

MATH 30 - Precalculus. Homework 5. Due Th. 03/21/2019. Professor Luis Fernández

NAME: _____

Write your answers in other sheets and **STAPLE this one to your other sheets.**

1. Do exercises 2, 4 and 6 from Exercise Set 2.5 of the book (page 335 of the 3rd edition).

2. Do exercises 12, 14, 22 and 24 from Exercise Set 2.5 of the book (page 336 of the 3rd edition).

3. Solve the following polynomial equations. [How? We did several examples in class; or look at examples 3, 4 and 5 of the book, section 2.5.]

a) $x^3 - 4x^2 - 7x + 10 = 0$

b) $3x^3 - 8x^2 - 8x + 8 = 0$

c) $x^4 + 3x^3 - 20x^2 + 24x - 8 = 0$

d) $x^4 - x^3 + 2x^2 - 4x - 8 = 0$

4. Use the results of the previous exercise to factor the following polynomials completely.
[NOTE: you DO NOT need to do any calculation, only use the *factor theorem*.]

a) $x^3 - 4x^2 - 7x + 10$

b) $3x^3 - 8x^2 - 8x + 8$

c) $x^4 + 3x^3 - 20x^2 + 24x - 8$

d) $x^4 - x^3 + 2x^2 - 4x - 8$

5. Solve the equation $(x - 1)^2(x - 2)(x - 3)(x + 4) = 0$.

[NOTE: you DO NOT need to do any calculation for this one; use the *factor theorem* to find the solution by just looking at the equation.]

6. Do exercises 44 and 58 from Exercise Set 2.3 of the book. Do not forget to use graph paper to do the graphs.
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7. For the following polynomial functions, find

1. The end behaviour.

2. The x -intercepts and their multiplicity.

3. The y -intercept.

4. Whether the function is even, odd or neither.

a) $f(x) = x^3 - 13x + 12$

b) $f(x) = -2x^4 + 2x^2$

c) $f(x) = x^7 - 3x^6 - x^5 + 11x^4 - 12x^3 + 4x^2$

d) $x^4 - 2x^3 - x^2 + 4x - 2$

8. Given the following information about the polynomial function $f(x)$, graph $f(x)$ in the axes provided.

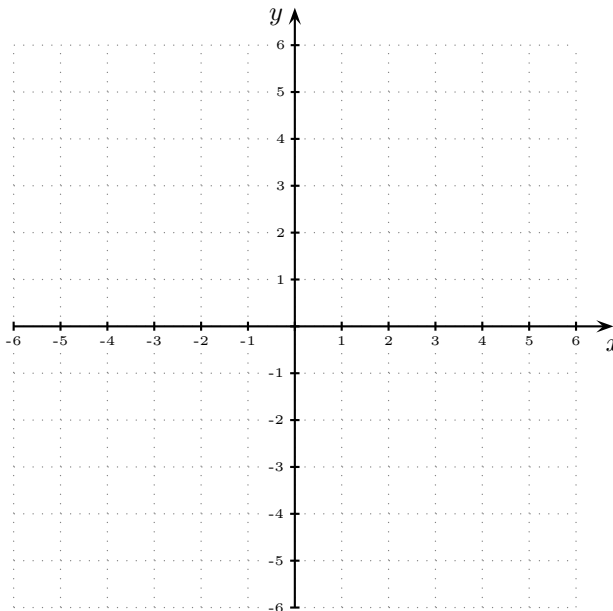
1. End behaviour: The leading term of $f(x)$ is x^5 .

2. x -intercepts:

- 1 with multiplicity 2.
- -2 with multiplicity 1.

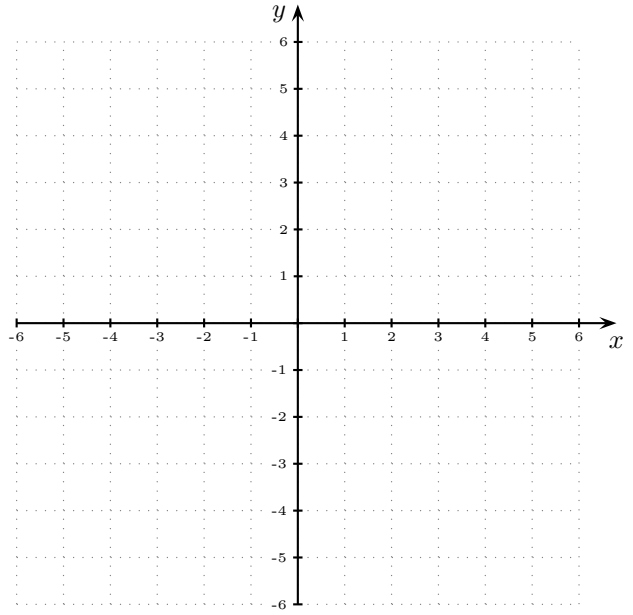
3. y -intercept: $f(0) = 1$.

4. Symmetry: f is not even nor odd.



9. Given the following information about the polynomial function $f(x)$, graph $f(x)$ in the axes provided.

1. End behaviour: The leading term of $f(x)$ is $-x^7$.
2. x -intercepts:
 - -2 with multiplicity 2.
 - 0 with multiplicity 2.
 - 3 with multiplicity 3.
3. y -intercept: $f(0) = 0$.
4. Symmetry: f is not even nor odd.



10. For the following rational functions, first find
1. The end behaviour and the horizontal asymptotes, if any.
 2. The vertical asymptotes.
 3. The x -intercepts and their multiplicity.
 4. The y -intercept.

Then **sketch the graph of the function** in the graph paper provided (or in your own).

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

b) $f(x) = \frac{3x^2}{x^2-9}$

c) $f(x) = \frac{x-4}{x^2-x-6}$

$f(x) = \frac{2x+5}{x^3-13x+12}$

11. Given the following information about the rational function $f(x)$, graph $f(x)$ in the axes provided.

1. End behaviour: Horizontal asymptote at $y = 1$.
2. End behaviour: Vertical asymptotes:
 - At $x = -3$.
 - $x = 3$.
3. x -intercepts:
 - -2 with multiplicity 1.
 - 2 with multiplicity 1.
4. y -intercept: $f(0) = 1$.
5. Symmetry: f is an even function.

