

1. Use a graphing utility to determine the *number* of real solutions to the equation $y = -x^3 + 9x^2 + 21x + 11$.

- a) 0 b) 1 c) 2 d) 3 e) 4

2. $y = -5x^3 + 11x$ has a zero in the interval

- a) (0, 0.5) b) (0.5, 1) c) (1, 1.5) d) (1.5, 2) e) (2, 2.5)

3. For what value(s) of k is $x^2 + kx - 4$ divisible by $x - 1$?

- a) 0 b) 1 c) 2 d) 3 e) 4

4. Find an equation for the line Parallel to $y = 2x - 4$ that contains the point (0, 3).

- a) $y = \frac{1}{2}x + 3$ b) $2x - y = 3$ c) $2x - y = -3$
d) $x + 2y = 6$ e) $2x + y = 6$

5. Given this sign pattern $f(x)$ $\leftarrow \begin{array}{cccc} + & 0 & - & 0 & - & 0 & - \\ & -4 & & -1 & & 2 & \end{array} \rightarrow$, which of the following **might** be the equation of $f(x)$?

- a) $f(x) = (x+4)(x+1)(x-2)$
- b) $f(x) = -(x+4)(x+1)(x-2)$
- c) $f(x) = -(x+4)(x+1)^2(x-2)$
- d) $f(x) = -(x+4)(x+1)^2(x-2)^2$
- e) $f(x) = -(x+4)^3(x+1)(x-2)^4$

6. Find the remainder when $3x^4 - 2x^3 - 20x^2 - 12$ is divided by $x+2$.

- a) -2
- b) 32
- c) 464
- d) -28
- e) None of these

7. Solve the inequality $x^4 - x^3 - 6x^2 \leq 0$.

- a) $x \in [-2, 3]$
- b) $x \in [-3, 2]$
- c) $x \in (-\infty, -2] \cup \{0\} \cup [3, \infty)$
- d) $x \in (-\infty, -3] \cup \{0\} \cup [2, \infty)$
- e) $x \in (-2, 0) \cup (0, 3)$

Honors PreCalculus 2021-22

Name: _____

PreCalc Basics Test

Round to 3 decimal places.

score _____

Show all work.

1. Use your graphing calculator to find **and sketch** a complete graph of $f(x) = x^4 - 21x^3 + 43x^2 - 14x - 8$. State the window used, find the zeros, and the extreme points.

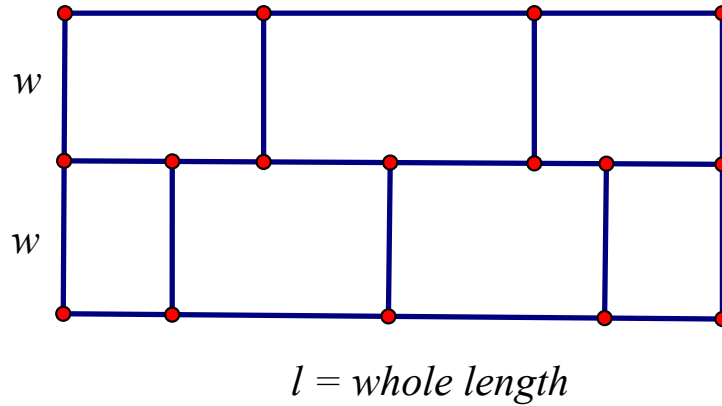
Window:

Zeros:

Extreme Points:

2. Find the zeros of $y = -3x^4 - 19x^3 - 25x^2 + 19x + 28$ by calculator and prove it by synthetic division.

3. A farmer with 1700 feet of fencing is wants to enclose a rectangular area and then divide it into seven pens with fence (see below). What is the largest possible total area of the five pens?



- a. State the equation needed to maximize the area of the field.
- b. State the secondary equation needed to eliminate the extra variable.
- c. Eliminate the extra variable in the equation needed to minimize the amount of fencing.
- d. Find the maximum area of the field.

4. Use synthetic division to find $f\left(-\frac{2}{7}\right)$ if $f(x) = 14x^3 - 7x + 8$.

5. Find an inequality that has this sign pattern and solution:



6. Show the sign patterns for
 $y = -4x(5x - 2)^4(x + 1)^5$

$$y = (3 - x)(x + 3)^2(5x + 1)^2$$

7. Show the sign pattern and solve $-3x^4 - 19x^3 - 25x^2 + 19x + 28 < 0$. (Note: This is the polynomial from #2 above)

8. Show the sign pattern and solve $2x^3 - 3x^2 - 32x + 48 \geq 0$