RISING GRADE 9 SUMMER PACKET

DUE ON THE FIRST DAY OF SCHOOL

The problems in this packet are designed to help you review topics from previous mathematics courses that are essential to your success in Integrated Math III. **You are expected to bring this completed packet to class on the first day of school.** In addition, this packet will count as part of your first quarter grade. **Upon returning, you will be ASSESSED on the content of this packet**. All contents outlined in the packet are Integrated Algebra I objectives. Neatly **SHOW YOUR WORK** on a separate sheet of paper.

1. Explain how you translate the graph of $y = -x^2$ to produce the graph of $y = -(x-6)^2$?

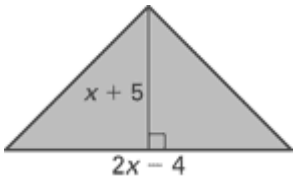
2. Simplify $\left(7x^3 - 3x^2 + 5x - 5\right) + \left(5x^2 - 8x - 3\right)$?

3. The point P (–3, 7) is reflected in the line $y = x$. What are the coordinates of P' ?

4. When Maureen multiplied the trinomials $4x^2 + y - 4$ and $4x^2 - y + 4$, she got an answer of $16x^4 - y^2 - 16$
   Which of the following responses best describes Maureen's expression?
   a. It is correct
   b. It is missing the term 8y
   c. It is missing the term $32x^2$
   d. It is missing the term $8x^2y$

5. Solve $-5x + 4 \leq -2x + 7$?

6. Write the trinomial that represents the area of the triangle



Solve the compound inequality.

7. $x - 3 \leq 5$ or $x + 4 \geq 14$

8. Solve and graph $6x - 4 \geq 14$ or $3x + 10 < 4$?

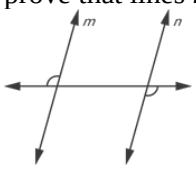
9. What is the solution of the linear system:
   $4x + 3y = 5$
   $-2x + 5y = 17$

Solve the system by graphing.

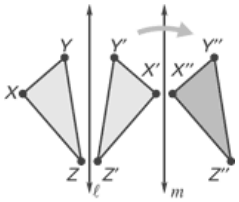
10. $x + y = 3$
    $y = 2x - 9$

11. Your teacher is giving a test worth 200 points. There is a total of 30 five-point and ten-point questions. How many five-point questions are on the test?

12. State the postulate or theorem you would use to prove that lines m and n are parallel.



13. What two transformations were performed to obtain $\triangle X'Y'Z'$ in the diagram?

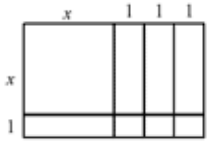


14. The table below shows the speed of a sled at different elapsed times.

Time Elapsed	Speed of the Sled (mi/h)
1	2
2	3
3	6
4	8
5	9
6	9
7	9

Jasmine thinks the line $y = 1.5x + 0.5$ best fits the data. Use her model to predict the speed of the sled when 4.5 seconds have elapsed.

15. Write a variable expression for the area of the rectangle.



16. Find the sum of the first nine terms of the arithmetic series.
–3 – 6 – 9 – 12 . . .

Factor the trinomial.

17. $x^2 - 3x - 10$

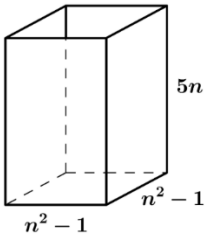
18. $3x^2 - 19x + 6$

19. A rectangle has an area given by $A = x^2 + 5x + 6$. Find possible expressions for the length and width of the rectangle.

20. The art students at Ridley High School designed T-shirts, caps, and sweatshirts featuring the school mascot. The art students sold them at football and basketball games. The table below shows how many of each item were sold. Approximately what percent of the sweatshirts sold were sold to non-students?

	T-shirts	Caps	Sweatshirts
Students	356	278	249
Non-Students	212	412	373

21. The figure shows a right rectangular prism with dimensions labeled as algebraic expressions.

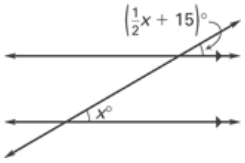


a. Create a polynomial expression that represents the volume of the right rectangular prism. Write your answer in standard form.
b. If each of the three dimensions was tripled, by what factor would the volume of the right rectangular prism be multiplied?

22. The mass of a boulder is about 10^6 grams. The mass of a pebble is about 10 grams. The mass of the boulder is about how many times the mass of the pebble?

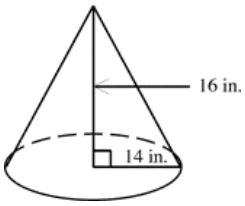
Find the value of *x*.

23.



Find the volume of the cone. Round to the nearest tenth.

24.



Find the difference.

25. $\left(6b^3 + 3b^2 + 8\right) - \left(2b^3 - 8b^2 + 6b - 5\right)$

Solve the quadratic equation by factoring.

26. $x^2 - 4x = 0$

27. The variables *x* and *y* vary directly and $y = -6$ when $x = \frac{1}{4}$. Write an equation that relates the variables.

Find the slope and *y*-intercept of the graph of the equation.

28. $y = 2x - 7$

29. Two athletes run several miles each day to train. A random sample of their daily distances is taken. Use a calculator to find the mean and standard deviation for each athlete. Use your results to make a conclusion about the data. Round your answers to the nearest hundredth, if necessary.

Distances (miles)	
Athlete A	3, 6, 5, 8, 4, 8, 6, 8, 9, 5, 5, 6, 7, 7, 3, 5, 5, 6, 7, 10, 3, 9
Athlete B	8, 9, 8, 8, 8, 4, 4, 4, 5, 5, 6, 15, 1, 3, 8, 4, 4, 8, 6, 10, 10, 10

30. Ordinary conversation with another person typically has an intensity level of 65 decibels, which is equivalent to a power intensity of about 32 ten-millionths of a watt per square meter. How would you correctly represent the number 32 ten-millionths in scientific notation?

31. A cylinder 19 centimeters high and 16 centimeters in diameter is filled with flour to 3.5 centimeters from the top. What volume of flour, to the nearest cubic centimeter, does the cylinder contain?

32. Metal rods get shorter when they are cooled. In a science class experiment, identically-sized metal rods were cooled in ice-baths. The rods were all painted so there were no clues as to what metal they were. Their length changes are shown in the table below.

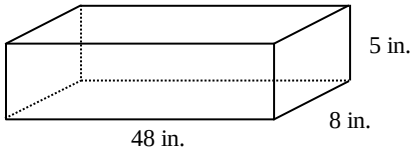
Rod	Change in Length (m)
#1	-1.0×10^{-2}
#2	-2.1×10^{-3}
#3	-1.9×10^{-3}
#4	-1.6×10^{-2}

The teacher told the students that the rod that showed the greatest change in length would be the copper rod. Which rod was the copper rod?

33. An object is launched upward from the ground with an initial vertical velocity of 40 feet per second. After how many seconds does the object reach a height of 25 feet? Justify your answer.

Find the surface area of the solid.

34.



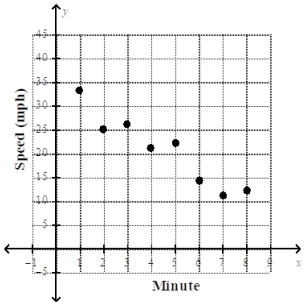
35. Of every 5 hot dogs Martha sold, 3 had sauerkraut. What percent of the hot dogs sold had sauerkraut?

36. The table shows the wavelength of a laser as it passes through different mediums. Use the table to answer the following questions.

Medium	Wavelength (in meters)
Argon Gas	1.0×10^{-6}
Neon Gas	1.0×10^{-7}
Fluorine Gas	1.0×10^{-10}

a. Which gas creates the longest wavelength?
b. Which gas creates the shortest wavelegth?

37. The scatter plot below records the speed of a car once a minute as it is slowing down over 8 minutes. Sketch a line that appears to best fit the data. Then write an equation of the line, and predict the speed of the car after nine minutes.

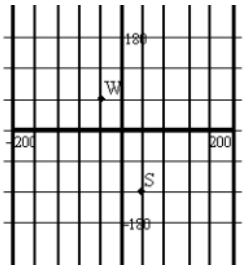


38. Kayleigh borrowed money to pay for her car. She pays 14% interest each year on the amount she owes.
a. If she owes $1500, how much interest does she have to pay for the year?
b. Kayleigh's friend owes $2400 on her car, but pays 9% interest. Who pays more interest for the year? Justify your answer.

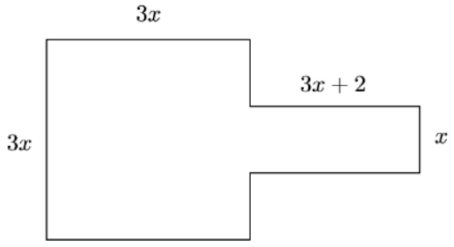
Round your answer to the nearest tenth of a percent, if necessary.

39. In a sample of 100 cars, 23 had electronic fuel injection. What percent of the cars had electronic fuel injection?

40. On a certain farm, individual crops are laid out in rectangles that are 60 feet north and south, and 40 feet east and west. How far would you have to walk to get from the shed (S) to the well (W) if you did not step on any crops? How far would it be if you walked diagonally across the crops?



41. Find the area and Perimeter of the composite figure shown below

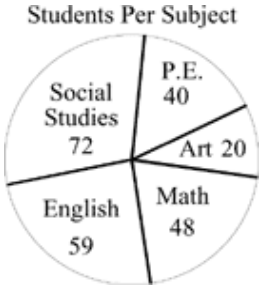


A = ____

P = ____

42. The nonshared sides of two adjacent angles form a pair of opposite rays. The angles are _____.

43. A survey was taken to determine the favorite subjects of 8th graders. The results are shown in the graph. About what percent of students chose Social Studies as their favorite subject?



44. The data {1, 5, 8, 5, 1} represent a random sample of the number of days absent from school for five students at Monta Vista High. Find the mean and the standard deviation of the data.

45. If one micrometer is 10^{-6} meter, how many micrometers are in 10^3 meters?

46. Find the slope of the line passing through (3, –1) and (6, 4).

47. Write $5^0 \square 5^{-12}$ using positive exponents.

Find the product.

48. $(4x+1)(4x-3)$

Simplify. Write your answer using exponents.

49. $\left(4t^2r^4\right)^3$

50. Tell whether **Line 1** and **Line 2** are *parallel*, *perpendicular*, or *neither*.
Line 1 passes through (10, 7) and (13, 9)
Line 2 passes through (–4, 3) and (–1, 5)

51. Mae answered 40 of 45 questions on a test. Of those she answered, Mae answered 6 incorrectly. Approximately what percent of all the questions on the test did she answer incorrectly or not answer?

52. Write $\frac{2^3}{2^{-3}}$ as a single power of 2.

53. What are the mean, median, and mode(s) of the data?
2, 17, 26, 27, 14, 4, 12, 26, 26, 6

54. Simplify $(2x)^4\left(3x^3\right)^2$.

55. The diameter of a softball is 3.8 inches. Estimate the amount of leather used to cover the softball.

56. The width (in meters) of a rectangle is 3 more than twice its length. The area is 35 square meters. What is the length of the rectangle?

Factor the polynomial.

57. $p^2 - 169q^2$

58.

The populations of five Asian capital cities are shown in the table. Order the cities from least to greatest population.

City	Population in 2012
Bangkok, Thailand	8.25×10^6
Beijing, China	2.02×10^7
Manila, Philippines	1.65×10^6
Suva, Fiji	8.44×10^5
Tokyo, Japan	1.32×10^7

Solve the equation.

59. $x^3 + 4x^2 - 25x - 100 = 0$

60. You own a used car dealership. For a certain model of car, you determine that the value of the car to your dealership x years after it is first sold is approximated by $y = -800x + 12,000$.

a. Graph the equation of the line.

b. What is the slope of the line?

c. Is there a *positive relationship* or a *negative relationship* between the value of the car and its age?

d. Identify the x-intercept of the line and interpret its value.

e. Identify the y-intercept of the line and interpret its value.

f. You have a car of the given model on your lot that is 6 years old. Use the equation to approximate the car's value.

g. You are told that the value of a car of the given model, based on its age, is less than $6000. Give a range of values that could represent the age of the car.

h. You are selling a 3-year-old model. Your dealership is running a special by giving an 8 percent discount off the usual value of the vehicle. How much would you sell the car for?

i. A different car model is worth $15,000 when it is brand new and is worth $8025 when it is 9 years old. Explain how you would find the equation of the line that gives the value of this model after it is x years old. Write the equation.

61. The table below gives the average life expectancy (in years) of a person based on various years of birth.

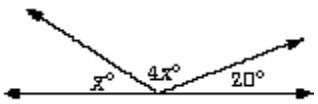
Year of birth	1910	1920	1930	1940	1950	1960	1970	1980	1990
Life expectancy (years)	50	54.1	59.7	62.9	68.2	69.7	70.8	73.7	75.4

a. Use the table to make a list of data pairs (x, y) where x represents the number of years since 1910 and y represents life expectancy.

b. Draw a scatter plot of the data pairs from part (a).

c. Write an equation that approximates the best-fitting line, and use it to predict the life expectancy for someone born in 2010.

62. Explain how you would tell another student how to find the value of x in the figure below.



63. Melissa found the sum of $5x^2 + x + 1$ and $6x^3 + 5 + 7x$ to be $11x^2 + 6x + 8$.
a. Is her answer correct? If not, what is the correct answer?
b. What error does it appear that Melissa made in adding the polynomials?

64.

Keisha is working to complete her summer reading in one week. This is so she can chill for the remainder of the summer. She read ($2x^2 + 5x - 3$) pages of Unbroken on Monday, (5x - 3) pages on Tuesday, and ($6x^2 + 2$) pages on Wednesday.

Part A: How many pages did she read in three days?
Part B: *Yay! Keisha read the entire book in a week!* If the book has $14x^2 + 12x - 3$ pages in all, how many pages did she read during the rest of the wee?
Part C: Let x = 3, How many pages does the book have?

Graph the quadratic function.

65. $y = x^2 - 1$

66.

An error has been made in subtracting the two polynomials shown in the work below.

$$(6x^2 - 4x - 5) - (3x^2 - 7x + 2) =$$
$$6x^2 - 4x - 5$$
$$\underline{-3x^2 - 7x + 2}$$
$$3x^2 - 11x - 3$$

Part A: Explain the error that has been made.
Part B: Wha is the answer when you correctly subtract the two polynomials?

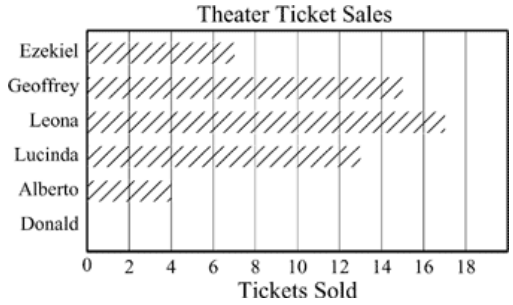
67. About 10^4 taxpayers live in City A. Last year, the state collected about 10^7 dollars in taxes from these taxpayers.
a. On average, how much did each taxpayer in City A pay in taxes last year?
b. City B has 10^6 taxpayers and collected 10^8 dollars in taxes. On average, did a resident of City B pay more or less than a resident of City A in taxes? Explain.

68. During a recent flight, one of the space shuttles traveled 2.5×10^6 mi. The total cost of the flight was $\$5 \times 10^7$. Explain how to find the cost per mile traveled using the numbers in their given form. Include the process for finding the answer and the answer in your explanation.

69. The outside of a rectangular picture frame has length $4x + 5$ centimeters and width $2x + 3$ centimeters. The picture window inside the frame is a rectangle that is $4x - 2$ centimeters long and $x + 1$ centimeters wide.
a. Write a polynomial to describe the area (in square centimeters) of the picture window.
b. The picture frame, not including the window, is made of flat pieces of wood. Write a polynomial that describes the area (in square centimeters) of the wooden part of the frame. Explain your reasoning.

70. Write the expression $\frac{x^{10}}{x^2}$ in simplest form. Then write a different expression that involves division of exponents that is equivalent to $\frac{x^{10}}{x^2}$. Justify your answer.

71. The bar graph shows how many theater tickets were sold by students at Da Vinci School for the Arts. Donald's ticket sales have not been added to the graph.



Part A If the mean number of tickets sold by the six students is 10, how many tickets did Donald sell? Show your work.
Part B How do Donald's ticket sales compare to the median of the ticket sales?
Part C How many more tickets would the students have to sell to raise the mean to 15? Explain your answer.

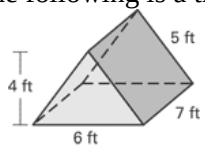
72. You are painting vases. Some vases are in the shape of prisms that are 4 inches wide, 4 inches deep, and 12 inches high. Others are in the shape of cylinders that are 12 inches high and have a diameter of 4 inches.
    a. What is the surface area of the vases shaped like a prism?
    b. What is the surface area of the vases shaped like a cylinder?
    c. If 1 bottle of paint covers 225 square inches, then how many bottles of paint will it take to cover 4 vases shaped like prisms? How many bottles of paint will it take to cover 4 vases shaped like cylinders?

73. The recorded times, in seconds, that it took Devon and Patrick to run the 200 meter race are listed below.

    Devon: 23.5, 23.7, 23.9, 24.4, 23.8, 23.5, 23.4, 23.2, 24.1, 23.4
    Patrick: 24.2, 23.8, 23.9, 23.4, 24.3, 24.0, 23.9, 23.2, 24.4, 23.7

    a. Using the same number line, make a box-and-whisker plot of the data for each person.
    b. Make a conclusion about the data.

74. The following is a three-dimensional sketch of a tent you take on a camping trip.



    a. Count the number of faces of the tent.

    b. Count the number of edges of the tent.

    c. Count the number of vertices of the tent.

    d. Find the volume of the tent.

    e. Find the surface area of the tent.

    f. Sketch a net for the tent.

    g. You make a cone shaped paper cup. Its height is 10 centimeters and its diameter is 8 centimeters. What volume of water will the cup hold?

    h. You pour a drink of water from your canteen. Your canteen is the shape of a cylinder with a diameter of 20 centimeters and a height of 6 centimeters. What volume of water does the canteen hold?

    i. What is the surface area of your canteen?

    j. Explain why all of the following terms are correct ways of referring to the tent: *solid*, *polyhedron*, and *prism*.

75. In order from least to greatest, the side lengths (in inches) of a triangle are 8, $2x^2 + 5x - 3$, and $8x^2 - 5x - 4$.
    a. How much longer is the longest side of the triangle than the second longest side? Explain how you found your answer.
    b. Find the perimeter of the triangle.
    c. A student wants to change the length of the shortest side of the triangle so that the triangle has a perimeter of $10x^2$ inches. What should the new length of the shortest side be? Explain