

Name \_\_\_\_\_  
Mr. Schlansky

Date \_\_\_\_\_  
Algebra II

## *Algebra II Regents Review Round 1 Test*

### Part I: (2 Points Each)

1. The expression  $6xi^3(-4xi + 5)$  is equivalent to

- |                    |                        |
|--------------------|------------------------|
| 1) $2x - 5i$       | 3) $-24x^2 + 30x - i$  |
| 2) $-24x^2 - 30xi$ | 4) $26x - 24x^2i - 5i$ |

2. A recursive formula for the sequence 64, 48, 36, ... is

- |                           |                            |
|---------------------------|----------------------------|
| 1) $a_n = 64(0.75)^{n-1}$ | 3) $a_n = 64 + (n-1)(-16)$ |
| 2) $a_1 = 64$             | 4) $a_1 = 64$              |
| $a_n = a_{n-1} - 16$      | $a_n = 0.75a_{n-1}$        |

3. Given: Set  $U = \{S, O, P, H, L, A\}$

Set  $B = \{A, L, O\}$

If set  $B$  is a subset of set  $U$ , what is the complement of set  $B$ ?

- |                  |                  |
|------------------|------------------|
| 1) $\{O, P, S\}$ | 3) $\{A, H, P\}$ |
| 2) $\{L, P, S\}$ | 4) $\{H, P, S\}$ |

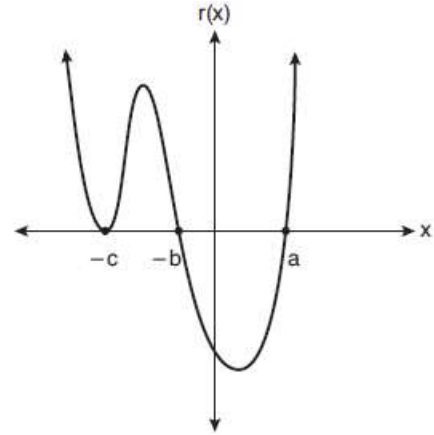
4. The exact value of  $\sin\left(\frac{8\pi}{3}\right)$  is

- |                   |                          |
|-------------------|--------------------------|
| 1) $\frac{1}{2}$  | 3) $-\frac{\sqrt{3}}{2}$ |
| 2) $-\frac{1}{2}$ | 4) $\frac{\sqrt{3}}{2}$  |

5. What is the solution set of the equation  $\frac{30}{x^2-9} + 1 = \frac{5}{x-3}$ ?

- 1)  $\{2, 3\}$
- 2)  $\{2\}$
- 3)  $\{3\}$
- 4)  $\{ \}$

6. A sketch of  $r(x)$  is shown below.



An equation for  $r(x)$  could be

- 1)  $r(x) = (x - a)(x + b)(x + c)$       3)  $r(x) = (x + a)(x - b)(x - c)$   
 2)  $r(x) = (x + a)(x - b)(x - c)^2$     4)  $r(x) = (x - a)(x + b)(x + c)^2$

7. Which is the solution to:  $1 - 2(5)^{2x} = -5$ ?

- 1)  $\frac{\ln 6}{2 \ln 3}$                                       3)  $\frac{2 \ln 4}{\ln 3}$   
 2)  $\frac{2 \ln 5}{\ln 1}$                                       4)  $\frac{\ln 3}{2 \ln 5}$

8. How is the parent function transformed to create  $f(x) = -(x - 4)^2 + 3$ ?

- 1) reflected over the x-axis, left 4, up 3  
 2) reflected over the x-axis, left 4, down 3  
 3) reflected over the x-axis, right 4, up 3  
 4) reflected over the x-axis, right 4, down 3

9. Which scenario is best described as a controlled experiment?

- 1) For a class project, students in Health class ask every tenth student entering the school if they eat breakfast in the morning.  
 2) A social researcher wants to learn whether or not there is a link between attendance and grades. She gathers data from 15 school districts.  
 3) A researcher wants to learn whether or not there is a link between children's daily amount of physical activity and their overall energy level. During lunch at the local high school, she distributed a short questionnaire to students in the cafeteria.  
 4) Sixty seniors taking a course in Advanced Algebra Concepts are randomly divided into two classes. One class uses a graphing calculator all the time, and the other class never uses graphing calculators. A guidance counselor wants to determine whether there is a link between graphing calculator use and students' final exam grades.

10. A survey is to be conducted in a small upstate village to determine whether or not local residents should fund construction of a skateboard park by raising taxes. Which segment of the population would provide the most unbiased responses?

- 1) a club of local skateboard enthusiasts
- 2) senior citizens living on fixed incomes
- 3) a group opposed to any increase in taxes
- 4) every tenth person 18 years of age or older walking down Main St.

11. The solutions to the equation  $3x^2 - 4x + 2 = 2x - 3$  are

- 1)  $\frac{2}{3} \pm \frac{\sqrt{2}}{3}i$
- 2)  $1 \pm \frac{\sqrt{6}}{3}i$
- 3)  $1 \pm \frac{\sqrt{12}}{3}$
- 4)  $1 \pm 2\sqrt{6}i$

12. Which binomial is *not* a factor of the expression  $x^3 - 4x^2 - 25x + 28$ ?

- 1)  $x+6$
- 2)  $x-7$
- 3)  $x-1$
- 4)  $x+4$

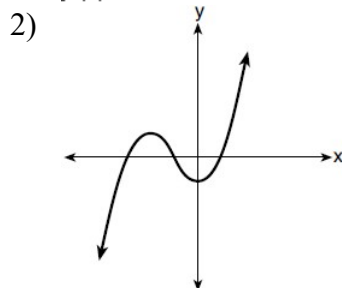
13. What is the inverse of the function  $y = 4x + 5$ ?

- 1)  $x = \frac{1}{4}y - \frac{5}{4}$
- 2)  $y = \frac{1}{4}x - \frac{5}{4}$
- 3)  $y = 4x - 5$
- 4)  $y = \frac{1}{4x+5}$

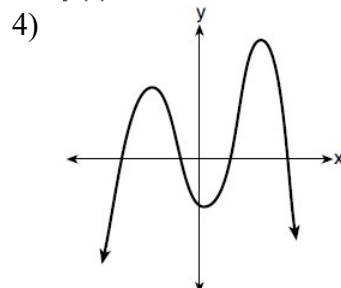
14. Consider the end behavior description below.

- as  $x \rightarrow -\infty, f(x) \rightarrow \infty$
- as  $x \rightarrow \infty, f(x) \rightarrow \infty$

1)  $f(x) = x^4 + 2x^2 + 1$



3)  $f(x) = -x^3 + 2x - 6$



15. For which values of  $x$ , rounded to the *nearest hundredth*, will  $|x^2 - 9| - 3 = \log_3 x$ ?
- |                  |                  |
|------------------|------------------|
| 1) 2.29 and 3.63 | 3) 2.84 and 3.17 |
| 2) 2.37 and 3.54 | 4) 2.92 and 3.06 |

**Part II: (2 Points Each)**

16. Solve *graphically* for all values of  $x$ :  $\sqrt{x-5} + x = 7$

17. Given:      $A = \{8, 11, 14, 16, 21\}$   
                $B = \{4, 8, 12, 16\}$

a) What is  $A \cap B$ ?

b) What is  $A \cup B$ ?

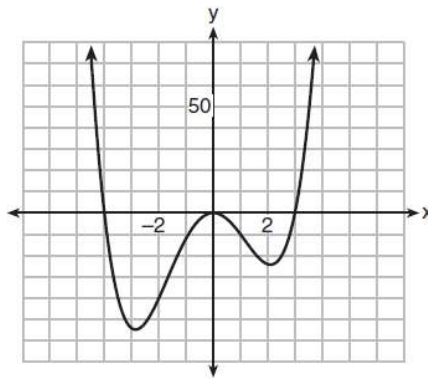
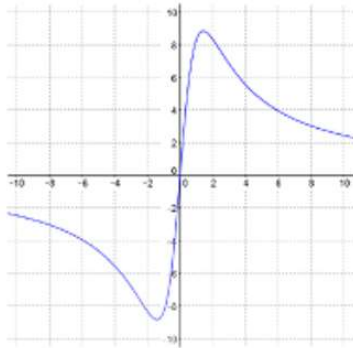
18. Does the equation  $x^2 - 4x + 13 = 0$  have imaginary solutions? Justify your answer.

19. In 2015 at Sabres Prep Academy, the probability that a student passed Algebra II was 78%. The probability that a student passed Chemistry was 86%. The probability they passed Algebra II or Chemistry was 88%. What is the probability that they passed Algebra II and Chemistry?

20. Express with a fractional exponent:

$$\frac{\sqrt[3]{x^2} \cdot \sqrt{x^5}}{\sqrt[6]{x}}$$

21. Determine whether the following functions is an even function. Justify your answer.



$$f(x) = -2|x| - 4$$

22. The table below gives air pressures in kPa at selected altitudes above sea level measured in kilometers. Write an exponential regression equation that models these data rounding all values to the *nearest thousandth*.

<b>x</b>	<b>Altitude (km)</b>	0	1	2	3	4	5
<b>y</b>	<b>Air Pressure (kPa)</b>	101	90	79	70	62	54

23. A theater with 15 rows has 10 seats in the first row, 12 seats in the second row, 14 seats in the third row, and so on. Write a recursive formula that represents this sequence.

24. If  $a_n = 3a_{n-1} - 4$  and  $a_2 = 9$ , find  $a_5$

25. Rowan is training to run in a race. He runs 15 miles in the first week, and each week following, he runs 3% more than the week before. Using a geometric series formula, find the total number of miles Rowan runs over the first ten weeks of training, rounded to the *nearest thousandth*.

26. Using the formula below, determine the monthly payment on a 5-year car loan with a monthly percentage rate of 0.625% for a car with an original cost of \$21,000 and a \$1000 down payment, to the *nearest cent*.

$$P_n = PMT \left( \frac{1 - (1 + i)^{-n}}{i} \right)$$

$P_n$  = present amount borrowed

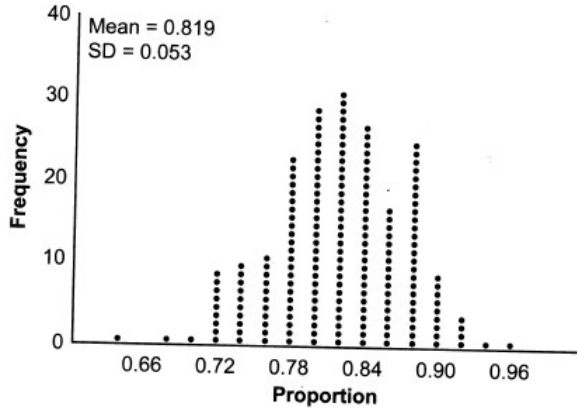
$n$  = number of monthly pay periods

$PMT$  = monthly payment

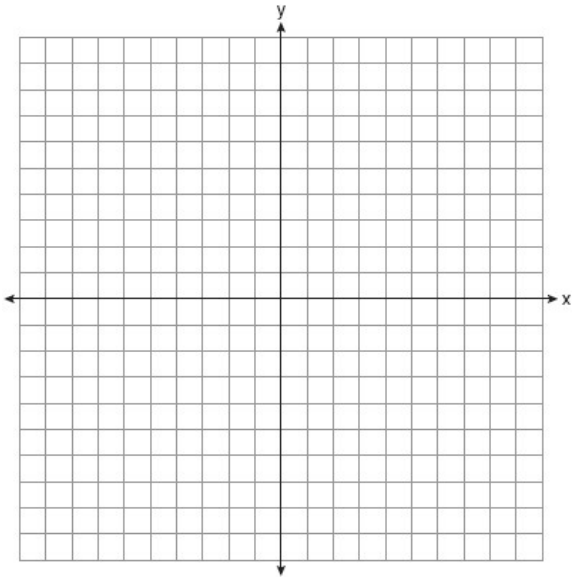
$i$  = interest rate per month

27. The scores of a recent test taken by 1200 students had an approximately normal distribution with a mean of 225 and a standard deviation of 18. Determine the number of students who scored higher than 240

28. State officials claim 82% of a community want to repeal the 30 mph speed limit on an expressway. A community organization devises a simulation based on the claim that 82% of the community supports the repeal. Each dot on the graph below represents the proportion of community members who support the repeal. The graph shows 200 simulated surveys, each of sample size 60. Based on the simulation, determine the margin of error rounded to the *nearest hundredth*.



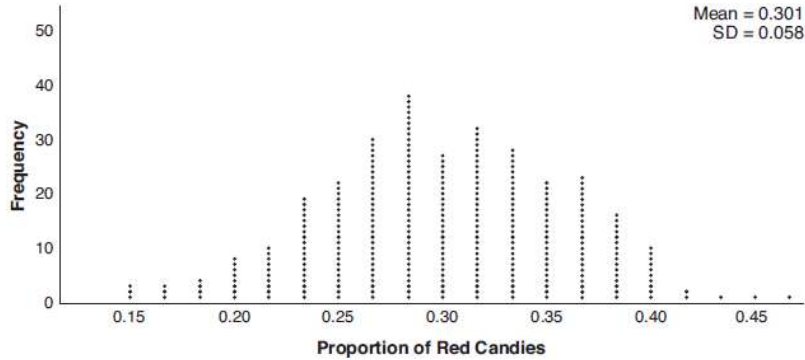
29. Graph  $p(x) = x^3 + 2x^2 - x - 2$  over the interval  $-2 \leq x \leq 1$



30. The average monthly high temperature in Buffalo, in degrees Fahrenheit, can be modeled by the function  $B(t) = 25.29 \sin(0.4895t - 1.9752) + 55.2877$ , where  $t$  is the month number (January = 1). State, to the *nearest tenth*, the average monthly rate of temperature change between August and November.

**Part III: (4 Points Each)**

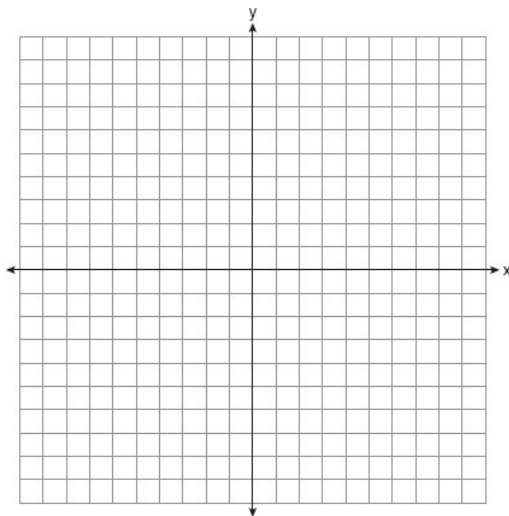
31. Mary bought a pack of candy. The manufacturer claims that 30% of the candies manufactured are red. In her pack, 14 of the 60 candies are red. She ran a simulation of 300 samples, assuming the manufacturer is correct. The results are shown below.



Based on the simulation, determine the middle 95% of plausible values that the proportion of red candies in a pack is within. Based on the simulation, is it unusual that Mary’s pack had 14 red candies out of a total of 60? Explain.

Graph the following functions on the grids provided and fill in the end behavior

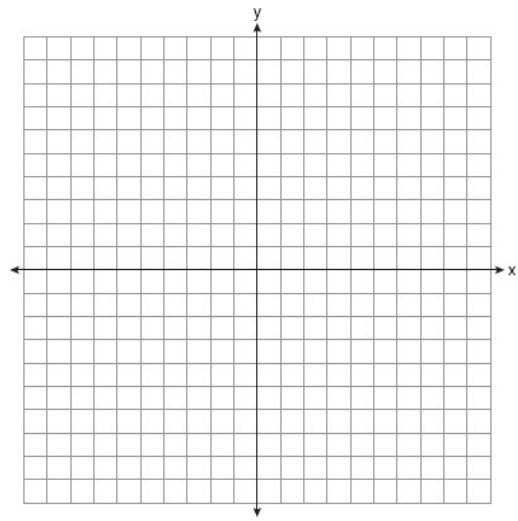
32.  $y = \log_2(x + 9) - 3$



$x \rightarrow -9, f(x) \rightarrow$

$x \rightarrow \infty, f(x) \rightarrow$

33.  $c(x) = -9(3)^{x-4} + 2$



$x \rightarrow -\infty, f(x) \rightarrow$

$x \rightarrow \infty, f(x) \rightarrow$

34. The results of a survey of the student body at Central High School about television viewing preferences are shown below.

	Comedy Series	Drama Series	Reality Series	Total
Males	95	65	70	230
Females	80	70	110	260
Total	175	135	180	490

What is the probability that a female prefers watching a drama series?

Are the events “student is a male” and “student prefers reality series” independent of each other? Justify your answer.

35. A technology company is comparing two plans for speeding up its technical support time. Plan  $A$  can be modeled by the function  $A(x) = 15.7(0.98)^x$  and plan  $B$  can be modeled by the function  $B(x) = 11(0.99)^x$  where  $x$  is the number of customer service representatives employed by the company and  $A(x)$  and  $B(x)$  represent the average wait time, in minutes, of each customer. Graph  $A(x)$  and  $B(x)$  in the interval  $0 \leq x \leq 100$  on the set of axes below. To the *nearest integer*, solve the equation  $A(x) = B(x)$ .

