

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. $(3x + 5y^2)(9x^2 - 15xy^2 + 25y^4)$
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. -
c. 

10. a. 6
b. +
c. 

11. a. 4
b. -
c. 

12. a. 3
b. +
c. 

13. a. 3
b. -
c. 

14. a. 6
b. -
c. 

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Factor each of the following:

1. $5x^3 - 10x^2 + 3x - 6$
2. $(x^2 - 5x)^2 - 36$

3. $8x^3 - 1$
4. $27x^3 + 125y^6$

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5. $3x^3 + 3x^2 - 12x - 12$
6. $(2x + 3)(x - 1) - (3x - 1)(x - 1)$

7. $(4x + 3)(x + 2) + (5x - 1)(x + 2)$
8. $y^6 - 1$
(use your notes for this one)

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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. _____

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Multiplicity

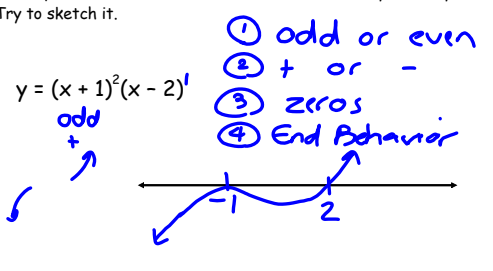
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Warm-Up: Without your calculator.
This equation is a combination of the last two from yesterday.
Try to sketch it.

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

① odd or even
② + or -
③ zeros
④ End Behavior

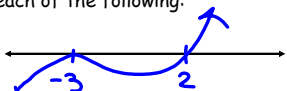
odd
+



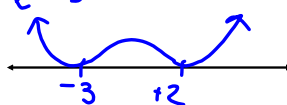
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Use your calculator to sketch each of the following:

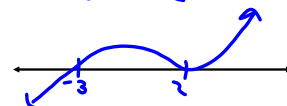
1. $P(x) = (x - 2)(x + 3)^2$



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.

Even power → tangent at the zero
Odd power → cross at the zero

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 $x = b/a$

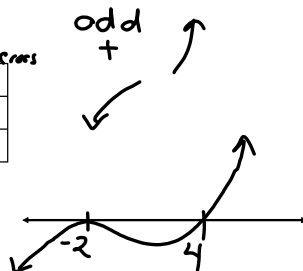
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Find the zeros of each polynomial, state the multiplicity of each. Sketch (including the end behavior) - no calculators!

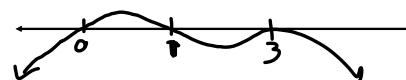
1. $P(x) = (x + 2)^2(x - 4)$

zero	(power) multiplicity	Tangent/cross
-2	2	T
4	1	C



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

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

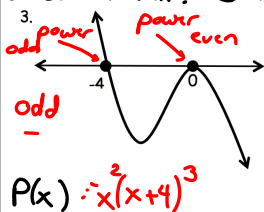


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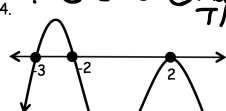
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Given the following graphs, write a possible polynomial function for the graph.

- ① odd or even? ② + or -? ③ zeros ④ Multiplicity T/C



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



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

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