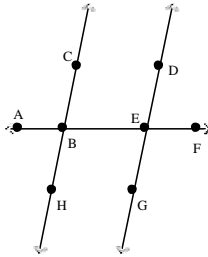


## Accelerated Math III Summer Review Packet

### DUE THE FIRST DAY OF SCHOOL

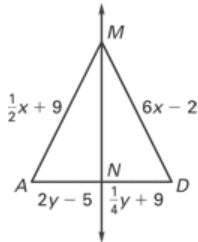
The problems in this packet are designed to help you review topics from previous mathematics courses that are essential to your success in Accelerated Math IV. **You are expected to bring this completed packet to class on the first day of school.** In addition, this packet will count as part of your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

1. In the figure shown,  $\overleftrightarrow{HC} \parallel \overleftrightarrow{GD}$  and  $m\angle ABC = 100^\circ$ . Which of the following statements is false?

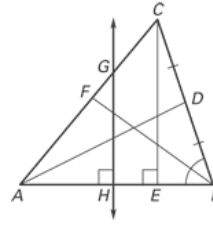


- $m\angle CBE = 80^\circ$
  - $m\angle DEF = 80^\circ$
  - $\angle DEB$  and  $\angle CBE$  are corresponding angles.
  - $\angle CBE$  and  $\angle GEB$  are alternate interior angles.
2. Which of the following statements is *false*?
- Medians intersect inside a triangle.
  - Perpendicular bisectors intersect inside a triangle.
  - Angle bisectors intersect inside a triangle.
- I only
  - II only
  - III only
  - II, III
  - I, III

3. In the diagram,  $\overleftrightarrow{MN}$  is the perpendicular bisector of  $\overline{AD}$ . What are the values of  $x$  and  $y$ ?

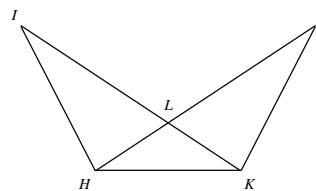


Use the figure.



- Identify an altitude of  $\triangle ABC$ .
- What are all solutions of  $x^2 - 5x + 4 = 0$ ?
- In the quadratic formula  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ ,  $b^2 - 4ac$  is called the
- Solve the system using any algebraic method.
 
$$x + y = 2$$

$$x - y = 0$$
- Give the first four terms of the geometric sequence for which  $a_1 = -7$  and  $r = -4$ .
- Simplify  $i^{-30}$ ?
- Refer to the figure below. Which of the following statements is true?



$\triangle HLK$  is isosceles with base  $\overline{HK}$ ,  $\angle IHL$  and  $\angle JKL$  are right angles,  $\overline{IK} \cong \overline{JH}$

- $\triangle HIL \cong \triangle KJL$  by HL
- $\triangle HLK \cong \triangle JLK$  by SSS
- $\triangle HKI \cong \triangle HJK$  by SAS
- There are no congruent triangles.

11. The literature club is printing a storybook to raise money. The print shop charges \$3 for each book, and \$45 to create the film. How many books can the club print if their budget is \$525?

12. **Use an equation to model the sentence.**  
How many raisins are left in a jar of 49 raisins after you have eaten some?

13. Using the input and output values, derive the equation

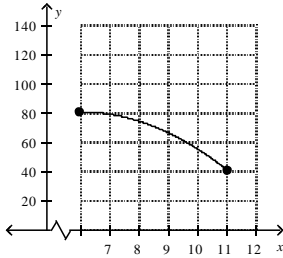
Input, $x$	1	2	3	4	5
Output, $y$	17	26	35	44	53

**Solve.**

14.  $9x - 5 \leq 7x - 11$

15. An oil tank contains 208.3 gallons of oil. Whenever the amount of oil drops below 50 gallons, an alarm sounds. If 182.5 gallons are pumped into a delivery truck, how many gallons must be pumped back into the tank in order to shut off the alarm?

16. What is the domain of the function in the graph?



**Solve the linear system.**

17.  $3x + y = 17$   
 $-4x - y = -21$

18. Ace Rent a Car charges a flat fee of \$15 and \$0.24 a mile for their cars. Acme Rent a Car charges a flat fee of \$29 and \$0.14 a mile for their cars. Use the following model to find out after how many miles Ace Rent a Car becomes more expensive than Acme Rent a Car.

$c = 15 + 0.24m$  Ace  
 $c = 29 + 0.14m$  Acme

**Multiply the expressions. Simplify the result.**

19.  $\frac{m^2 - 9}{m + 3} \cdot \frac{m}{2m - 6}$

**Solve the equation. Check for extraneous solutions.**

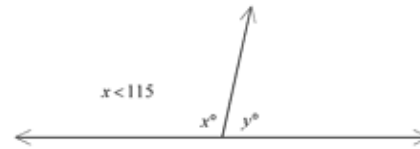
20.  $\frac{x - 2}{x - 6} = \frac{x + 5}{x - 4}$

21. Find the focus of the parabola:  $y^2 = 12x$

22. The cost,  $C$ , of manufacturing and selling  $x$  units of a product is  $C = 23x + 70$ , and the corresponding revenue,  $R$ , is  $R = x^2 - 70$ . Find the break-even value of  $x$ .

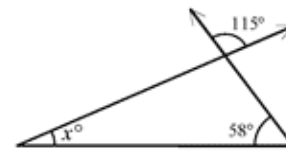
23. Find the inverse of the relation  $y = 4x + 2$

24. Which is *not* a possible value for  $y$  in the figure below?

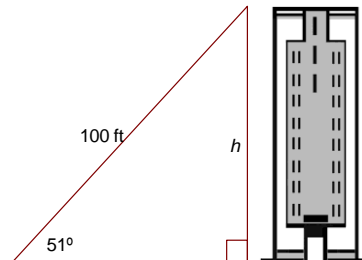


- a. 70    b. 115    c. 55    d. 160

25. Find the value of  $x$ . The diagram is not to scale.



26. What is the height of the building shown below?  
Round to the nearest tenth if necessary.



**Rewrite in slope-intercept form. Then find the slope and y-intercept of the line.**

27.  $8y - 9x = 72$

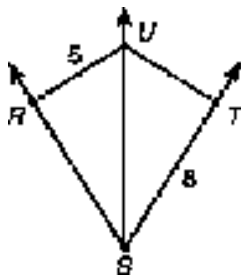
**Complete each statement.**

28.  $\overleftrightarrow{SU}$  is the bisector of  $\angle RST$ .

$\overline{UR} \perp \overline{RS}$

$\overline{UT} \perp \overline{ST}$

Complete with a number:  $RS = \underline{\hspace{2cm}}$ ,  $UT = \underline{\hspace{2cm}}$ .



29. The angle bisectors of a triangle are concurrent at a point called the \_\_\_\_\_.

**Use for #30-33 Complete the statement with the word *inside, on, or outside*.**

30. In an acute triangle, the altitudes intersect \_\_\_\_\_ the triangle.

31. In a right triangle, the altitudes intersect \_\_\_\_\_ the triangle.

32. In an obtuse triangle, the altitudes intersect \_\_\_\_\_ the triangle.

33. The incenter of a triangle is equidistant from the three \_\_\_\_\_ of the triangle.

**Use for #34-36 Complete the statement with the word *always, sometimes, or never*.**

34. The perpendicular bisectors of a triangle will \_\_\_\_\_ intersect on the triangle.

35. The angle bisectors of a triangle will \_\_\_\_\_ intersect outside the triangle.

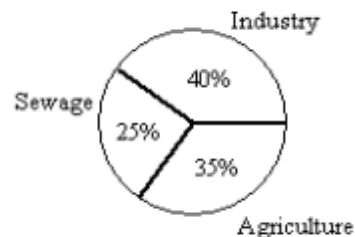
36. The medians of an acute triangle will \_\_\_\_\_ intersect inside the triangle.

37. Use Pascal's triangle and the binomial expansion theorem to expand  $(2x - 3y)^4$ . What is the coefficient of the term containing  $xy^3$ ?

38. When completing the square, what number should be added to both sides of:  $x^2 - 16x = 8$ ?

39. The circle graph below shows the main sources of water pollution in a county.

**Sources of Water Pollution**



What is the measure, in degrees, of the central angle of the section of the circle that represents the pollution caused by industry?

40. Use the results of three card-game experiments in the table to find the experimental probability of winning one hand of cards. Express your answer as a decimal.

	<b>Experiment</b>		
	<b>1</b>	<b>2</b>	<b>3</b>
<b>Number of hands</b>	30	50	200
<b>Number of wins</b>	9	15	46

41. You put 7 tiles with the letters A through G into a bag. You reach in without looking and pull out 3 tiles and place them in a row. What is the probability that they spell BAG?

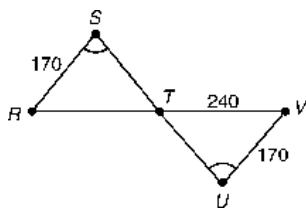
42. The Museum of Fine Arts offers free admission on the first 3 days of each month and during the entire month of January. There are 31 days in January. On a day picked at random, find the probability that the museum will be offering free admission. Write your result as a fraction.

43. There are 18 marbles in a bag, 4 are blue and 14 are yellow. Suppose you take a marble from the bag without looking. Then you take a second marble from the bag without looking. Find the probability that both marbles are blue. Express your answer as a fraction in simplest form.

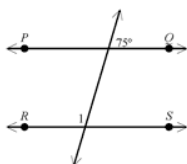
**Graph the quadratic function.**

44.  $y = (x - 2)^2 + 4$

45. Which postulate or theorem can be used to determine the length of  $\overline{RT}$ ?



46. Find  $m\angle 1$  in the figure below.  $\overleftrightarrow{PQ}$  and  $\overleftrightarrow{RS}$  are parallel.

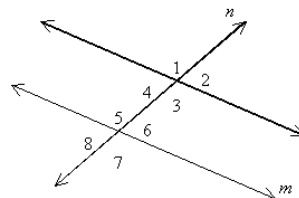


**Solve the equation. Then check the solution.**

47.  $\frac{1}{7}x + \frac{1}{6}x = 78$

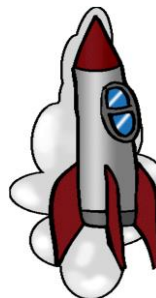
48. A rental car agency charges \$15 per day plus 11 cents per mile to rent a certain car. Another agency charges \$18 per day plus 8 cents per mile to rent the same car. How many miles per day will have to be driven for the cost of a car from the first agency to equal the cost of a car from the second agency?

49. In the figure,  $\angle 6$  and  $\angle 3$  are \_\_\_\_\_.

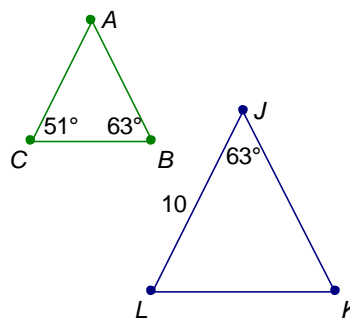


50. Which of the following expressions cannot be factored into a product of lower degree terms over the set of real numbers?

51. The equation  $-16t^2 + 144t$  gives the height, in feet, of a toy rocket  $t$  seconds after it was launched up into the air. How long will it take for the rocket to return to the ground? Solve the quadratic equation  $-16t^2 + 144t = 0$  by factoring to solve the problem.



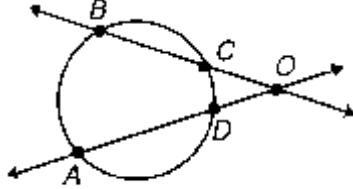
52. What additional information do you need to prove  $\triangle ABC \sim \triangle KJL$ ?



53. Make an input-output table for the function  $y = 2x + 4$ . Use  $x$ -values of 1, 2, 3, 4, and 5.

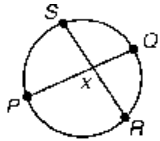
54.  $m\widehat{AB} = 82^\circ$ ,  $m\widehat{CD} = 30^\circ$

Find  $m\angle DOC$ .



Not drawn to scale

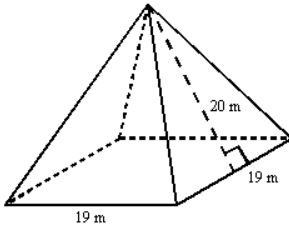
55. Given  $m\widehat{SQ} = 106^\circ$ ,  $m\widehat{PR} = 120^\circ$ , find  $x$ .



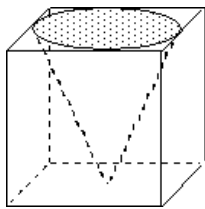
Not drawn to scale

56. Find the length of a  $40^\circ$  arc in a circle with a radius of 4.

57. Find the surface area of this square pyramid if the height of each triangular face is 20 meters and the length of each side of the base is 19 meters.



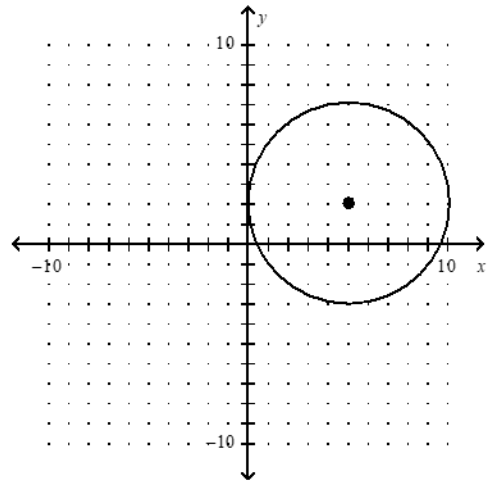
58. A machinist drilled a conical hole into a cube of metal as shown. If the cube has sides of length 8 cm, what is the volume of the metal after the hole is drilled? Use  $\pi \approx 3.14$  and round to the nearest tenth.



59. An experiment consists of spinning a spinner. The table shows the results. What is the probability that the spinner lands on red or purple? Express your answer as a fraction in simplest form.

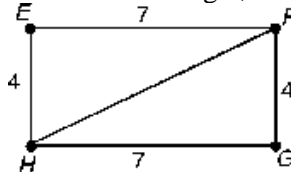
Outcome	Frequency
red	8
purple	4
green	6

60. A small messenger company can deliver only in a small part of the city. Write an equation for the boundary where the company delivers, and find its radius. Each unit represents one block.



61. A wooden fence is to be built around a 50 m-by-62 m lot. How many meters of fencing will be needed? If the wood for the fence costs \$47.75 per meter, what will the wood for the fence cost?

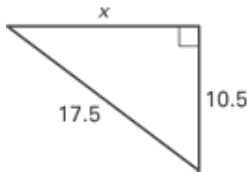
62. If  $EFGH$  is a rectangle, what is  $FH$ ?



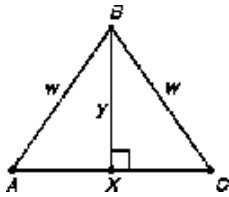
63.  $\overleftrightarrow{BM} \perp \overline{AC}$  and  $\overline{AM} \cong \overline{CM}$ . Find  $BC$ .

**Find the unknown side length. Simplify answers that are radicals. Tell whether the side lengths form a Pythagorean triple.**

64.



65.  $\triangle ABC$  is isosceles. What must the ratio of  $w$  to  $y$  be to make the triangle equilateral?



**Perform the indicated operation(s).**

66.  $(x^2 - x + 1) + (x^2 - x + 1)$

67.  $(2x + y)(2x - y)$

**Factor the polynomial completely.**

68.  $x^3 + 1$

**Write the expression as a complex number in standard form.**

69.  $(9 - 7i) - (10 - 6i)$

**Use the quadratic formula to solve the equation.**

70.  $2p^2 + 16p = -2p^2 + 3$

71. **Compact Discs** At a music store, compact discs cost \$14.95 each, but are now on sale for \$12.95 each. If you bought ten compact discs in the past month, and spent a total of \$139.50, how many did you buy on sale?

72. Identify the sequence as arithmetic, geometric, or neither.  
1, 1, 2, 6, 24, 120, ...

73. Find the common ratio of the geometric sequence.  
2, -8, 32, -128, ...

74. Divide  $-2x^3 - x + 5$  by  $x - 3$ .

75. The Fahrenheit and Celsius scales are related by the equation  $F = \frac{9}{5}C + 32$ . What temperature in degrees Celsius would give the body temperature of  $98.6^\circ\text{F}$ ?

76. Provide the reasons for statements 3 and 5 in the proof.  
Given:  $\angle 1$  and  $\angle 2$  form a linear pair;  $m\angle 2 = 100^\circ$   
Prove:  $m\angle 1 = 80^\circ$

Statements	Reasons
1. $m\angle 2 = 100^\circ$	1. Given
2. $\angle 1$ and $\angle 2$ are a linear pair.	2. Given
3. $m\angle 1 + m\angle 2 = 180^\circ$	3. ?
4. $m\angle 1 + 100^\circ = 180^\circ$	4. Substitution Property of
5. $m\angle 1 = 80^\circ$	5. ?

77. The altitudes of a triangle are concurrent. What is the name of their common point?

78. **Vertical Motion** A football is released into the air at an initial height of 6 feet and an initial velocity of 30 feet per second. The football is caught at a height of 7 feet. Use the vertical motion model  $h = -16t^2 + vt + s$  where  $h$  is the height,  $t$  is the time in motion,  $s$  is the initial height, and  $v$  is the initial velocity, to find how long the football is in motion.

79. **Biking** You and your friend leave from school on your bikes and head in opposite directions. You ride your bike 5 miles due east, then turn  $30^\circ$  toward north and bike 3 miles. Your friend bikes 5 miles due west, then turns  $40^\circ$  toward south and bikes 3 miles. Who is farther from school?

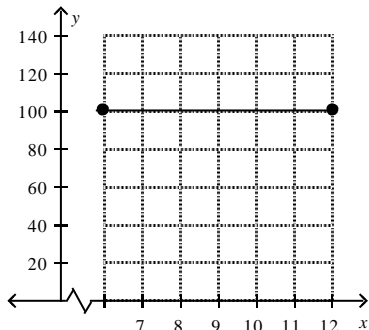
**Solve the equation.**

80.  $3 - 4z = -5 + 8z$

81. Connie takes at least 54 seconds to recite a poem. Write and graph an inequality to describe this interval.

82. Is the relation  $\{(-5, -6), (-5, -3), (-3, -2)\}$  a function?

83. What is the range of the function in the graph?



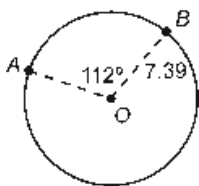
**Divide the expressions. Simplify the result.**

84.  $\frac{x^2 + 11x + 30}{x^2 - 25} \div \frac{x + 6}{x - 6}$

85. The pool at a park is circular. You want to find the equation of the circle that is the boundary of the pool. Find the equation if the area of the pool is 400 square feet and  $(0, 0)$  represents the center of the pool.

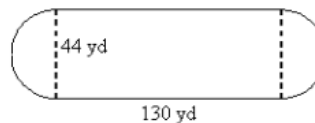
86. A footbridge is in the shape of an arc of a circle. The bridge is 7 ft tall and 29 ft wide. What is the radius of the circle that contains the bridge? Round your answer to the nearest tenth.

87. Circle  $O$  has a radius of 7.39. If  $m\angle AOB$  is  $112^\circ$ , then find the length of  $\widehat{AB}$  to one decimal place.

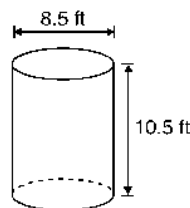


88. Using an overlapping circle and a polygon, invent questions regarding area. Include a drawing showing the relationship between the circle and polygon.

89. The rectangular part of the field below is 130 yards long, and the diameter of each semicircle is 44 yards. Find the cost of reseeding the field at \$0.50 per square yard.



90. Find the volume of the cylinder. (Round the result to one decimal place.)



91. The volume of a right cylinder is  $160\pi \text{ cm}^3$  and the height is 10 cm. Find the diameter.

**Solve the equation. Check for extraneous solutions.**

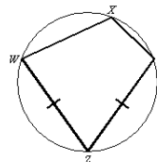
92.  $\sqrt[3]{y - 2} = 5$

93. The sales of a certain product after an initial release can be found by the equation  $s = 19\sqrt{2t} + 48$ , where  $s$  represents the total sales and  $t$  represents the time in weeks after release. How many weeks will pass before the product sells about 125 units? Round your answer to the nearest week.

**Solve the equation. Check for extraneous solutions.**

94.  $\sqrt{x^2 + 5} = 3 - x$

95. Given:  $m\angle X = 110^\circ$ ;  $\overline{WZ} \cong \overline{YZ}$ ;  $m\angle Y = 100^\circ$

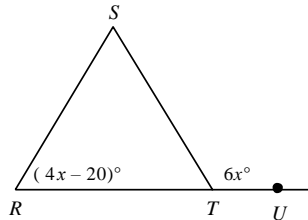


Refer to the diagram to find the measure of each of the following:

- $\angle Z$
- $\widehat{WZ}$
- $\angle W$
- $\widehat{WX}$

96. Write the standard equation of a circle with center  $(-4, -4)$  and radius 4.

97. Triangle  $RST$  is isosceles, with  $\overline{RS} \cong \overline{ST}$  and  $\angle SRT \cong \angle STR$ . (The figure may not be drawn to scale.)



**Part A** Write an equation that can be solved to find the value of  $x$ . Explain the origin of the equation.

**Part B** Solve the equation in Part A and use the answer to find the measure, in degrees, of  $\angle SRT$ .

98. Kim's earnings from her part-time job can be expressed by a linear equation of the form  $y = ax$ , where  $x$  represents how many hours she works in a pay period,  $a$  is her hourly wage, and  $y$  is her earnings, in dollars. She prepared the table below so she could make a graph of her income versus the number of hours she works in a pay period.

Hours of Work	Earnings (\$)
3	23.25
5	38.75
8	62.00
11	77.50
15	116.25
20	155.00

**Part A** Sketch a graph of the ordered pairs shown in the table above

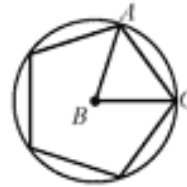
**Part B** One of the rows in Kim's original table has an incorrect earnings value. Which ordered pair on the graph has an incorrect  $y$ -value for the time given? Explain how you can identify that point.

**Part C** What should the  $y$ -value be for the number of hours of work in the ordered pair identified in Part B? Explain your reasoning.

99. A company is designing packaging in the shape of a right cylinder for a new product. They want the radius of the cylinder to be 2 inches less than its height.

- Find the volume of the cylinder in terms of the height.
- Find the surface area of the cylinder in terms of the height.
- Write the ratio of the volume of the cylinder to the surface area of the cylinder in simplest form.
- The company decides to choose between a height of 8 inches or 10 inches. They want to choose the one which will be the more cost efficient. Which should they choose? Explain.

100. A regular pentagon is inscribed in a circle as shown.



- What is the measure of central angle  $ABC$ ?
- What is the measure of each base angle of isosceles triangle  $ABC$ ?
- How are the measures of these base angles related to the measure of one interior angle of the regular pentagon?
- Write an expression for the measure of one interior angle of a regular polygon based on your discovery. Let  $n$  = the number of sides of the polygon.