

## Honors Algebra 2 Summer Assignment Directions

The summer work for Algebra 2, is broken up into sections by week. It is expected that student spend a little time each week throughout the summer reviewing the concepts learned in Algebra 1 and Geometry so that they are able to retain information and concepts and can be successful in their upcoming and future math courses.

The timeline of work will also assist students in managing their time and gaining a deeper understanding of the math concepts and importance of these concepts in the world outside the classroom.

Each week, students will complete review activities to review important concepts from Algebra 1 that students will need to have mastered to be successful in Algebra 2. At the start of each week of activities, some review material and notes will be provided. If additional help is needed, students are also encouraged to look at Khan Academy and mathisfun.com.

The last two weeks of the summer work will allow students time to review all the content and skills and apply this knowledge to various situations and complete two longer assessments. Students will turn these in the week we return to school in the Fall to her math teacher and present work and findings to her class.

**The work in this assignment was completed by my daughter:**

**Parent Signature:** \_\_\_\_\_

The weeks and units will cover the following material:

**Week 1:** Suggested Dates: June 17 – 21

Review:

- Fraction Operations
- Decimal Operations
- Percent, Decimals, and Fraction Conversions
- Prime Factorization

**Week 2:** Suggested Dates: June 24 - 28

Review:

- Graphing
- Coordinate Plane
- Ordered Pairs
- Mapping

**Week 3:** Suggested Dates: July 1-5

Review:

- Properties of Real Numbers
- Classifying Numbers

**Week 4:** Suggested Dates: July 8 – 12

Review:

- Pythagorean Theorem
- Order of Operations
- Evaluating Expressions
- Using Formulas

**Week 5:** Suggested Dates: July 15 - 19

Review:

- Solving One and Two Step Equations
- Solving Inequalities
- Solving Ratios and Proportions

**Week 6:** Suggested Dates: July 22 – 26

Review:

- Calculating Slope
- Identifying the y-intercept
- Writing Linear Equations
- Graphing Linear Equations

**Weeks 7 and 8:** Suggested Dates: July 29 – August 8

Complete the Water Park activity and Math in the Real World to apply skills learned in Algebra 1 and Geometry and practiced in weeks 1-6. Be ready to return to school in the Fall and share your ideas and findings with your classmates.

**Week 1:** For the problems in this section, use the resources provided as well as any class notes or online sources to perform the indicated operation(s). The concepts in this week should be mastered for Algebra 2. Please show all work in the space provided and write your final answer on the line. If more space is needed a separate sheet can be used; but, please still write the final answers on the line.

Perform the following operations and write your answers in lowest terms.

1.  $\frac{2}{3} \times \frac{5}{8}$

1. \_\_\_\_\_

2.  $\frac{15}{8} - \frac{12}{5}$

2. \_\_\_\_\_

3.  $-\frac{6}{7} + \frac{3}{2}$

3. \_\_\_\_\_

4.  $\frac{1}{3} \div \frac{5}{2}$

4. \_\_\_\_\_

5.  $15\frac{3}{8} \div \frac{-4}{5}$

5. \_\_\_\_\_

6. Write the prime factorization of 360.

6. \_\_\_\_\_

7. Complete all missing blanks in the table below. Be sure fractions are written in lowest terms.

Percent	Fraction	Decimal
10%		
		0.2
	$\frac{3}{10}$	
62%		

Perform the indicated operations.

8.  $0.9256 - 8.6012$

8. \_\_\_\_\_

9.  $0.02 \times 1.45$

9. \_\_\_\_\_

10. In one particular suburb, 29.41% of families own a pug. If there are a total of 17 families in this neighborhood that own a dog in general, then how many dog owners own a pug? Round to the nearest hundredth if necessary.

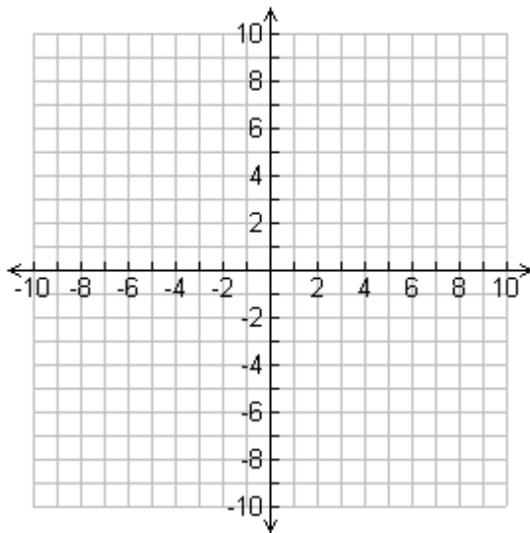
10. \_\_\_\_\_

**Week 2:** For the problems in this section, use the resources provided as well as any class notes or online sources to perform the indicated operation(s). The concepts in this week should be mastered for Algebra 2. Please show all work in the space provided and write your final answer on the line. If more space is needed a separate sheet can be used; but, please still write the final answers on the line.

1. Plot the points in the coordinate plane below *and* identify which quadrant they are in on the line.

- A.  $(-1, -1)$       B.  $(2, -3)$       C.  $(-3, 0)$       D.  $(5, 1)$

E. Identify the point already on the graph.



1A. \_\_\_\_\_

1B. \_\_\_\_\_

1C. \_\_\_\_\_

1D. \_\_\_\_\_

1E. \_\_\_\_\_

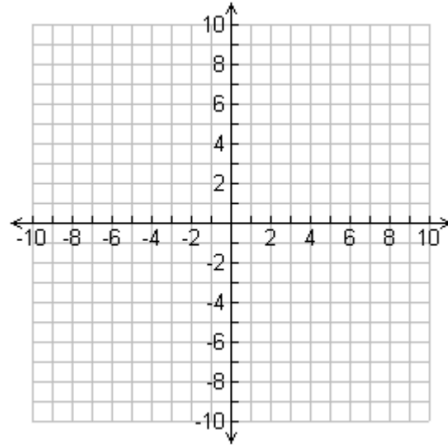
2. Write the following relation as a table, graph, and mapping in the space below.

$$\{(40,2), (45, 3), (50,4)\}$$

3. Graph the following equation using a table of values.

$$y = 2x + 1$$

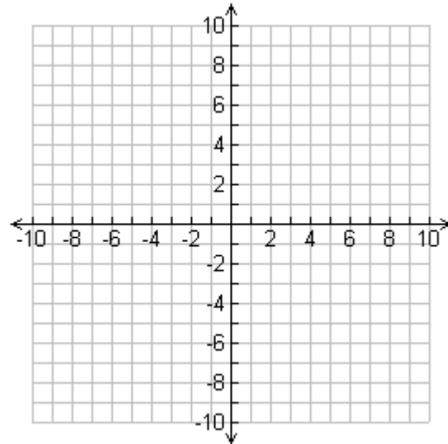
X	Y



4. Graph the following equation using a table of values.

$$y = -\frac{1}{2}x + 6$$

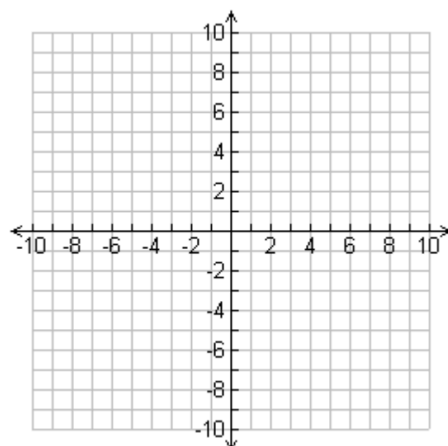
X	Y



5. Graph the following equation using a table of values.

$$2y + 3x = 9$$

X	Y



**Week 3:** For the problems in this section, use the resources provided as well as any class notes or online sources to perform the indicated operation(s). The concepts in this week should be mastered for Algebra 2. Please show all work in the space provided and write your final answer on the line. If more space is needed a separate sheet can be used; but, please still write the final answers on the line.

Identify the property being shown.

1.  $17 + 22 = 22 + 17$

1. \_\_\_\_\_

2.  $89 + 0 = 89$

2. \_\_\_\_\_

3.  $(8 + 4) + 5 = 8 + (4 + 5)$

3. \_\_\_\_\_

4.  $8(x + 4) = 8x + 32$

4. \_\_\_\_\_

5. Fill in the blanks to the following statements.

A. The commutative property applies to \_\_\_\_\_ and \_\_\_\_\_ . It states that the order of terms does not matter.

B. The associative property states that terms can be \_\_\_\_\_ in any order in \_\_\_\_\_ or \_\_\_\_\_ problems without affecting the answer.

6. Check the sets of real numbers to which each number belongs. You *may* check more than one box for each number.

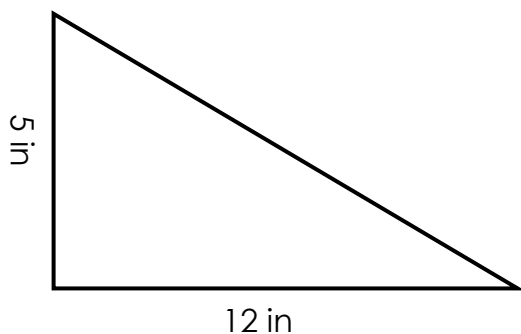
	<b>Natural</b>	<b>Whole</b>	<b>Integer</b>	<b>Rational</b>	<b>Irrational</b>
0.875					
4					
$\pi$					
$\overline{.625}$					
0					
$-\frac{7}{8}$					
$\sqrt{5}$					



**Week 4:** For the problems in this section, use the resources provided as well as any class notes or online sources to perform the indicated operation(s). The concepts in this week should be mastered for Algebra 2. Please show all work in the space provided and write your final answer on the line. If more space is needed a separate sheet can be used; but, please still write the final answers on the line.

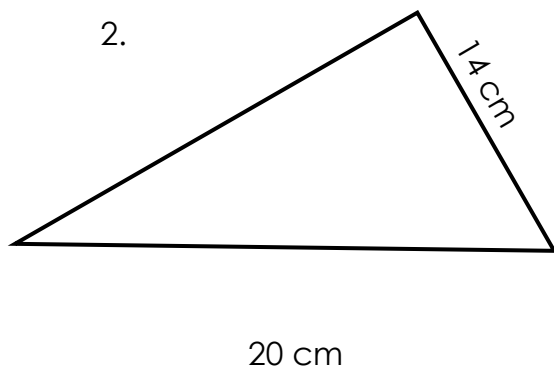
Find the measure of the missing side. Please show all work and round to the nearest hundredth if necessary.

1.



1. \_\_\_\_\_

2.



2. \_\_\_\_\_

3. A ladder is leaning up against a house. The foot of the ladder is 2.5 feet from the house. The ladder is 8 feet long. How far up the side of the house does it reach? (Hint: Draw a picture.)

3. \_\_\_\_\_

4. Simplify using order of operations.

$$-21 \div 3 + (3 \times 9) \times 9 + 5$$

4. \_\_\_\_\_

5. Ivan bought P pounds of peaches at \$2.29 per pound and G pounds of grapes at \$3.79 per pound.

A. Write an expression that give the amount Ivan paid for the peaches and grapes.

5A. \_\_\_\_\_

B. Suppose he bought 2 pounds of peaches and 3 pounds of grapes. How much did he spend total? Show the work of how you obtained your answer.

5B. \_\_\_\_\_

C. Suppose he spend \$15.24 in total. If he only bought one pound of grapes, how many pounds of peaches did he buy? Show the work of how you obtained your answer.

5C. \_\_\_\_\_

6. Evaluate the following when  $a = 4$  and  $b = 5$ .

A.  $\frac{b^2+2ab}{4}$

6A. \_\_\_\_\_

B.  $\frac{b-a+7}{a^2+b}$

6B. \_\_\_\_\_

C.  $\frac{-b+a^2}{(a-b)^3}$

6C. \_\_\_\_\_

D.  $2a^2 - 9$

6D. \_\_\_\_\_

7. Find the surface area of a rectangular prism with length 10 inches, width 4 inches, and height 5 inches.

7. \_\_\_\_\_

8. Find the volume of a sphere with diameter of 6 inches.

8. \_\_\_\_\_

**Week 5:** For the problems in this section, use the resources provided as well as any class notes or online sources to perform the indicated operation(s). The concepts in this week should be mastered for Algebra 2. Please show all work in the space provided and write your final answer on the line. If more space is needed a separate sheet can be used; but, please still write the final answers on the line.

Solve the following equations for the unknown variable.

1.  $5x - 3 = 12$

1. \_\_\_\_\_

2.  $2 - 3x = 7$

2. \_\_\_\_\_

3.  $8 - \frac{x}{2} = 3$

3. \_\_\_\_\_

4.  $3x - 5 + 2x = 7 - x$

4. \_\_\_\_\_

5.  $2(x + 1) = -12 + 2x$

5. \_\_\_\_\_

6.  $\frac{3}{4}d - \frac{1}{2} = \frac{3}{8} + \frac{1}{2}d$

6. \_\_\_\_\_

7.  $-5(h + 12) - (4h - 2) = h - 8$

7. \_\_\_\_\_

8. The sum of two consecutive integers is one less than three times the smaller integer. Find the two integers.

8. \_\_\_\_\_

Solve each inequality and graph the solution on a number line.

9.  $25 - 3(n - 2) \geq -8 + 6$

9. \_\_\_\_\_

10.  $7k + 1 \leq 8$  or  $-7 < k - 10$

10. \_\_\_\_\_

11.  $-4 < -3b + 2 \leq 20$

11. \_\_\_\_\_

Solve each proportion for the unknown variable.

12.  $\frac{x}{21} = \frac{3}{63}$

12. \_\_\_\_\_

13.  $\frac{3+y}{4} = \frac{-y}{8}$

13. \_\_\_\_\_

14. Use proportions to find the price of each item. When discount and sales tax are listed, compute the discount before tax.

- A. 2 concert tickets: \$28  
Student discount: 28%

14A. \_\_\_\_\_

- B. Camera: \$110.95  
Discount: 20%  
Tax: 5%

14B. \_\_\_\_\_

**Week 6:** For the problems in this section, use the resources provided as well as any class notes or online sources to perform the indicated operation(s). The concepts in this week should be mastered for Algebra 2. Please show all work in the space provided and write your final answer on the line. If more space is needed a separate sheet can be used; but, please still write the final answers on the line.

Calculate the slope of the line that passes through the points.

1.  $(4, 9)$   $(1, -6)$  1. \_\_\_\_\_

2.  $(1, -2)$   $(-2, -5)$  2. \_\_\_\_\_

3. Determine the value of  $r$  so that the line passes through each pair of points has the given slope.  
 $(6, 8)$   $(r, -2)$  slope = 1

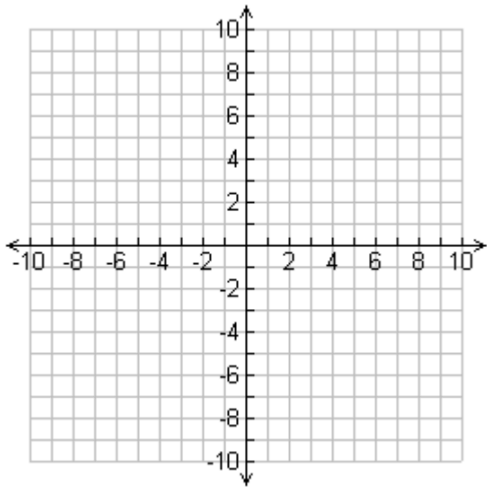
3. \_\_\_\_\_

4. Write the equation of a line that has a slope of  $\frac{2}{5}$  and passes through the point  $(-5, 0)$ .

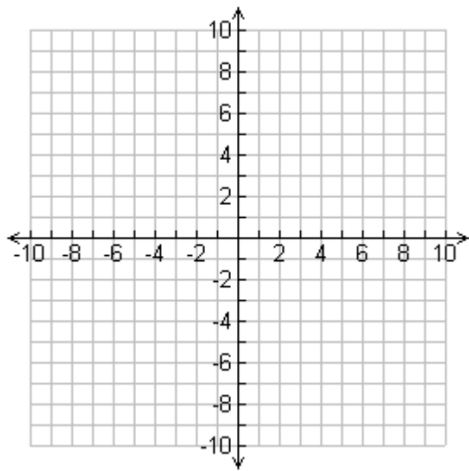
4. \_\_\_\_\_

5. Write the equation of a line that has a slope of  $-\frac{2}{3}$  and passes through the point  $(3, -5)$ .

6. Graph the following equation using any method.  $y = -\frac{1}{2}x + 5$ . \_\_\_\_\_



7. Graph the following equation using any method.  $6x + 3y = 6$



8. A video store charges a one-time membership fee of \$11.75 plus \$1.50 per video rental. Write an equation to identify how many videos Ridgely rents if she spends \$72.

8. \_\_\_\_\_



9. Donna went to the mall and spent \$41. She bought several t-shirts that each cost \$12 and she bought one pair of socks for \$5. Write an equation to identify how many t-shirts Donna bought.

9. \_\_\_\_\_

10. Write the following equation in slope intercept form. Then, identify the slope and the y-intercept.

$$y - 4 = -3(x + 6)$$

10. \_\_\_\_\_

11. Identify the x and y intercepts of the line represented by the equation below.

$$2x + y = 10$$

11. \_\_\_\_\_

**Weeks 7 & 8:**

Complete the following activity to apply all that you have learned and reviewed this summer. This assignment will be tuned into your Algebra 2 teacher the first week of school and your findings will be shared with your classmates. Take your time on the assignment and do your best work!

## Application #1: Water Park Project

**Step 1: Designing your Park**

You have recently been hired to create a blueprint for a water park. Your boss, Gelatinous Harrington, is a very controlling person. She wants you to include specific attractions and necessities in your design. Be prepared to answer her questions before you have had enough time to adequately explain what you are doing. First off, she wants it to be done on a large sheet of graph paper so that she can apply her mathematical knowledge to make the park the best it can be. She has issues and will yell at you if you do not do this properly. Before starting your blueprint, identify the center of your paper, and use a ruler to draw in the x and y axes. Then, you need to plot the approximate entrance points (where the line starts!) of each attraction on the graph paper and draw in the remaining part of the attraction around it in a creative fashion. Try to spread them out as much as possible. Think of an actual amusement park layout. Use a pencil to draw the items and then go back and color them in with colored pencils. Creativity will be included in the grade for this portion.

Items to be included on the design are listed below:

- Help center
- Large whirlpool
- 3 different water slides (use your imagination)
- Toddler area
- Lazy river
- Concessions
- Gift shop
- Restrooms
- Security desk

You must also have a name for your water park

## Task 2: Naming your Coordinates

After planning out the layout and design of each water park attraction, you must identify its location by using ordered pairs. Use your “entrance points” as the attractions identifiable location and fill in the chart below accordingly!

<b>Location:</b>	<b>Ordered Pairs:</b>
Help Center	( _____ , _____ )
Large Whirlpool	( _____ , _____ )
Water Slide #1	( _____ , _____ )
Water Slide #2	( _____ , _____ )
Water Slide #3	( _____ , _____ )
Toddler Area	( _____ , _____ )
Lazy River	( _____ , _____ )
Concessions	( _____ , _____ )
Gift Shop	( _____ , _____ )
Restrooms	( _____ , _____ )
Security Desk	( _____ , _____ )

**Task 3: Calculating the Slope:**

After identifying each attraction's location with ordered pairs, you are now ready to calculate the slope between attractions using the slope formula,

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Using a RED pencil and a ruler, MARK the direct path to/from the locations mentioned below. Calculate the slope of the line that is formed and show your work in the space provided.

Help Center to Water Slide #1	Toddler Area to Concessions
Gift Shop to Restrooms	Security Desk to Water Slide #2
Lazy River to Large Whirlpool	Help Center to Gift Shop
Restrooms to Water Slide #3	Concessions to Lazy River

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#### Task 4: Calculating the Midpoint

Sally Toodles is meeting her mom at the halfway point between the attractions listed above. They have asked you to calculate their meeting spots, by applying the midpoint formula,  $MP = \left( \frac{x_2+x_1}{2}, \frac{y_2-y_1}{2} \right)$

Mark the MIDPOINTS with RED POINTS and show your work in the space provided!

Help Center to Water Slide #1	Toddler Area to Concessions
Gift Shop to Restrooms	Security Desk to Water Slide #2
Lazy River to Large Whirlpool	Help Center to Gift Shop
Restrooms to Water Slide #3	Concessions to Lazy River

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### Task 5: Calculating the Distance

Congratulations! After working hard to design your park on a coordinate system, your supervisor is very pleased with your efforts and the results! Now that the planning stage is finished, your park has been selected for construction. Site development is underway, and you have been hired as a consultant to work with the development team. Your role is to apply your math skills in the following tasks, which will then be submitted for review to your supervisor. Keep your work neat and organized so that they can accurately assess your abilities.

A team of surveyors is trying to determine how large a space they will need to design your park. You have been asked to determine, using the distance formula, how far away certain attractions are from one another. This will provide them with the information they need to expand the park from your scaled blueprint to actual dimensions. Calculate the distance in unit dimensions by applying your selected attraction points (Task 2) and the distance formula,

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Show all work in the space provided.

Help Center to Water Slide #1	Toddler Area to Concessions
Gift Shop to Restrooms	Security Desk to Water Slide #2

Lazy River to Large Whirlpool	Help Center to Gift Shop
Restrooms to Water Slide #3	Concessions to Lazy River

### Task 6: Converting to Actual Dimensions

Your water park design has been drawn as a blueprint, but to build it, you will need actual dimensions in lieu of the unit dimensions. A large rectangular plot of land has been selected for development, and the city has given approval for construction. Knowing that the actual dimensions for the land is 301m x 196 m in size, determine the scale of your coordinate system.

**1<sup>st</sup>:** count the number of spaces along the length of your paper: \_\_\_\_\_ spaces.

**2<sup>nd</sup>:** set a ratio equal to \_\_\_\_\_ spaces per 301m.

Now, use this ratio to solve for the actual unknown distances by setting up a proportion and calculating. Show your work!

Show your work in the space provided!

Help Center to Water Slide #1	Toddler Area to Concessions
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Gift Shop to Restrooms	Security Desk to Water Slide #2
Lazy River to Large Whirlpool	Help Center to Gift Shop
Restrooms to Water Slide #3	Concessions to Lazy River

### **Task 7: Reporting your Findings**

As you prepare for the review of your work, there is one more task that needs completion. You will be writing an expository paper to explain the process of your work. By communicating your deeds in a written format, you are communicating your understanding of the work that you have successfully completed. If communicated well, you may be promoted within your organization. Lastly, conclude your paper with a personal reflection of the work.

- Pick a presentation format: poster board, PowerPoint, video, brochure, or anything else.
- Your presentation should include your water park blueprint, all calculations being certain to identify the theme and importance of each task.
- Also, provide answers to the following questions:
  - o What are your thoughts/feelings in regard to the work that you produced during this project?



- How could the information you learned, the tasks you did, or the skills you developed help you or your community in the future?
- Be certain your presentation and work are all neatly done.

## Application #2: Community Project

Objective to obtain an interview with a person within the community who uses math on a daily basis and understand how math relates to the real world outside the classroom.

How to go about this project:

1. Initiate an interview with a person within the community who uses math on a daily basis. Schedule a date and time for the interview.
2. Compile a list of interview question in addition to those listed. You will need at least four additional questions to those on the list. Please be certain to write them in. Think of things that you would like to find out about as well as what other may wish to know. These should be written **prior** to the interview.
3. Interview person of interest. Optional: you may wish to record the interview to be turned in with your report. Video recorded interviews may be shown to classes but get permission before recording. Video interviews must range between 5 and 10 minutes.
4. Write a paper or create a presentation to include: reason why you chose this person to interview, summary of questions asked with responses, information you learned through this interview, explanation of whether or not this career interests you, how it applies to something you have learned or will be learning in Algebra 2, specific math skills needed to perform tasks within the job. You may also include any photographs or videos from the interview.

Person Interviewing: \_\_\_\_\_

Occupation: \_\_\_\_\_

Date of Interview: \_\_\_\_\_

1. What is your occupation?
2. Where do you work?
3. How long have you worked there?
4. Is a degree required to apply for this position? If so, what is the degree?
5. What skills must you have in order to do your job?
6. What is a typical day like when you go to work?
7. How do you use math on a daily basis?
8. What type of math do you use?
9. What do you like most about your job?
10. What do you like least about your job?
11. Would you recommend this occupation to others? Explain.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.