

(a) The function  $f$  is decreasing over which intervals? Choose all that apply.  
  $(-\infty, -2)$      $(-2, 0)$      $(0, 3)$      $(5, 7)$      $(3, 7)$      $(7, \infty)$

(b) The function  $f$  has local maxima at which  $x$ -values? If there is more than one value, separate them with commas.  
  $0, 5$

(c) What is the sign of the leading coefficient of  $f$ ?  
 Select One    $Pos., 4, 4$

(d) Which of the following is a possibility for the degree of  $f$ ? Choose all that apply.  
 4    5    6    7    8    9

Sep 20-9:33 AM

3.3

$$f(x) = -4x^4 + 8x^3$$

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

Handwritten notes include graphs of the functions and a sign chart for  $g(x)$ .

Sep 20-9:37 AM

Long Division

$$(8x^3 + 6x^2 + 3x + 14) \div (2x + 3)$$

$$2x + 3 \overline{) 8x^3 + 6x^2 + 3x + 14}$$

$$\underline{-(8x^3 + 12x^2)} \phantom{+ 14}$$

$$-6x^2 + 3x \phantom{+ 14}$$

$$\underline{+(6x^2 + 9x)} \phantom{+ 14}$$

$$-12x + 14$$

$$\underline{-(-12x + 18)}$$

$$-4$$

Handwritten notes:  $2x+3=0$ ,  $x = -\frac{3}{2}$

Sep 20-10:01 AM

$$(x^3 + 8x^2 + 6x - 7) \div (x + 7)$$

$$\begin{array}{r} x^3 \quad x^2 \quad 6x \quad -7 \\ -7 \left| \begin{array}{r} 1 \quad 8 \quad 6 \quad -7 \\ \underline{-7 \quad -7 \quad 7} \\ 1 \quad 1 \quad -1 \quad 0 \end{array} \right. \end{array}$$

Handwritten notes:  $(x^2 + x - 1)$ ,  $(x)$ , and a sign chart.

Sep 20-10:04 AM

$$(x^3 - 2x^2 - 9x - 2) \div (x + 2)$$

$$\begin{array}{r} x^3 \quad x^2 \quad x \quad -2 \\ -2 \left| \begin{array}{r} 1 \quad -2 \quad -9 \quad -2 \\ \underline{-2 \quad -4 \quad -18} \\ 1 \quad -4 \quad -1 \quad 0 \end{array} \right. \end{array}$$

Handwritten notes:  $1-4-12$ ,  $x^2 - 4x - 1$ ,  $x^2 - 4x - 1 + \frac{2}{x+2}$

Factor Theorem  $(x+2)$  a factor  
 $f(-2) = 0$   
 $f(-2) = (-2)^3 - 2(-2)^2 - 9(-2) - 2 = 0$

$(x+3)$  a factor  
 $f(-3) = (-3)^3 - 2(-3)^2 - 9(-3) - 2 = -2 \neq 0$

Sep 20-10:08 AM

$$h(x) = x^3 - 7x^2 + 11x + 3$$

3 is a zero  
 Express as a product of linear factors

$$3 \left| \begin{array}{r} 1 \quad -7 \quad 11 \quad 3 \\ \underline{3 \quad -21 \quad -3} \\ 1 \quad -4 \quad -1 \quad 0 \end{array} \right.$$

$$x^2 - 4x - 1$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{4 \pm \sqrt{16 - 4(-1)}}{2(1)} = \frac{4 \pm \sqrt{20}}{2} = \frac{4 \pm 2\sqrt{5}}{2} = 2 \pm \sqrt{5}$$

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graph

$$y = 2x^2 + 20x + 55$$

$$2(x^2 + 10x) + 55$$

$$2(x^2 + 10x + 25) + 55 - 50$$

$$2(x+5)^2 + 5$$

$(-5, 5)$

Sep 20-10:41 AM

$$f(x) = -3x^2 - 24x - 42$$

$$= -3(x^2 + 8x) - 42$$

$$= -3(x^2 + 8x + 16) - 42 + 48$$

$(x+4)(x+4)$

$$= -3(x+4)^2 + 6$$

Vertex  $(-4, 6)$

$-5^2 = -25$   
 $(-5)^2 = 25$   
 $(-4)^2$

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$$f(x) = -x^2 - 3x + 7$$

$$= -2x - 3$$

$$-h - 2x - 3$$

$x^4$   
 $|x^3 + |x^2 +$

$(-5)^2$

$$g(x) = 2x - 2$$

$$r(x) = -2x^2 - 2$$

$$g(r(-5))$$

$$r(-5) = -2(-5)^2 - 2$$

$$= -50 - 2 =$$

$$= -52$$

$$g(-52) = 2$$

$$-104 - 2 = -106$$

Sep 20-10:51 AM