

HW 5 - 3

Answers

1. $(x - 2)(5x^2 + 3)$

2. $(x - 6)(x + 1)(x - 2)(x - 3)$

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

4. $(3x + 5y^2)(\underline{9x^2} - 15xy^2 + \underline{25y^4})$

5. $3(x + 2)(x - 2)(x + 1)$

6. $(x - 1)(-x + 4)$

7. $(x + 2)(9x + 2)$

8. $(y - 1)(y + 1)(y^2 + y + 1)(y^2 - y + 1)$

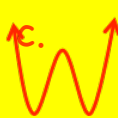
9. a. 5

b. -



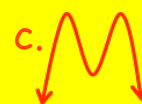
10. a. 6

b. +



11. a. 4

b. -



12. a. 3

b. +



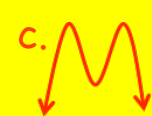
13. a. 3

b. -



14. a. 6

b. -



Factor each of the following:

1. $5x^3 - 10x^2 + 3x - 6$

2. $(x^2 - 5x)^2 - 36$

3. $8x^3 - 1$

4. $27x^3 + 125y^6$

5. $3x^3 + 3x^2 - 12x - 12$

6. $(2x + 3)(x - 1) - (3x - 1)(x - 1)$

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

7. $(4x + 3)(x + 2) + (5x - 1)(x + 2)$

$$(x+2)(9x+2)$$

8. $y^6 - 1$ **DOTS** 1st
(use your notes for this one)

$$\begin{aligned} & (y^3+1)(y^3-1) \quad \begin{matrix} a=y \\ b=1 \end{matrix} \\ & (y+1)(y^2-y+1)(y-1)(y^2+y+1) \end{aligned}$$

Without your calculator:

- a. state degree
- b. state the sign of the leading coefficient
- c. sketch (no graph paper) the end behavior

9. $P(x) = -2x^5 + x^2 - 3x + 1$

a. _____

b. _____

c. _____

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

a. _____

b. _____

c. _____

11. $P(x) = -5x^4 - x^2 + 4x$

a. _____

b. _____

c. _____

12. $P(x) = 4x^3 + 3x - 2$

a. _____

b. _____

c. _____

13. $P(x) = -6x^3 - x^2 + 5$

a. _____

b. _____

c. _____

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

a. _____

b. _____

c. _____

Notes First Today!!!

Multiplicity

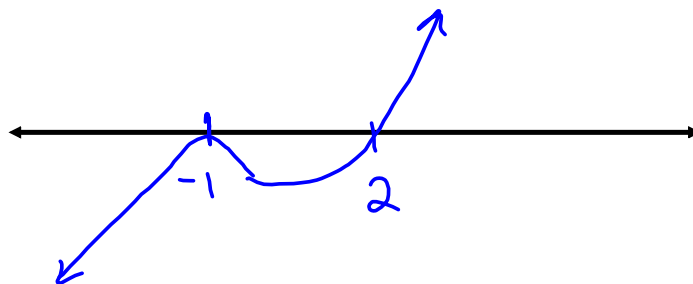
Warm-Up: Without your calculator.

This equation is a combination of the last two from yesterday.

Try to sketch it.

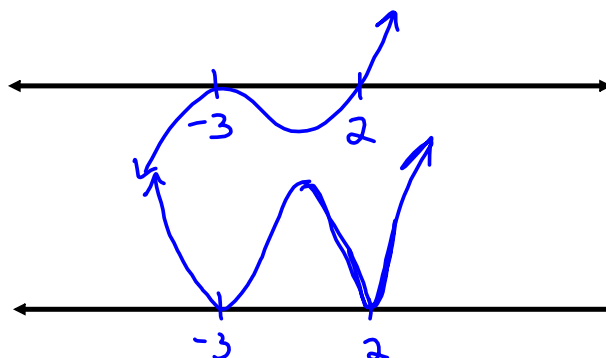
$$y = (x + 1)^2(x - 2)$$

degree = 3 (odd)
LC = +

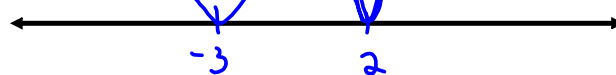


Use your calculator to sketch each of the following:

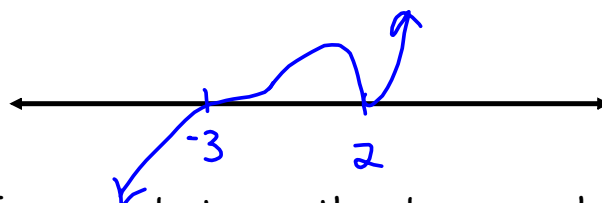
1. $P(x) = (x - 2)(x + 3)^2$



2. $Q(x) = (x - 2)^2(x + 3)^4$



3. $R(x) = (x - 2)^4(x + 3)^5$



Describe the similarities and differences between the above graphs.

- all have the same zeros (-3 and 2)
 - sometimes the graph is tangent to the x-axis, sometimes it crosses.
- even exponent $\rightarrow$ tangent odd $\rightarrow$ cross

- A factor of $(ax - b)^k$ yields a repeated zero $x = b/a$ of multiplicity k .
- If k (power) is odd, graph crosses the x -axis at $x = b/a$
 - If k (power) is even, graph is tangent to the x -axis at $x = b/a$

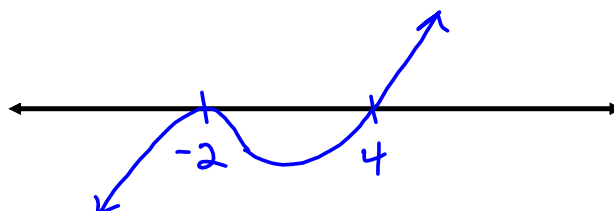
Find the zeros of each polynomial, state the multiplicity of each.
Sketch (including the end behavior) - no calculators!

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

Zeros Multiplicity (6/19)		
Z	M	T/C
-2	2	T
4	1	C

Tangent $\Rightarrow M$ is even
Cross $\Rightarrow M$ is odd

Degree = 3
LC $\Rightarrow +$



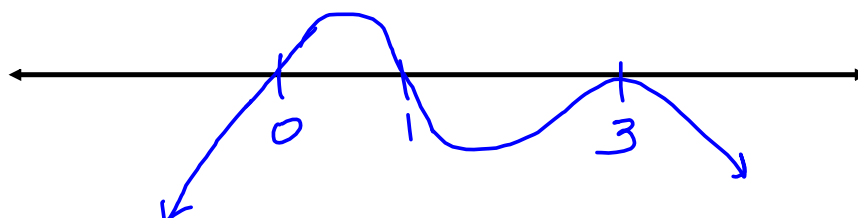
$$2. Q(x) = -x(x-1)^3(x-3)^2$$

Z	M	T/C
0	1	C
1	3	C
3	2	T

$$\text{Degree} = 1 + 3 + 2$$

$$= 6$$

$$LC = (-)$$



Given the following graphs, write a possible polynomial function for the graph.

