Name: _____ Date: _____ **Unit 6 Homework**

Forms and Zeros of Polynomials Homework

Directions: Be sure to show all work, communicate your thought process, and justify your reasoning. Remember to check that your answers are complete, correct, and reasonable. Do not forget to complete the "Throwback" problems! ☺

FACTOR EACH POLYNOMIAL COMPLETELY TO DETERMINE ITS ZEROS, AS WELL AS THE MULTIPLICITY OF EACH.

1. $3x^5 - 300x^3$

2. $x^2(x+6)^4 - 36(x+6)^4$

3. $2x^4 - 32x^2 + 3x^2 - 48$

4. $6x^2 + -7x - 5$

STATE THE ZEROS, AS WELL AS THE MULTIPLICITY OF EACH.
THEN REWRITE EACH POLYNOMIAL IN STANDARD FORM, AND IDENTIFY THE Y-INTERCEPT.

5. $(8-x)^2(x^2+7)$

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

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

WRITE A POLYNOMIAL FUNCTION FOR EACH SITUATION, BASED ON THE ZEROS.
WRITE YOUR FUNCTIONS IN FACTORED FORM, AND THEN CONVERT TO STANDARD FORM.
MAKE SURE ALL COEFFICIENTS ARE INTEGERS! ☺

8. Zeros: 3 (M.2) and ½

9. Zeros: i, i, and 3 (M.2)

10. Zeros: -5 and $\frac{3}{7}$

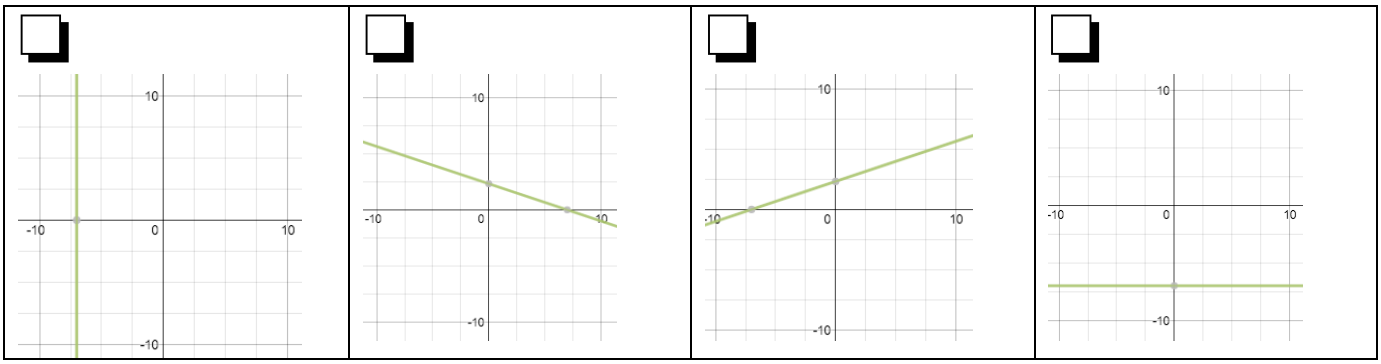
11. Zeros: -2A (M.2)

SOLVE THE PROBLEM, AND BE SURE TO SHOW AND EXPLAIN ALL WORK.

12. For a project, Ryan must design a box that is eight feet shorter than it is wide, and 3 feet shorter than double its width, in such a way that the box can hold as much volume as possible. Ryan is also restricted to a width of no more than two feet for the box. Determine the maximum volume such a box can have, as well as the width Ryan should use to create the box for this project.

THROWBACK!

13. Write the letter of the equation that corresponds to each graph in the provided boxes.



a. $x = -7$ b. $-7 = y$ c. $3x + 9y = 21$ d. $3x = 9y - 21$

14. Select the true statement.

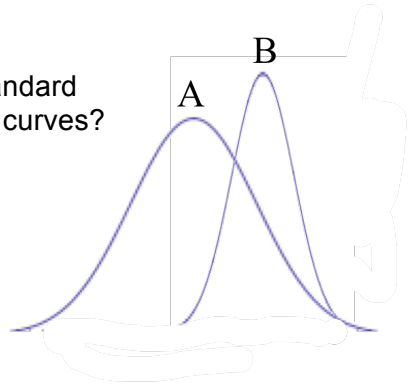
a. All lines are functions, and the domain and range of all lines consist of all real numbers.

b. Some lines are functions, and the domain and range of all lines consist of all real numbers.

c. Some lines are not functions. For those lines only, the domain contains all real numbers, but the range contains just one value.

d. Some lines are not functions. For those lines only, the range contains all real numbers, but the domain contains just one value.

15. Which data set has a higher mean? Which has a higher standard deviation? How did you know this, given the normal distribution curves?



16. A given data set has a mean of 45 and a standard deviation of 3. Provide ANY value that is within one standard deviation of the mean.

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Selected Solutions:

1. $3x^3(x - 10)(x + 10)$
Zeros: -10, 0 (M.3), and 10

3. $(2x^2 + 3)(x + 4)(x - 4)$
Zeros: -4, 4, $i\sqrt{(3/2)}$, and $-i\sqrt{(3/2)}$

5. Zeros: 8 (M.2), $-i\sqrt{7}$ and $i\sqrt{7}$
Standard form: $x^4 - 16x^3 + 71x^2 - 112x + 448$
y-intercept: (0,448)

7. Zeros: -4/3 and 2 (M.3)
$3x^4 - 14x^3 + 12x^2 + 24x - 24$
y-int: (0,-24)

9. $(x - 3)^2(x - i)(x + i)$
$x^4 - 6x^3 + 10x^2 - 6x + 9$

11. $(x - 2A)^2$
$x^2 - 4A + 4A^2$

Throwback:

13. A, C, D, B

14. d

15. Higher mean: set B (farther to the right)
Higher SD: set A (more spread out)

16. any numbers between but not including 42 and 48