

polypracticeassign.doc

<u>MC</u>	1. D	5. B	9. B
	2. A	6. A	10. C
	3. D	7. B	11. B
	4. C	8. C	12. A

Part B:

$$\begin{aligned}
 1. P(-1) &= (-1)^3 + 2(-1)^2 + 3(-1) + 2 \\
 &= -1 + 2 - 3 + 2 \\
 &= 0
 \end{aligned}$$

$$\begin{aligned}
 2. (a) \quad &x^4 - x^3 - 2x^2 \\
 &x^2(x^2 - x - 2) \\
 &x^2(x-2)(x+1)
 \end{aligned}$$

$$\begin{aligned}
 (b) \quad &x^3 + 5x^2 - 12 \\
 &P(1) = -6 \\
 &P(-1) = -8 \\
 &P(2) = 16 \\
 &P(-2) = 0 \checkmark
 \end{aligned}$$

$$\begin{array}{r}
 x^2 + 3x - 6 \\
 x+2 \overline{) x^3 + 5x^2 + 0x - 12} \\
 \underline{x^3 + 2x^2} \phantom{+ 0x - 12} \\
 3x^2 + 0x \phantom{- 12} \\
 \underline{3x^2 + 6x} \phantom{- 12} \\
 -6x - 12 \\
 \underline{-6x - 12} \\
 0
 \end{array}$$

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

↑ this will not factor

$$(c) \quad 15x^4 - 22x^2 + 8$$

add -22  
mult 120

$$\begin{aligned}
 &15x^4 - 12x^2 - 10x^2 + 8 \\
 &3x^2(5x^2 - 4) - 2(5x^2 - 4) \\
 &(5x^2 - 4)(3x^2 - 2)
 \end{aligned}$$

(d)  $6x^4 + 13x^3 - 8x^2 - 17x + 6$

$P(1) = 0$

$$\begin{array}{r} 6x^3 + 19x^2 + 11x - 6 \\ x-1 \overline{) 6x^4 + 13x^3 - 8x^2 - 17x + 6} \\ \underline{6x^4 - 6x^3} \phantom{- 8x^2 - 17x + 6} \\ 19x^3 - 8x^2 \phantom{- 17x + 6} \\ \underline{19x^3 - 19x^2} \phantom{- 17x + 6} \\ 11x^2 - 17x \phantom{+ 6} \\ \underline{11x^2 - 11x} \phantom{+ 6} \\ -6x + 6 \\ \underline{-6x + 6} \\ 0 \end{array}$$

Factors:

$(x-1)(x+2)(6x^2+7x-3)$

$\downarrow$   
 $6x^2+9x-2x-3$   
 $3x(2x+3)-1(2x+3)$   
 $(2x+3)(3x-1)$

$(x+1)(x+2)(2x+3)(3x-1)$

OR 
$$\begin{array}{r|rrrrr} -1 & 6 & 13 & -8 & -17 & 6 \\ & \downarrow & -6 & -19 & -11 & 6 \\ \hline & 6 & 19 & 11 & -6 & 0 \end{array}$$

$(x-1)(6x^3 + 19x^2 + 11x - 6)$

$\uparrow$   
 $P(-2) = 0$

$$\begin{array}{r} 6x^2 + 7x - 3 \\ x+2 \overline{) 6x^3 + 19x^2 + 11x - 6} \\ \underline{6x^3 + 12x^2} \phantom{+ 11x - 6} \\ 7x^2 + 11x \phantom{- 6} \\ \underline{7x^2 + 14x} \phantom{- 6} \\ -3x - 6 \\ \underline{-3x - 6} \\ 0 \end{array}$$

$$(e) x^3 - 17x^2 + 80x - 100$$

$$P(x) = 0$$

$$x-2 \quad (x-2)(x^2 - 15x + 50)$$

$$(x-2)(x-10)(x-5)$$

$$-2 \left| \begin{array}{cccc} 1 & -17 & 80 & -100 \\ \downarrow & -2 & 30 & -100 \\ \hline & 1 & -15 & 50 & 0 \end{array} \right.$$

$$(f) 27x^3 + 125y^3$$

$$(3x+5y)(9x^2 - 15xy + 5y^2)$$

\* Sum of Cubes

$$(g) 15x^2 - 7xy - 4y^2$$

$$15x^2 - 12xy + 5xy - 4y^2$$

$$3x(5x - 4y) + y(5x - 4y)$$

$$(5x - 4y)(3x + y)$$

$$(h) x^8 - 256 \text{ "diff. of squares"}$$

$$(x^4 - 16)(x^4 + 16)$$

$$(x^2 - 4)(x^2 + 4)(x^2 + 16)$$

$$(x - 2)(x + 2)(x^2 + 16)$$

$$(i) 8x^2 + 3x - 6$$

$$8x^2 + 16x - 3x - 6$$

$$8x(x+2) - 3(x+2)$$

$$(x+2)(8x-3)$$

3.  $f(x) = 2x^4 + 3x^3 - x^2 - 3x - 1$   
 $f(x) = (x+1)^2(x-1)(2x+1)$   
 $x$ -int:  $-1, 1, -\frac{1}{2}$

4. Solve:

(a)  $(x-3)^2(x+4)(x+6) \geq 0$   
 chart

zeros:  $3, -4, -6$

	$(x-3)^2(x+4)(x+6)$			$\geq 0$
$(-\infty, -6]$	+	-	-	+
$[-6, -4]$	+	-	+	-
$[-4, 3]$	+	+	+	+
$[3, \infty)$	+	+	+	+

sol'n  
 $(-\infty, -6] [-4, 3] [3, \infty)$

4. (b)  $2x^3 + 7x^2 - 10x - 24 < 0$

factor:  $(x-2)(x+4)(2x+3) < 0$   
 $x = 2, -4, -3/2$

	$(x-2)$	$(x+4)$	$(2x+3)$	$< 0$
$(-\infty, -4)$	-	-	-	-
$(-4, -3/2)$	-	+	-	+
$(-3/2, 2)$	-	+	+	-
$(2, \infty)$	+	+	+	+

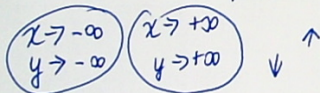
Sol'n:  
 $(-\infty, -4) \cup (-3/2, 2)$

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

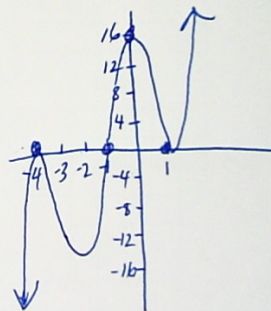
(a) degree 5

(b) 4 possible turn-points

(c) head term:  $x^5$  odd positive



(e) x-int: -4, 1, -1  
 y-int: 16



(d) zeros: -4, 1, -1

	$(x+4)^2$	$(x-1)^2$	$(x+1)$	
$(-\infty, -4)$	+	+	-	-
$(-4, -1)$	+	+	-	-
$(-1, 1)$	+	+	+	+
$(1, \infty)$	+	+	+	+

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

a) Degree: 4

b) possible turn pts: 3

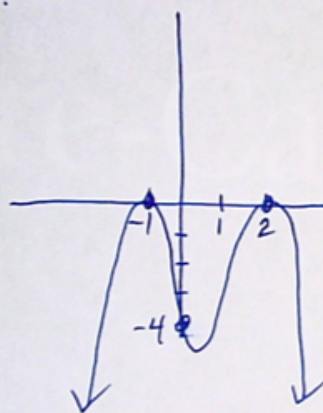
(c) End Beh: lead term  $-x^4$  neg even

$x \rightarrow -\infty$   $x \rightarrow +\infty$   
 $y \rightarrow -\infty$   $y \rightarrow -\infty$      $\downarrow$   $\downarrow$

(d)

	$-1(x+1)^2(x-2)^2$			
$(-\infty, -1)$	-	+	+	- always negative
$(-1, 2)$	-	+	+	
$(2, \infty)$	-	+	+	

(e).



$x$ -int: -1, 2  
 Just Touch    Just Touch

$y$ -int: -4

$$7. (a) y = a(x+3)(x-1)(x-7)$$

$$30 = a(2+3)(2-1)(2-7)$$

$$30 = a(5)(1)(-5)$$

$$30 = -25a$$

$$\frac{30}{-25} = a$$

$$-6/5 = a$$

$$\text{OR } -1.2$$

$$y = -\frac{6}{5}(x+3)(x-1)(x-7)$$

$$(b) y = a(x+5)(x+1)^2(x-2)(x-4)$$

$$20 = a(0+5)(0+1)^2(0-2)(0-4)$$

$$20 = a(5)(1)^2(-2)(-4)$$

$$20 = 40a$$

$$\frac{20}{40} = a$$

$$a = \frac{1}{2}$$

$$y = \frac{1}{2}(x+5)(x+1)^2(x-2)(x-4)$$

Test tomorrow:

Review            Page 153: 1-11 (omit 4)  
from book:       Page 155-156: 1-4, 6-8  
                      Page 148: 3



## Attachments

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