**UCS Algebra II Semester 1 REVIEW GUIDE 1 Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **1** | The box-and-whisker plot shows the weight distribution among 200 professional football players. Which of these is the BEST estimate of the number of players that weigh more than 270 pounds? |
|  | **A** | 25  | **C** | 70 |
|  | **B** | 50 | **D** | 100 |

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| **2** | The two box-and-whisker plots below show data regarding the basketball scores for Season 1 and Season 2 at Eisenhower High School. Which statement is true about these two sets of data? |
|  | **A** | The means for Season 1 and Season 2 are equal. |
|  | **B** | The median for Season 1 is greater than the median for Season 2 |
|  | **C** | The interquartile range for Season 1 is greater than the interquartile range for Season 2. |
|  | **D** | The interquartile range for Season 2 is greater than the interquartile range for Season 1. |

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| **3** | These two box plots show the ages of the members in Which statement describes a difference between the two data sets? |
|  | **A** | The West Side Gym ages have a greater range. |
|  | **B** | The West Side Gym ages have a greater interquartile range. |
|  | **C** | The West Side Gym ages are skewed toward the younger members. |
|  | **D** | The West Side Gym ages have a lower median. |
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| **4** | Julio conducted a survey of 100 workers to determine the length of time they spent commuting to work. If the results of the survey were normally distributed, about how many people out of 1,000 can Julio predict will spend more than 20 minutes commuting to work? |
|  | **A** | 160 | **C** | 660 |
|  | **B** | 340 | **D** | 840 |
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| **5** | Mark is creating a survey to study how the amount of homework in his school varies with grade level. Which of the following is the BEST way for Mark to collect the information? |
|  | **A** | He gives a survey to all the seniors that asks, “How many more hours per week do you think you spend on homework than freshmen?” |
|  | **B** | He gives a survey to all the juniors and seniors that asks, “Do you agree that you have more homework now than you did in the first two years of high school?” |
|  | **C** | He gives a survey to everyone in the school that asks, “Which grade level receives the most homework?” He keeps separate results for underclassmen and upperclassmen. |
|  | **D** | He gives a survey to everyone in the school that asks, “How many hours of homework do you have per week?” He keeps separate results for freshmen, sophomores, juniors, and seniors. |
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| **6** | Naomi is conducting a survey to determine which after-school activity is most popular at her high school. There are 1,352 students at her school. Which method of sampling BEST represents the school’s population? |
|  | **A** | surveying 37 students in art class |
|  | **B** | surveying 25 students at a Saturday football game |
|  | **C** | surveying every sixth student who enters the school in the morning |
|  | **D** | surveying the coaches of the track and field team and the sponsors of the cheerleading squad |

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| **7** | A large city has two baseball teams, team A and team B. A survey asked people whether they were fans of team A only, team B only, both teams, or neither team. Here are the survey data.  Assume the sample is unbiased. Based on the survey results, which estimation of the proportion of city residents who are team A fans is BEST? |
|  | **A** | 69% | **C** | 31% |
|  | **B** | 56.7% | **D** | 5.4% |
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| **8** | The graph shows the total number of students in each grade at Valley High School and the total number of students in each grade who purchased tickets to the school carnival. At which grade level is the percentage of students who purchased tickets to the carnival the lowest? |
|  | **A** | 9th Grade | **C** | 11th Grade |
|  | **B** | 10th Grade | **D** | 12th Grade |
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| **9** | Valleyview High School scored https://www98.achievedata.com/imagebank/14165331.jpg points against Newtown High School. Newtown scored https://www98.achievedata.com/imagebank/14165341.jpg points and lost by https://www98.achievedata.com/imagebank/14165351.jpg points. What equation relates the variables https://www98.achievedata.com/imagebank/14165361.jpg, https://www98.achievedata.com/imagebank/14165371.jpg, and https://www98.achievedata.com/imagebank/14165381.jpg? |
|  | **A** | L = V + N |
|  | **B** | V = N + L |
|  | **C** | V = N − L |
|  | **D** | N = L – V |
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| **10** | A farmer has no more than 50 acres for planting alfalfa and soybeans and has a maximum of $1200 to spend on the planting. It costs $20/acre to plant alfalfa and $30/acre to plant soybeans. Which set of inequalities represents this situation? Let *a* = acres of alfalfa and *b* = acres of soybeans. |
|  | **A** | a+b ≤ 50; 20a + 30b ≤ 1200 | **C** | a+b ≤ 20; 20a + 30b ≥ 1200 |
|  | **B** | a+b ≥ 50; 20a + 30b ≤ 1200 | **D** | a+b ≤ 1200; 20a + 30b ≤ 50 |

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| **11** | A rectangle has sides $a=x^{2}+2x-1$ and $b=3-x$ . If  $A(x)$ is the area of the rectangle, what is the coefficient of $x$ in $A(x)$? |
|  | **A** | -2 | **C** | 6 |
|  | **B** | 1 | **D** | 7 |

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| **12** | Which of the following expressions is equivalent to$$64x^{4}-36y^{2}$$ |
|  | **A** | $$(8x-6y)^{2}$$ | **C** | $$4(4x^{2}-3y)^{2}$$ |
|  | **B** | $$(8x-6y)(8x+6y)$$ | **D** | $$4(4x^{2}-3y)(4x^{2}+3y)$$ |

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| **13** | Given that $p(x)$ is a polynomial function and$ p\left(-5\right)=0$, which expression is a factor of $(x)$ ? |
|  | **A** | $$5x$$ | **C** | $$x-5$$ |
|  | **B** | $$-5x$$ | **D** | $$x+5$$ |

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| **14** | The height of a pole-vaulter, *h* , depends on his speed, s , in feet per second. Emilio’s pole-vaulting height can be modeled by this function: $$h\left(s\right)=0.03s^{2}$$ Which set of numbers describes the range of this function? |
|  | **A** | { all natural numbers}  | **C** | { all non-negative real numbers}  |
|  | **B** | { all positive integers}  | **D** | { all real numbers greater than 0.03}  |
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| **15** | Steve drove $450.2$ miles to his destination. To find the rate at which he drove on his trip, Steve used the function $\left(x\right)=\frac{450.2}{x}$ , where *x* represents time, in hours, and $f(x)$ represents the rate, in miles per hour. What is the domain of his function? |
|  | **A** |  $X<0 $or ( -∞, 0 ] | **C** |  All real numbers or (-∞, ∞) |
|  | **B** |  $X>0 $or ( 0, ∞) | **D** |  All positive integers |
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| **16** | What is the **approximate** average rate of change in the velocity of Andy’s car between minute 2 and minute 7?

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| **A** | $-\frac{1}{2}$ mph per minute |
| **B** | $2$ mph per minute |
| **C** | $-4$ mph per minute |
| **D** | $-20$ mph per minute |

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| **17** | Given the graph below, which statement is correct?  |
|  | **A** | As $x\rightarrow -\infty $, $f\left(x\right)\rightarrow +\infty $ and as $x\rightarrow +\infty $, $f\left(x\right)\rightarrow +\infty $ |
|  | **B** | As $x\rightarrow -\infty $, $f\left(x\right)\rightarrow -\infty $ and as $x\rightarrow +\infty $, $f\left(x\right)\rightarrow +\infty $ |
|  | **C** | As $x\rightarrow -\infty $, $f\left(x\right)\rightarrow 0$ and as $x\rightarrow +\infty $, $f\left(x\right)\rightarrow -\infty $ |
|  | **D** | As $x\rightarrow -\infty $, $f\left(x\right)\rightarrow 0$ and as $x\rightarrow +\infty $, $f\left(x\right)\rightarrow 0$ |

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| **18** | The graph of the quadratic function  is shown below.Which of the following statements is **FALSE** for this function? |
|  | **A** | 4 is a root of the equation . |
|  | **B** | 4 is a solution of the equation $0=x^{2}-x-12$. |
|  | **C** | 4 is a zero of the function . |
|  | **D** | 4 is the only $x$ -intercept of the function . |

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| **19** | The x-intercepts of a graph are: -3, -1, and 4. What are the factors of the polynomial expression for this graph? |
|  | **A** | $$(x-3)(x-1)(x+4)$$ | **C** | $$x(x-3)(x-1)(x+4)$$ |
|  | **B** | $$(x+3)(x+1)(x-4)$$ | **D** | $$x(x+3)(x+1)(x-4)$$ |

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| **20** | Find the vertex and axis of symmetry for the function $\left(x\right)=-2\left(x-4\right)^{2}+10$ . |
|  | **A** | $$\left(-4, 10\right); x=-4$$ | **C** | $$\left(4, 10\right); x=4$$ |
|  | **B** | $$\left(4, -10\right); x=4$$ | **D** | $$\left(4, 10\right); x=-2$$ |

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| **21** | What is the correct representation of the complex number whose real part is  and whose imaginary part is $\sqrt{-81} $? |
|  | **A** | $$-9+4i$$ | **C** | $$4-9i$$ |
|  | **B** | $$-4+9i$$ | **D** | $$9-4i$$ |

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| **22** | If   , which expression is the product of  and , in $a+bi$ form? |
|  | **A** |  | **C** |  |
|  | **B** |  | **D** |  |
| **23** | Which of the following is a solution to the quadratic equation  ? |
|  | **A** |   | **C** |   |
|  | **B** |   | **D** |   |

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| **24** | Which expression shows the completely factored form over the complex numbers of  ? |
|  | **A** | $$2(x^{2}+25)$$ | **C** | $$(2x+5)(x+10)$$ |
|  | **B** | $$2(x+5i)(x-5i)$$ | **D** | $$(2x+5i)(x-10i)$$ |

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| **25** | A polynomial function has zeros at: $1, -3, and -2i$. Which of the following could be that equation? And what is the degree of the equation?  |
|  | **A** | $$\left(x+1\right)\left(x-3\right)\left(x-2i\right)=0$$Degree of 3 | **C** | $$\left(x-1\right)\left(x+3\right)\left(x+2i\right)=0$$Degree of 3 |
|  | **B** | $$\left(x+1\right)\left(x-3\right)(x+2i)\left(x-2i\right)=0$$Degree of 4 | **D** | $$\left(x-1\right)\left(x+3\right)\left(x+2i\right)(x-2i)=0$$Degree of 4 |

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| **26** |  Given: $P\left(x\right)=\left(x+2\right)^{2}(x-1)(x^{2}+25)$.* How many real zeros are there?
* How many total zeros?
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|  | **A** | 2 real, 5 total | **C** | 3 real, 5 total |
|  | **B** | 3 real, 3 total | **D** | 3 real, 6 total |

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| **27** | Which expression is the result of using the polynomial identity $a^{2}-b^{2}=(a+b)(a-b)$ to rewrite $25p^{2}-16q^{2}$ in factored form? |
|  | **A** | $$(20p+2q)(5p-8q)$$ | **C** | $$(25p+2q)(p-8q)$$ |
|  | **B** | $$(5p+4q)(5p-4q)$$ | **D** | $$(10p+8q)(15p-8q)$$ |
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| **28** | On what intervals is this function *decreasing?*  |
|  | **A** | D: (-3 , -1) and (1, ∞) | **C** | D: (-∞, +∞) |
|  | **B** | D: (-∞ , -3) and (-1, 1) | **D** | D: (2, -1) and (3, -∞)  |
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| **29** | On what intervals is this function *increasing?*  |
|  | **A** | D: (-3 , -1) and (1, ∞) | **C** | D: (-∞, +∞) |
|  | **B** | D: (-∞ , -3) and (-1, 1) | **D** | D: (0, 3) and (1, ∞) |
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| **30** | What are the domain and range of $(x)=\frac{3x+4}{x+1}$ ? |
|  | **A** | domain: all real numbers except$ -1$ range: all real numbers except $-3$ | **C** | domain: all real numbers except range: all real numbers except$-3$  |
|  | **B** | domain: all real numbers except range: all real numbers except  | **D** | domain: all real numbers except range: all real numbers except  |
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| **31** | The area of the rectangle shown below is given by $A=x(3y+4)$. ***x*****3*y +* 4**When this formula is rearranged to solve for y, a set of steps should be applied to both sides of the equation. What is the correct order of steps? |
|  | **A** | subtract 4 , divide by 3 , divide by x | **C** | divide by x , divide by 3 , subtract 4 |
|  | **B** | distribute x to 3y and 4, subtract 4, divide by 3 | **D** | distribute x to 3y and 4 , subtract 4x , divide by 3x |

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| **32** | What are all the vertical asymptotes of the graph of  $f\left(x\right)$ ?$$f\left(x\right)=\frac{x+5}{x^{2}-4x-5}$$  |
|  | **A** | *x* = –1 | **C** | *x* = –1 and *x* = 5 |
|  | **B** | *x* = 1 | **D** | *x* = 1 and *x* = –5 |

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| **33** | The volume of a right circular cone is given by the equation, V $=\frac{1}{3}πr^{2}h$ , where $V=$ volume, $h= $height, and $r=$ radius of the base. Angie knows the volume and radius of a cone. Which equation could she use to find the height of the cone? |
|  | **A** | $$h=\frac{3V}{πr^{2}}$$ | **C** | $$h=\frac{V}{3πr^{2}}$$ |
|  | **B** | $$h=\frac{1}{3}Vπr^{2}$$ | **D** | $$h=\frac{Vπ}{3r^{2}}$$ |
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| **34** | Which statement BEST describes the graph of the function f(x) = x3 – 4x2 – 12x and its zeros? |
|  | **A** | The zeros are x = -6 and x = 2, and the ends of the polynomial graph both go upward. |
|  | **B** | The zeros are x = -2 and x = 6, and the ends of the polynomial graph both go downward. |
|  | **C** | The zeros are x = -2, x = 0, and x = 6, and the ends of the polynomial graph go in opposite directions – down on the left and up on the right. |
|  | **D** | The zeros are x = -6, x = 0, and x = 2, and the ends of the polynomial graph go in opposite directions – down on the left and up on the right. |
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| **35** | Two functions are graphed below. The function for graph *A* is$ y=\left|x\right|$. What is the equation of graph B?  |
|  | **A** | $$y=\left|x\right|+3$$ | **C** $ y=\left|x+3\right|$ |
|  | **B** | $$y=\left|x\right|-3$$ | **D** $ y=\left|x-3\right|$ |

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| **36** The equation $y=x^{2}$  is graphed on the coordinate plane.   Which graph represents $=2(x-3)^{2}+2$ ? |
|  | **A** |  | **C** |  |
|  | **B** |  | **D** |  |
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| **37** | Which statement BEST compares the functions $h\left(x\right)=x^{2}+2x-8$ and $g(x)$, shown in the graph below?  |
|  | **A** | Both functions have a root at $=2$ . | **C** Both functions cross the $y$-axis at$ (0,4)$. |
|  | **B** | Both functions have $ (x+4)$ as a factor. | **D** Both functions have the same end behavior. |

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| **38** The graph of $f\left(x\right)=\frac{1}{x}$  is shown below.   Which of these is the graph of$ f\left(x\right)=-\frac{2}{x}$ ? |
|  | **A** |  | **C** |  |
|  | **B** |  | **D** |  |

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| **39** | The following test scores were recorded for two Algebra II classes. 1st hour: 45, 33, 98, 75, 57, 684th hour: 34, 88, 78, 76, 54, 89Which of the following statements is true?  |
|  | **A** | The median of 1st hour is lower than the median of 4th hour. | **C** $ $The median of 1st hour is higher than the  median of 4th hour. |
|  | **B** | The median of 1st hour is the same as the median of 4th hour. | **D** $ $I forgot how to find median! |

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| **40** | 2000 students were surveyed and showed that 56% of students owned a car with a margin of error of ±2%. What is the percent interval of students who own a car?  |
|  | **A** | 56%-58% | **C** $ $56%-60% |
|  | **B** | 54%-56% | **D** $ $54%-58% |

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| **41** | John’s grade is twice as high as Stacy’s. Which equation represents their grades if *j* is John’s grade and *s* is Stacy’s?  |
|  | **A** | s = 2j | **C** $ $s = ½ j |
|  | **B** | 2s = 2j | **D** $ $s = .2j |

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| **42** | On a ski trip in Michigan the temperature was 23o at 8:00 am. By 2:00 pm the temperature had risen to 35o. What was the average rate of change? |
|  | **A** | The temperature rose 12o per hour | **C** $ $The temperature rose 6o per hour |
|  | **B** | The temperature rose 2o per hour | **D** $ $The temperature dropped 2o per hour |

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| **43** | Identify the roots: 2x2+12x+16 |
|  | **A** | x = -2, x = 4 | **C** $ $x = -4, x = -2 |
|  | **B** | x = 0, x = -2, x = 4 | **D** $ $x = 2, x = -4 |

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| **44** | Find the difference. (-5 + 3i) – (4 – 2i) |
|  | **A** | 1 – 1i  | **C** $ $1 + 5i |
|  | **B** | -9 – 1i | **D** $ $-9 + 5i |

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| **45** | Factor: 8x3 + 216 |
|  | **A** | (x – 6)(8x2 – 3x – 6)  | **C** $ $(2x + 6)(4x2 – 12x + 36) |
|  | **B** | (2x – 6)(4x2 + 12x + 36) | **D** $ $(2x + 6)(2x2 – 12x + 36) |

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| **46** | If y = 4.5x2 +9 and the domain is all negative real numbers, what is the range of the function? |
|  | **A** |  y > 9  | **C** $ $x < 0 |
|  | **B** | y > 9 | **D** $ $y < 0 |

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| **47** | Which of the following could be the equation of the graph that is translated up 9 units and is more narrow than y = 2x3 – 5  |
|  | **A** |  y = 3x3 + 4 | **C** $ $y = ½x3 + 4 |
|  | **B** | y = -2x3 – 9 | **D** $ $y = 3x3 + 9 |

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| **48** | Which of the following represents $f\left(x\right)=\frac{1}{x}$ translated down 3 and left 2. |
|  | **A** |  $f\left(x\right)=\frac{1}{x-2}$ +3 | **C** $ f\left(x\right)=\frac{1}{x+2}$ – 3  |
|  | **B** | $f\left(x\right)=\frac{1}{x-3}$ +2 | **D** $ f\left(x\right)=\frac{1}{x+3}$ – 2  |

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| **49** | Identify any points of discontinuity $f\left(x\right)=\frac{(x-4)(x+5)}{(x-2)(x-4)}$  |
|  | **A** |  Vertical Asymptote at x = 5 Hole at x = 2 | **C** $ $Vertical Asymptote at x = -2 Hole at x = -4 |
|  | **B** | Vertical Asymptote at x = 2Hole at x = 4 | **D** $ $Vertical Asymptote at x = 2 and x = 4  |