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Unit 5, L1 Test Review

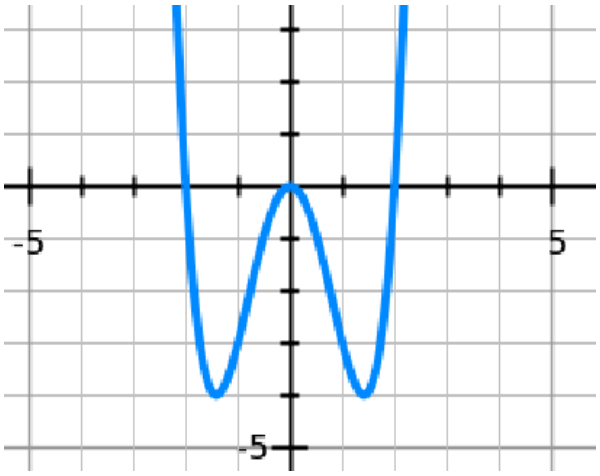
Learning Target 5A: *I can identify patterns relating rules and graphs of polynomial functions, connecting polynomial degree to local maximum values, local minimum values, and zeroes.*

1. Describe the end behavior of the polynomial functions.

a. $y = -x - 7$

b. $y = x^4 + x^2 - 3$

2. Consider the graph of the polynomial function shown below.



a. What is the degree **AND** type of this polynomial function? Explain your reasoning.

b. Write the function model for the graph. List the points that you used.

c. Find all maximum points according to your function in part b.

d. Find all minimum points according to your function in part b.

e. How many zeros does this function have? Find the zeroes of this polynomial function.

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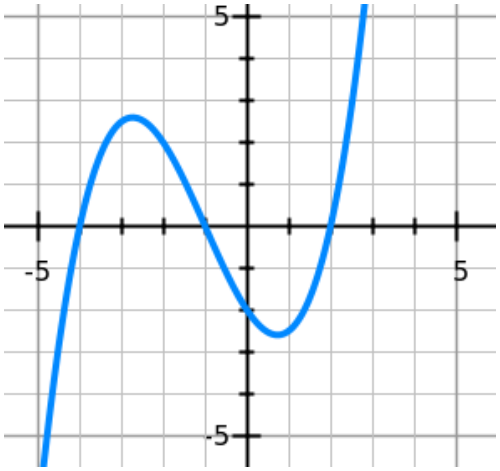
3. Consider the graph of the polynomial function shown below.



a. What is the degree **AND** type of this polynomial function? Explain your reasoning.

b. Write the function model for the graph. List the points that you used.

c. Find all maximum points according to your function in part b.

d. Find all minimum points according to your function in part b.

e. How many zeros does this function have? Find the zeroes of this polynomial function.

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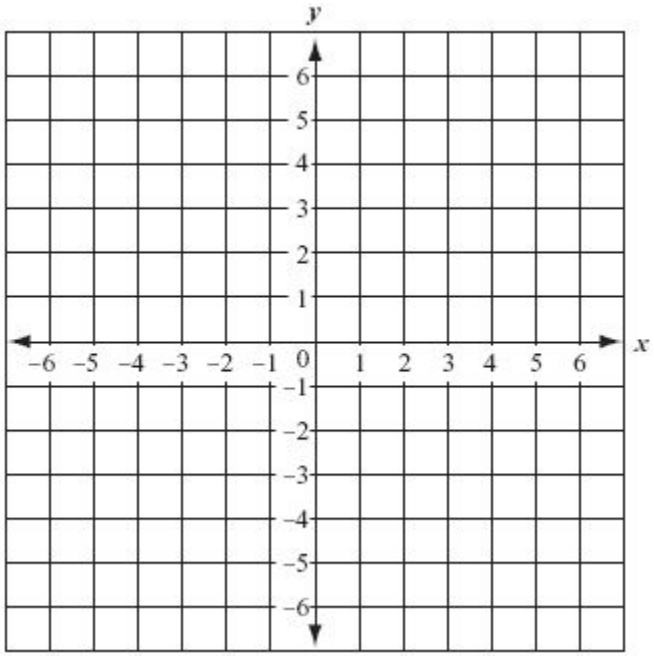
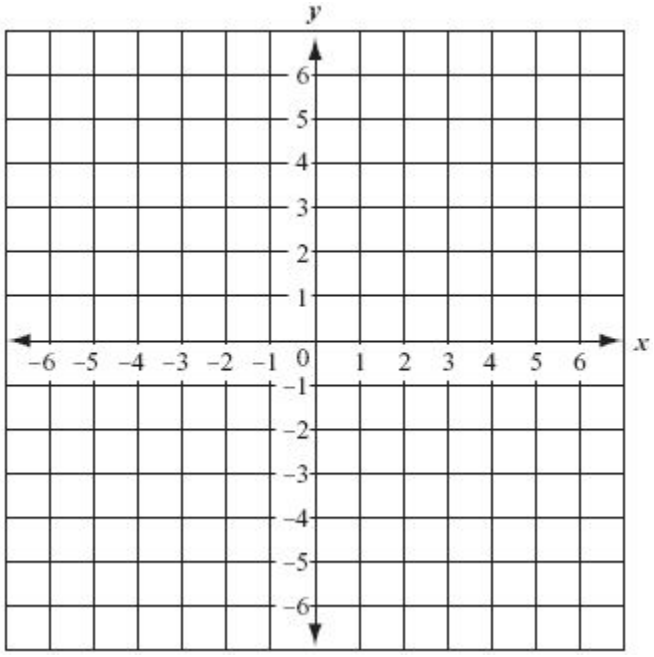
4. Draw the graph of the polynomial function with the following features.

End Behavior: ∞, ∞
Maximum: None
Minimum: $(1,-4)$
Zeros: $x = -1, 3$
Y-intercept: $(0,-3)$



5. Draw the graph of the polynomial function with the following features.

End Behavior: $-\infty, -\infty$
Maximum: $(-5,6), (2,3)$
Minimum: $(-1,-1)$
Zeros: $x = -6,-2,0,3$
Y-intercept: $(0,0)$



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Learning Target 5B: *I can combine polynomials by adding, subtracting, and multiplying and give the result in its simplified form.*

6. Consider the polynomial function $f(x) = 2x^4 - x^3 - 4x^2 + 3$ and $g(x) = 6x^3 + 2x^2 + x - 2$

a. Write a polynomial function rule for $h(x)$ of $f(x) + g(x)$.

b. Write a polynomial function rule for $j(x)$ of $g(x) - f(x)$.

7. The daily income of a rock climbing business depends on the ticket cost x according to the function $I(x) = 100x - 4x^2$. The daily expenses of the business are related to the ticket price according to the rule $E(x) = 2x + 150$. Find a rule in standard polynomial form for the daily profit.

8. The total area of an 8x10 picture frame is represented by the function $F(x) = 3x^3 - 2x - 7$. The wood part of the frame surrounding the picture has the function $W(x) = 4x^2 + 9x - 13$. Write a function, P(x), that represents the area of just the picture.

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9. Write in standard form.

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

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

c. $x(x - 1)(x + 3)$

***Learning Target 5C**: I can find zeroes of polynomial functions and create polynomial functions with prescribed zeroes.*

10. What are the possible number of zeros a function can have?

For each function, determine the zeros. Are there any repeated zeros?

11. $f(x) = x(x - 4)(x - 4)$

12. $y = (x + 8)(x - 5)(x + 2)$

Write in factored form.

13. $y = 2x^3 + 10x^2 + 12x$

14. $y = x^2 - x - 20$

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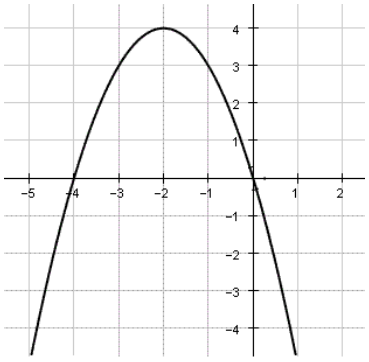
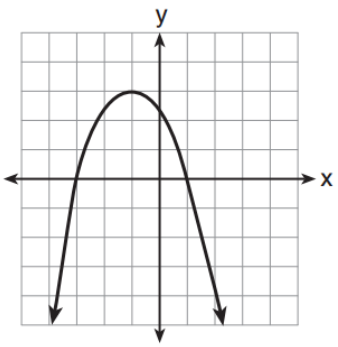
15. Determine the zeros for the given graph.

a.



b.



16. A polynomial function has zeros $x = -3,0,2$.

a. Write the function in factored form.

b. Write the function in standard form.

For each function, determine the zeros by factoring. Are there any repeated zeros?

17. $f(x) = x^2 - 8x + 16$ **18.** $y = x^2 - 18x + 81$ **19.** $f(x) = x^2 + 4x - 12$

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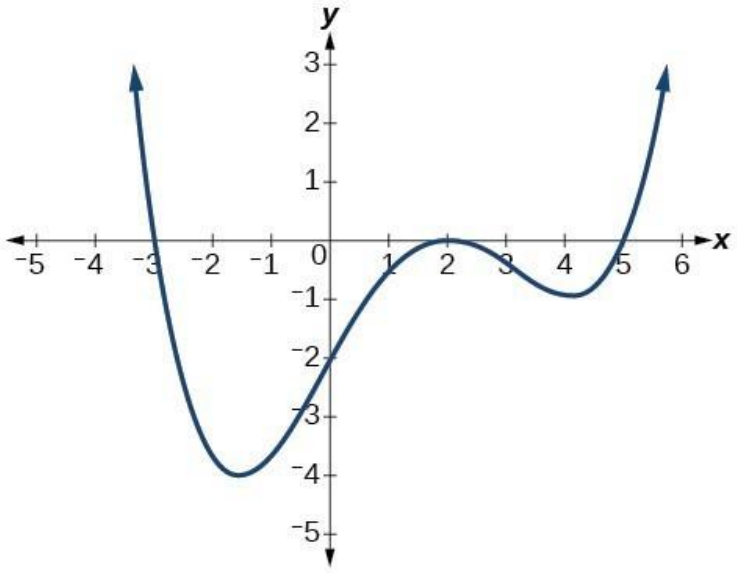
20. Evaluate the work below and analyze the reasoning with justification (whether the logic is correct or not).

Scale for both axis is 1



Degree: 3

Zeros: $x = -3, 2, 5$

Factored Form:
$f(x) = (x+3)(x-2)(x-5)$

Standard Form:

$$f(x) = x^4 - 6x^3 - 9x^2 + 52x - 60$$