ccc} + & 0 & - \\ & -5 & -1 \end{array} \rightarrow$

b)  $f(x)$   $\leftarrow \begin{array}{ccc} - & 0 & + \\ & -5 & -1 \end{array} \rightarrow$

c)  $f(x)$   $\leftarrow \begin{array}{ccc} - & 0 & + \\ & -3 & -1 \end{array} \rightarrow$

d)  $f(x)$   $\leftarrow \begin{array}{ccc} + & 0 & - \\ & -3 & -1 \end{array} \rightarrow$

e)  $f(x)$   $\leftarrow \begin{array}{ccc} + & 0 & - \\ & -3 & -1 \end{array} \rightarrow$

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**Honors PreCalculus '17-18**

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

Dr. Quattrin

Polynomials Test-- CALCULATOR ALLOWED

Round to 3 decimal places.

Score \_\_\_\_\_

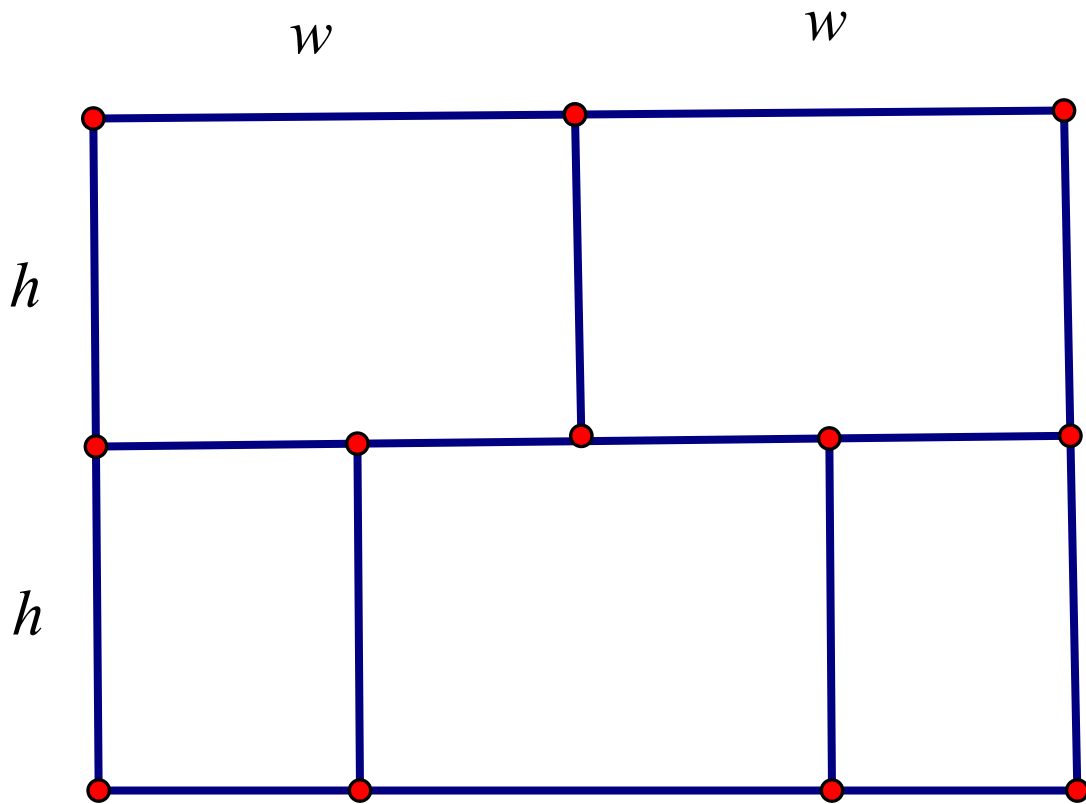
Show all work.

1. Find the zeros and extreme points of  $y = 2x^3 - 5x^2 - 14x + 35$ . Show the algebraic work to support the zeros and critical values.

2. Find the zeros and extreme points of  $y = 4x^3 - 12x^2$  on  $x \in [-1, 4]$ . Show the derivative and algebra to support the critical values.

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3. A field with an area equal to 160 square yards is partitioned as the diagram below.



What is the minimum amount of fencing required for the partitioning?

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4a. Find the zeros, algebraically, of  $y = 4 + 8x - x^2 - 2x^3$ .

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4b. Find the extreme points of  $y = 4 + 8x - x^2 - 2x^3$ . Show the derivative before using your calculator.

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Dr. Quattrin

Polynomials Test—CALCULATOR NOT ALLOWED

Show all work.

Score \_\_\_\_\_

5. The sign pattern for the derivative of  $H(x)$  is given. (a) Is  $x = -4$  at a maximum, a minimum, or neither? Why? (b) Is  $x = -1$  at a maximum, a minimum, or neither? Why?

$$\begin{array}{ccccccc} & - & 0 & - & 0 & + & 0 & - \\ \frac{dH}{dx} & \leftarrow & & & & & & \rightarrow \\ x & & -4 & & -1 & & 2 & \end{array}$$

a)

b)

6. Find the traits and **sketch**  $y = 4x^3 - 12x^2$  on  $x \in [-1, 4]$ .

Domain:

Range:

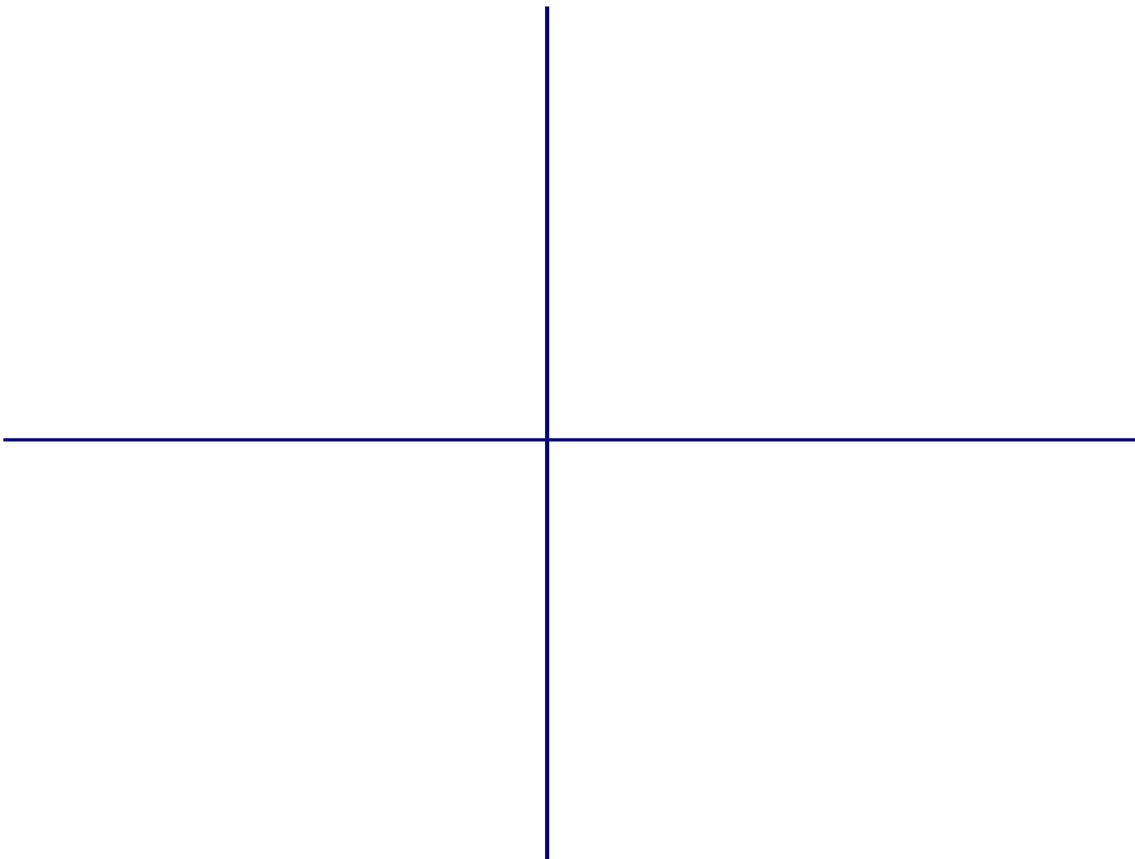
Zeros:

$Y$  – Int:

End Behavior (left):

Extreme Points:

End Behavior (right):



7. Find the traits and **sketch** of  $y = 2x^3 - 5x^2 - 14x + 35$ .

Domain:

Range:

Zeros:

Y - Int:

End Behavior (left):

Extreme Points:

End Behavior (right):

