

1. Assume  $f$  is a linear function and  $f(2) = 14$  and  $f(0) = 10$ . Determine a formula for  $f$ .

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

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

(c)  $f(x) = 3x + 4$

(d)  $f(x) = 3x + 10$

(e)  $f(x) = 10x + 4$

2. 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)  $2y - x = 6$

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

(a)  $(-4, 2)$

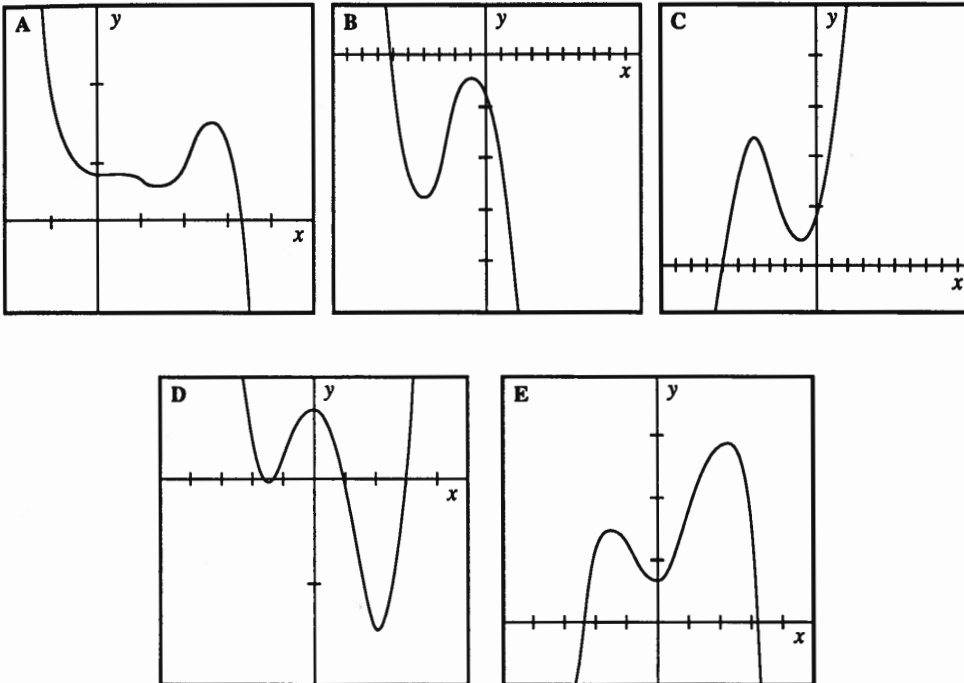
(b)  $(-2, -4)$

(c)  $(4, -2)$

(d)  $(2, -4)$

(e)  $(4, 2)$

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



5. The length of a rectangle is 7 units more than its width. Write the area of a function as a function of its length,  $x$ .

- (a)  $A = x(7 - x)$
- (b)  $A = x(x - 7)$
- (c)  $A = x(x + 7)$
- (d)  $A = 7x^2$
- (e) None of the above

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 the above

7. Determine that polynomial inequality that matches the sign pattern and solution.

$$\begin{array}{c} y \\ x \end{array} \begin{array}{c} + 0 + 0 + 0 + \\ \leftarrow \begin{array}{ccc} -5 & 0 & 7 \end{array} \rightarrow; \text{ no solution} \end{array}$$

- (a)  $x(x+5)(x-7) < 0$
- (b)  $-x(x+5)(x-7) < 0$
- (c)  $-x(x+5)^2(x-7) > 0$
- (d)  $x^4(x+5)^2(x-7)^6 < 0$
- (e)  $x^2(x+5)^2(x-7)^2 > 0$

Honors Precalculus '16-17

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

PreCalc Basics

**Round to 3 decimal places.**

**score** \_\_\_\_\_

**Show all work.**

1. Show the sign patterns for

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

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

2. Find the zeros of  $y = 2x^4 + x^3 - 14x^2 - 19x - 6$  by calculator and prove it by synthetic division.

3. Use your graphing calculator to find **and sketch** a complete graph of  $f(x) = 5x^4 + x^3 - 9x^2 + 4x - 7$ . State the window used, find the zeros, and the extreme points.

Window:

Zeros:

Extreme Points:

4. Use synthetic division to find  $f\left(-\frac{2}{3}\right)$  if  $f(x) = 9x^3 - 5x^2 + 3$ .

**PreCalc Basics****NO CALCULATOR ALLOWED****Show all work.**

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

$$\begin{array}{c} y \\ x \end{array} \begin{array}{ccccccc} & + & 0 & - & 0 & - & 0 & - \\ \leftarrow & & -3 & & \frac{1}{4} & & 5 & \rightarrow \end{array} \text{ and } x \in (-\infty, -3] \cup \left\{ \frac{1}{4} \right\} \cup \{5\}$$

6. Simplify the following expression:

(a) 
$$\frac{x^3 - 3x^2 + 4x - 12}{x^3 - 64}$$

(b) 
$$\frac{8x - 4x^2}{xy - 2y + 3x - 6} \div \frac{3x + 6}{y + 3}$$

7. Show the sign pattern and solve  $2x^4 + x^3 - 14x^2 - 19x - 6 < 0$ . (note: this is the polynomial from #2 above)

8. Show the sign pattern and solve  $-3x^3 + 7x^2 + 18x - 42 \geq 0$