1.   If $f(x)$ is a linear function $f(3)=16$ and $f(1)=10$, then the equation of the line is

(a) $f(x)=\dfrac{1}{3}x+4$

(b) $f(x)=2x+10$

(c) $f(x)=\dfrac{1}{2}x+4$

(d) $f(x)=-\dfrac{1}{2}x+10$

(e) $f(x)=3x+7$

2.   An equation for the line through the point $(0,4)$ and parallel to the line with the equation $3x-y=6$ is

(a) $y=-3x+4$

(b) $y=4x$

(c) $y=3x+4$

(d) $y=-\dfrac{1}{3}x+4$

(e) $y=3x$

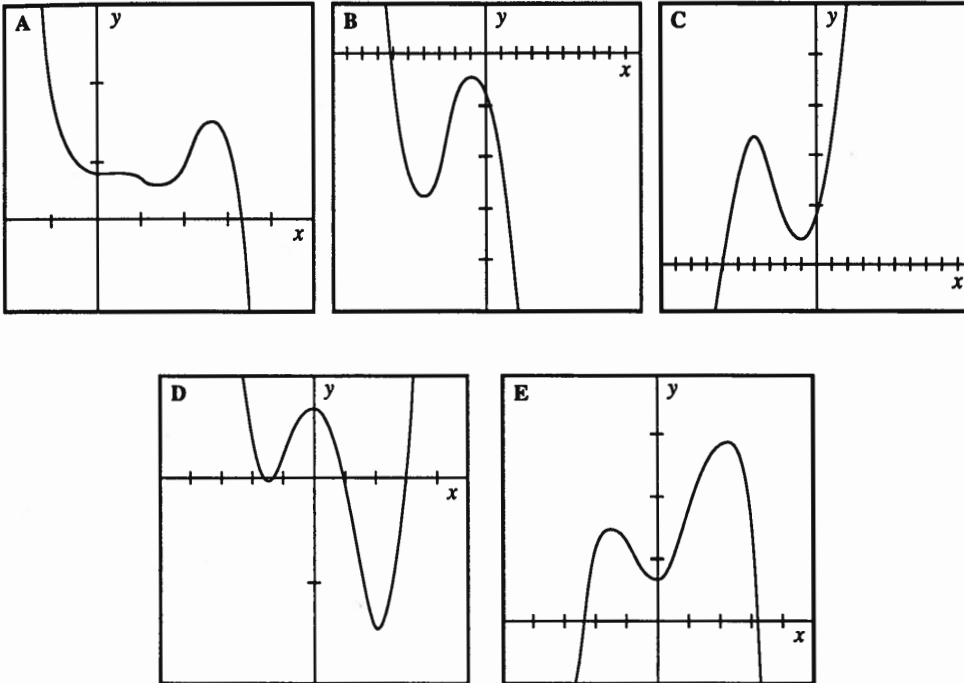3. Find the vertex of the parabola $-5x^2-40x+y-78=0$.

(a) $(-4,2)$
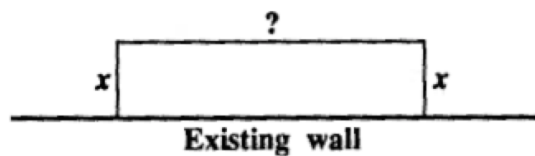
(b) $(-2,-4)$

(c) $(-4,-2)$

(d) $(2,-4)$

(e) $(4,2)$

4. Which one of the following could represent a complete graph of $f(x) = -x^3 + px^2 + qx + r$ where p, q, and r are real numbers?

5. Three sides of a fence and an existing wall form a rectangular enclosure. The *total* length of fence used is 180 feet. Let x be the length of the two sides perpendicular to the wall.

What possible x-values make sense in this problem?

(a) $x > 0$
(b) $0 < x < 180$
(c) $0 < x < 80$
(d) $x < 180$
(e) None of these

6. Given this sign pattern $f(x)$ $\xrightarrow[\quad -4 \quad\quad -1 \quad\quad 2 \quad]{- \quad 0 \quad + \quad 0 \quad - \quad 0 \quad -}$, 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) $f(x)=-(x+4)^3(x+1)(x-2)^4$

7. Solve $3x^2-5x<2$.

(a) $x<-\dfrac{1}{3}$ or $2<x$

(b) $-\dfrac{1}{3}<x<2$

(c) $x<-2$ or $\dfrac{1}{3}<x$

(d) $-2<x<\dfrac{1}{3}$

(e) $-\dfrac{2}{3}<x<1$

Honors Precalculus '17-18   **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.   The volume of a right circular cone is given by $V = \frac{1}{3}\pi r^2 h$ and the surface area is given by $V = \pi r^2 + \pi r l$. Given that r, h, and l form a right triangle, what equation would you put in your calculator to find the radius which would determine the maximum volume of a cone with surface area $= 100\pi$ cm²?
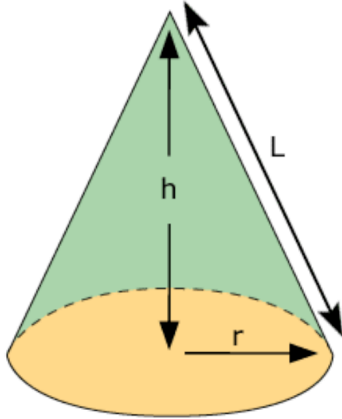
4. Use synthetic division to find $f\left(-\frac{1}{2}\right)$ if $f(x) = 8x^3 - 4x + 3$.

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

y   + 0   + 0   − 0   − 0   +

x   -7   0   3   4

$$x \in (-\infty, 0] \cup \{3\} \cup [4, \infty)$$

6. Show the sign patterns for
$$y = -2x(3x-5)^3(x-5)^2$$

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

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 $-9x^3 + 18x^2 + 4x - 8 > 0$