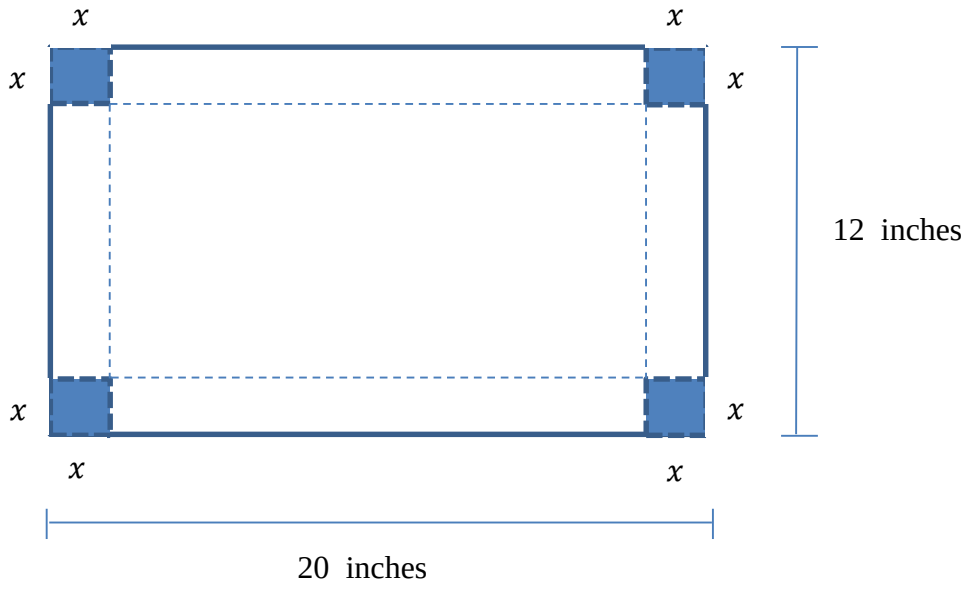
Honours GSE Algebra II/Advanced Algebra
Unit 2: Operations with Polynomials
Review for Mid-Unit Test

Name: _____

Date: _____ Period: _____

1. Making Boxes

Mary needs open-topped boxes to store her excess inventory at year's end. Mary purchases large rectangles of thick cardboard with a length of 20 inches and width of 12 inches to make the boxes. Mary is interested in maximizing the volume of the boxes and wants to know what size squares to cut out at each corner of the cardboard (which will allow the corners to be folded up to form the box) in order to do this.




(a) Volume is a three-dimensional measure. What is the third dimension that the value $x$ represents?

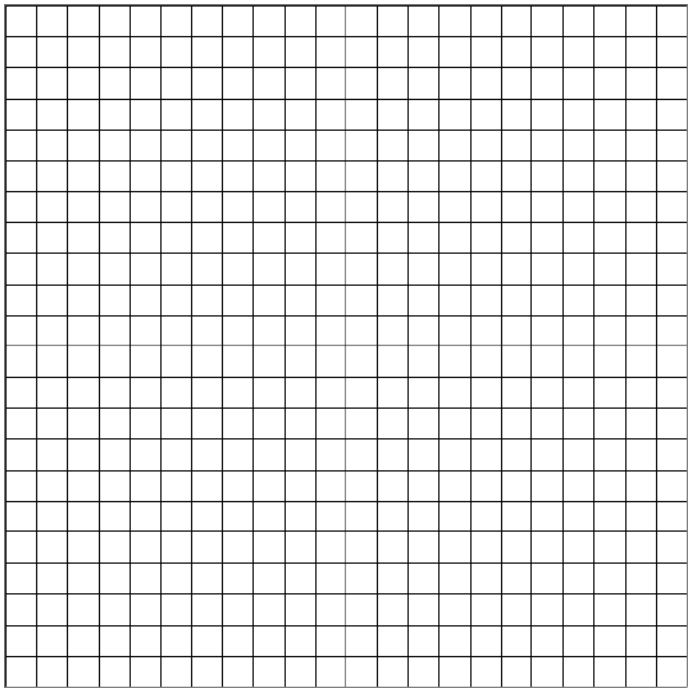
(b) Using the table below, choose five values of $x$ and find the corresponding volumes.

| $x$ | Length | Width | Volume |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

You tested several different values of $x$ above, and calculated five different volumes. There is a way to guarantee that you use dimensions that will maximize volume, and now we're going to work through that process.

(c) Write an equation for volume in terms of the three dimensions of the box.

(d) Graph the equation from part (c).



(e) From your graph, what are the values of the three dimensions that maximize the volume of the box? What is the maximum volume of the box?

Using words, classify the following polynomials by degree and number of terms.

| | Degree | Terms |
|---|---|---|
| 2. $4x^2 + 3x - 5$ | _____ | _____ |
| 3. $5x^3 - 2x^5 + 3x^2 - 3$ | _____ | _____ |
| 4. $7x^3$ | _____ | _____ |
| 5. $x - 3$ | _____ | _____ |
| 6. $2x^2 - 3x^5$ | _____ | _____ |
| 7. $6x^3 + 2x^2 + 4x^5 + 3x - 1$ | _____ | _____ |
| 8. $x^2 + 3x^5 - 2x + 2x^4 + 3x^3 - 5$ | _____ | _____ |
| 9. $2x^4 - 3x - 5$ | _____ | _____ |

10. Give an example of a quadratic trinomial. _____

11. Give an example of a cubic monomial. _____

12. Give an example of a quantic binomial. _____

Simplify each of the following.

13. $(2x^3 – 4x^2 + 5x + 3) + (2x^2 + 3x – 5)$ _____

14. $(3x^2 – 4x + 5) + (2x^3 + 5x + 1)$ _____

15. $(2x + 3) – (2x^3 + 4x^2 – 3x + 5)$ _____

16. $(5x^3 + 2x^2 – 3x + 1) – (5x^2 + 2x – 7)$ _____

17. $(x + 5)(x + 7)$ _____

18. $(x + 3)(2x + 3)$ _____

19. $(x + 3)(x – 2)$ _____

20. $(2x + 1)(x – 3)$ _____

21. $(x – 5)(x – 6)$ _____

22. $(x – 3)(3x – 4)$ _____

23. $(3x + 6)(2x + 7)$ _____

24. $(3x + 5)( 4x – 2)$ _____

25. $(2x^2 + 3x + 1)(2x^3)$ _____

26. $(x^2 + 3)(2x^3 – 4x^2 + 5x – 3)$ _____

Factor each of the following.

27. $x^2 – 16$ _____

28. $x^2 – 81$ _____

29. $x^2 + 49$ _____

30. $x^2 + 121$ _____

Expand each of the following using Pascal's Triangle. Circle your final answer.

31. $(x + 1)^4$

32. $(x - 2)^5$

33. $(x - 2y)^3$

Expand the following using the Binomial Theorem. Show your use of the Binomial Theorem and circle your final answer.

34. $(x + y)^7$