

1. Use a graphing utility to determine the *number* of real solutions to the equation  $4x^3 - 10x + 17 = 0$ .

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

2.  $y = x^3 + 18x - 35$  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  $x^2 + 3x + k$  divisible by  $x + k$ ?

- a) only 0  
b) only 0 or 2  
c) only 0 or  $-4$   
d) no value of  $k$   
e) any value of  $k$

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

- a)  $y = -0.5x + 3$       b)  $y = \frac{1}{2}x + 3$       c)  $y = \frac{1}{3}x - 2$   
d)  $y = -\frac{1}{2}x - 4$       e)  $2y - x = 6$

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  $x^3 - 6x^2 + 5x - 2$  is divided by  $x - 6$ .

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

7. Solve the inequality  $x^3 + 4x^2 - 12x \geq 0$ .

- a)  $x \in [-6, 0]$
- b)  $x \in [2, \infty)$
- c)  $x \in [0, 2]$
- d)  $x \in [-6, 0] \cup [2, \infty)$
- e)  $x \in [-6, 0) \cup (0, 2]$

Honors PreCalculus 2020-21

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  $f(x) = -x^4 - 10x^3 + 5x^2 + 12x + 1$ . State the window used, find the zeros, and the extreme points.

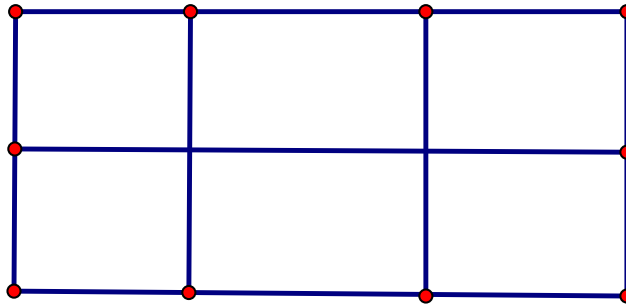
Window:

Zeros:

Extreme Points:

2. Find the zeros of  $y = -3x^4 - 11x^3 + 32x^2 + 44x - 80$  by calculator and prove it by synthetic division.

3. A 4000 square-foot field is surrounded and divided into six equal parts by a fence.



- a. State the equation needed to minimize the amount of fencing to be used.
- 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 minimum amount of fencing.

4. Use synthetic division to find  $f\left(-\frac{1}{3}\right)$  if  $f(x) = 9x^3 - 7x + 3$ .

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

$$\begin{array}{ccccccc} & + & 0 & - & 0 & - & 0 & + \\ y & & & & & & & \\ x & \longleftarrow & -4 & & \frac{2}{3} & & 2 & \longrightarrow \end{array} \text{ and } x \in (-\infty, -4] \cup \left\{\frac{2}{3}\right\} \cup [2, \infty)$$

6. Show the sign patterns for

$$y = -4x(2x-5)^6(x-5)^3$$

$$y = (4-x)(x+3)^2(x+1)$$

7. Show the sign pattern and solve  $-3x^4 - 11x^3 + 32x^2 + 44x - 80 < 0$ . (Note: This is the polynomial from #2 above)

8. Show the sign pattern and solve  $4x^3 - 3x^2 - 36x + 27 \geq 0$