**NUTS & BOLTS - ALGEBRA 1**

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| **UNIT 10** |
| * You should be able to graph **SQUARE ROOT**, **CUBIC**, **CUBE ROOT**, **ABSOLUTE VALUE**, and **PIECEWISE** functions. * If a sequence has a *common difference*, it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * If a sequence has a *common ratio*, it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * To find the *n*th term of a sequence, use the formula on the reference sheet! * To write an explicit formula, use the reference sheet formula and plug in   everything except \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ , then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   * In a recursive formula, block out the notation and find the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * When *f(x)* is transformed into *f(x) + k*, this is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * When *f(x)* is transformed into *f(x+k)*, this is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * When *f(x)* is transformed into *–f(x)*, this is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * When *f(x)* is transformed into *f(-x)*, this is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * When *f(x)* is transformed into  and , the graph gets \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * When *f(x)* is transformed into  and , the graph gets \_\_\_\_\_\_\_\_\_\_\_. |

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| **UNIT 11** |
| * You should know these statistical graphs: **DOT PLOT**, **BOX PLOT**, **TWO-WAY FREQUENCY TABLE**, and **SCATTER PLOT**\_. * The mean is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and is represented by \_\_\_\_\_\_\_\_\_\_\_\_. * The median is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * The mode is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * The range is the difference between the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * The interquartile range (IQR) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * Standard deviation is represented by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * The variable on the *x*-axis is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variable and   the variable on the *y*-axis is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_variable.   * The line of best fit can also be called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * When the calculator gives you the equation for the line or curve of best fit,   you are performing a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   * The correlation coefficient is represented by \_\_\_\_\_\_\_\_\_\_\_\_\_\_. All correlation   coefficients must be between \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. To find the  correlation coefficient on the calculator, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   * When a change in one variable produces a change in the other, the variables   are said to have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ relationship.   * To find a residual: * In a residual plot, a line is the best fit if the points are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   A line is not the best fit if the points \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  The closer the residual plots are to the *x*-axis, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |

1. The table below shows the temperature, *T(m)*, of a cup of hot chocolate that is allowed to chill over several minutes, *m*.



Which expression best fits the data for *T(m)*?

(1)  (3) 

(2)  (4) 

2. A computer application generates a sequence of musical notes using the function , where *n* is the number of the note in the sequence and  is the note frequency in hertz. Which function will generate the same note sequence as ?

(1)  (3) 

(2)  (4) 

3. The function, *t(x)*, is shown in the table below.



Determine whether *t(x)* is linear or exponential. Explain your answer.

4. Which scenario represents exponential growth?

(1) A water tank is filled at a rate of 2 gallons/minute.

(2) A vine grows 6 inches every week.

(3) A species of fly doubles its population every month during the summer.

(4) A car increases its distance from a garage as it travels at a constant speed of 25 miles per hour.

5. Nancy works for a company that offers two types of savings plans. Plan *A* is represented on the graph below.



Plan *B* is represented by the function , where *x* is the number of weeks. Nancy wants to have the highest savings possible after a year. Nancy picks Plan *B*.

Her decision is

(1) correct, because Plan *B* is an exponential function and will increase at a faster rate.

(2) correct, because Plan *B* is a quadratic function and will increase at a faster rate.

(3) incorrect, because Plan *A* will have a higher value after 1 year.

(4) incorrect, because Plan *B* is a quadratic function and will increase at a slower rate.

6. The graph of the function  is shown below.



The domain of this function is

(1)  (3) 

(2)  (4) 

7. Graph the function  on the set of axes below.



8. Richard is asked to transform the graph of *b(x)* below.



The graph of *b(x)* is transformed using the equation . Describe how the graph of *b(x)* changed to form the graph of *h(x)*.

9. Graph  and  on the grid below.

Does ? Use your graph to explain why or why not.



10. In 2014, the cost to mail a letter was 49 cents for up to one ounce. Every additional ounce cost 21 cents. Which recursive function could be used to determine the cost of a 3-ounce letter, in cents?

(1) 

(2) 

(3) 

(4) 

11. Which recursively defined function represents the sequence

3, 7, 15, 31, …?

(1) 

(2) 

(3) 

(4) 

12. Marcel claims that the graph below represents a function.



State whether Marcel is correct. Justify your answer.

13. Sandy programmed a website’s checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $0.99.

State an equation that represents the cost, *C*, when *s* songs are downloaded.

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

14. Which statistic can *not* be determined from a box plot representing the scores on a math test in Mrs. DeRidder’s algebra class?

(1) the lowest score

(2) the median score

(3) the highest score

(4) the score that occurs most frequently

15. A radio station did a survey to determine what kind of music to play by taking a sample of middle school, high school, and college students. They were asked which of three different types of music they prefer on the radio: hip-hop, alternative, or classic rock. The results are summarized in the table below.



What percentage of college students prefer classic rock?

(1) 14% (3) 33%

(2) 28% (4) 58%

16. What type of relationship exists between the number of pages printed on a printer and the amount of ink used by that printer?

(1) positive correlation, but not causal

(2) positive correlation, and causal

(3) negative correlation, but not causal

(4) negative correlation, and causal

17. Analysis of data from a statistical study shows a linear relationship in the data with a correlation coefficient of . Which statement best summarizes this result?

(1) There is a strong positive correlation between the variables.

(2) There is a strong negative correlation between the variables.

(3) There is a moderate positive correlation between the variables.

(4) There is a moderate negative correlation between the variables.

18. The table below shows 6 students’ overall averages and their averages in math class.



If a linear model is applied to these data, which statement best describes the correlation coefficient?

(1) It is close to -1. (3) It is close to 0.

(2) It is close to 1. (4) It is close to 0.5.

19. After performing analyses on a set of data, Jackie examined the scatter plot of the residual values for each analysis. Which scatter plot indicates the best linear fit for the data?



20. The data table below shows the median diameter of grains of sand and the slope of the beach for 9 naturally occurring ocean beaches.



Write the linear regression equation for this set of data, rounding all values to the *nearest thousandth.*

Using this equation, predict the slope of the beach, to the *nearest tenth of a degree*, on a beach with grains of sand having a median diameter of 0.65 mm.

21. Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, *f(x)*, in terms of the number of cards she makes, *x*.



Write a linear function, *f(x)*, that represents the data.

Explain what the slope and *y*-intercept of *f(x)* mean in the given context.