Sample Test

1) Given W = whole numbers
N = natural numbers
Z = integers
R = rational numbers
I = irrational numbers

Which of the following is not true?

A) $R \subset I$

B) $W \subset Z$

C) $Z \subset R$

D) $N \subset W$

2) Which of the following is an irrational number?

A) .362626262...

B) $4\frac{1}{3}$

C) $\sqrt{5}$

D) $-\sqrt{16}$

3) Which denotes a complex number?

A) 4.1212121212...

B) $-\sqrt{16}$

C) $\sqrt{127}$

D) $\sqrt{-100}$

4) Choose the correct statement:

A) Rational and irrational numbers are both proper subsets of the real numbers.

B) The set of whole numbers is a proper subset of the set of natural numbers.

C) The set of integers is a proper subset of the set of irrational numbers.

D) The set of real numbers is a proper subset of the natural, whole, integers, rational, and irrational numbers.

5) Which statement is an example of the identity axiom of addition?

A) 3 + -3 = 0

B) 3x = 3x + 0

C) $3 \cdot \frac{1}{3} = 1$

D) 3 + 2x = 2x + 3

6) Which axiom is incorrectly applied?

$3x + 4 = 7$

Step a $3x + 4 - 4 = 7 - 4$

additive equality

Step b $3x + 4 - 4 = 3$

commutative axiom of addition

Step c. $3x + 0 = 3$

additive inverse

Step d. $3x = 3$

additive identity

A) step a

B) step b

C) step c

D) step d

7) Which of the following sets is closed under division?

A) integers

B) rational numbers

C) natural numbers

D) whole numbers

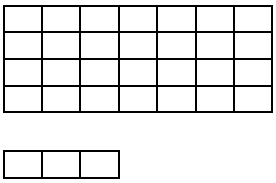
8) How many real numbers lie between -1 and +l ?

A) 0

B) 1

C) 17

D) an infinite number



9) The above diagram would be least appropriate for illustrating which of the following?

A) $7 \times 4 + 3$

B) $31 \div 8$

C) 28×3

D) 31 - 3

10) $24 - 3 \times 7 + 2 =$

A) 5

B) 149

C) –3

D) 189

11) Which of the following does not correctly relate an inverse operation?

A) a - b = a + -b

B) $a \times b = b \div a$

C) $\sqrt{a^2} = a$

D) $a \times \frac{1}{a} = 1$

12) Mr. Brown feeds his cat premium cat food which costs $40 per month. Approximately how much will it cost to feed her for one year?

A) $500

B) $400

C) $80

D) $4800

13) Given that n is a positive even integer, 5n + 4 will always be divisible by:

A) 4

B) 5

C) 5n

D) 2

14) Given that x, y, and z are prime numbers, which of the following is true?

A) x + y is always prime

B) xyz is always prime

C) xy is sometimes prime

D) x + y is sometimes prime

15) Find the GCF of $2^2 \cdot 3^2 \cdot 5$ and $2^2 \cdot 3 \cdot 7$.

A) $2^5 \cdot 3^3 \cdot 5 \cdot 7$

B) $2 \cdot 3 \cdot 5 \cdot 7$

C) $2^2 \cdot 3$

D) $2^3 \cdot 3^2 \cdot 5 \cdot 7$

16) Given even numbers x and y, which could be the LCM of x and y?

A) $\frac{xy}{2}$

B) 2xy

C) 4xy

D) xy

17) $(3.8 \times 10^{17}) \times (.5 \times 10^{-12})$

A) 19×10^{5}

B) 1.9×10^{5}

C) 1.9×10^{6}

D) 1.9×10^{7}

18) 2^{-3} is equivalent to

A) .8

B) -.8

C) 125

D) 125

19) $\dfrac{3.5 \times 10^{-10}}{0.7 \times 10^{4}}$

A) 0.5×10^{6}

B) 5.0×10^{-6}

C) 5.0×10^{-14}

D) 0.5×10^{-14}

20) Solve for x: $\frac{4}{x} = \frac{8}{3}$

A) .66666...

B) .6

C) 15

D) 1.5

21) Choose the set in which the members are <u>not</u> equivalent.

A) 1/2, 0.5, 50%

B) 10/5, 2.0, 200%

C) 3/8, 0.385, 38.5%

D) 7/10, 0.7, 70%

22) If three cups of concentrate are needed to make 2 gallons of fruit punch, how many cups are needed to make 5 gallons?

A) 6 cups

B) 7 cups

C) 7.5 cups

D) 10 cups

23) A sofa sells for $520. If the retailer makes a 30% profit, what was the wholesale price?

A) $400

B) $676

C) $490

D) $364

24) Given a spinner with the numbers one through eight, what is the probability that you will spin an even number or a number greater than four?

A) 1/4

B) 1/2

C) ¾

D) 1

25) If a horse will probably win three races out of ten, what are the odds that he will win?

A) 3:10

B) 7:10

C) 3:7

D) 7:3

26) Given a drawer with 5 black socks, 3 blue socks, and 2 red socks, what is the probability that you will draw two black socks in two draws in a dark room?

A) 2/9

B) 1/4

C) 17/18

D) 1/18

27) A sack of candy has 3 peppermints, 2 butterscotch drops and 3 cinnamon drops. One candy is drawn and replaced, then another candy is drawn: what is the probability that both will be butterscotch?

A) 1/2

B) 1/28

C) 1/4

D) 1/16

28) Find the median of the following set of data:
14 3 7 6 11 20

A) 9

B) 8.5

C) 7

D) 11

29) Corporate salaries are listed for several employees. Which would be the best measure of central tendency?

$24,000 $24,000 $26,000
$28,000 $30,000 $120,000

A) mean

B.) median

C) mode

D) no difference

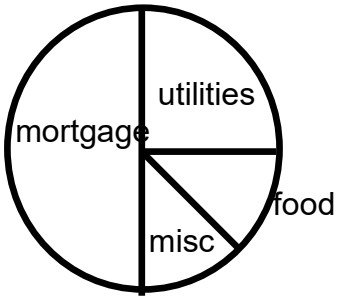
30) Which statement is true about George's budget?

A) George spends the greatest portion of his income on food.

B) George spends twice as much on utilities as he does on his mortgage.

C) George spends twice as much on utilities as he does on food.

D) George spends the same amount on food and utilities as he does on mortgage.



31) A student scored in the 87th percentile on a standardized test. Which would be the best interpretation of his score?

A) Only 13% of the students who took the test scored higher.

B) This student should be getting mostly B's on his report card.

C) This student performed below average on the test.

D) This is the equivalent of missing 13 questions on a 100 question exam.

32) A man's waist measures 90 cm. What is the greatest possible error for the measurement?

A) $\pm$ 1 m

B) $\pm$8 cm

C) $\pm$1 cm

D) $\pm$5 mm

33) The mass of a cookie is closest to

A) 0

B) 0.5 grams

C) 15 grams

D) 1.5 grams

34) 3 km is equivalent to

A) 300 cm

B) 300 m

C) 3000 cm

D) 3000 m

35) 4 square yards is equivalent to

A) 12 square feet

B) 48 square feet

C) 36 square feet

D) 108 square feet

36) If a circle has an area of 25 cm², what is its circumference to the nearest tenth of a centimeter?

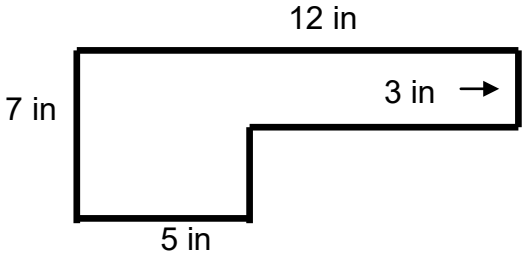
A) 78.5 cm

B) 17.7 cm

C) 8.9 cm

D) 15.7 cm

37) Find the area of the figure below.



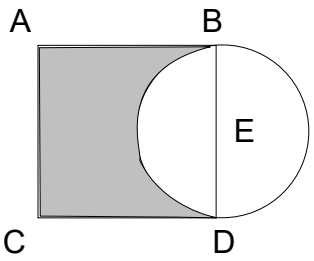
A) 56 in^2

B) 27 in^2

C) 71 in^2

D) 170 in^2

38) Find the area of the shaded region given square ABCD with side AB=10m and circle E.



A) 178.5 m^2

B) 139.25 m^2

C) 71 m^2

D) 60.75 m^2

39) Given similar polygons with corresponding sides of lengths 9 and 15, find the perimeter of the smaller polygon if the perimeter of the larger polygon is 150 units.

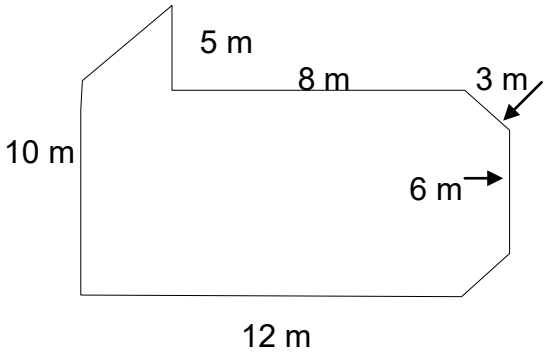
A) 54

B) 135

C) 90

D) 126

40)



Compute the area of the polygon shown above.

A) 178 m^2

B) 154 m^2

C) 43 m^2

D) 188 m^2

41) If the radius of a right cylinder is doubled, how does its volume change?

A) no change

B) also is doubled

C) four times the original

D) pi times the original

42) Determine the volume of a sphere to the nearest cm^3 if the surface area is 113 cm^2.

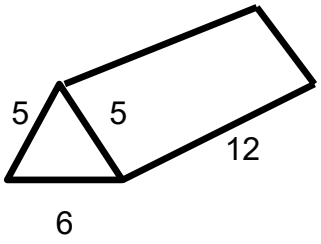
A) 113 cm^3

B) 339 cm^3

C) 37.7 cm^3

D) 226 cm3

43) Compute the surface area of the prism.



A) 204

B) 216

C) 360

D) 180

44) If the base of a regular square pyramid is tripled, how does its volume change?

A) double the original

B) triple the original

C) nine times the original

D) no change

45) How does lateral area differ from total surface area in prisms, pyramids, and cones?

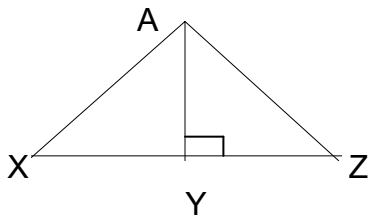
A) For the lateral area, only use surfaces perpendicular to the base.

B) They are both the same.

C) The lateral area does not include the base.

D) The lateral area is always a factor of pi.

46) Given XY ≅ YZ and ∠AYX ≅ ∠AYZ. Prove ΔAYZ ≅ ΔAYX.



1) XY ≅YZ

2) ∠AYX ≅∠AYZ

3) AY ≅ AY

4) ΔAYZ ≅ ΔAYX

Which property justifies step 3?

A) reflexive

B) symmetric

C) transitive

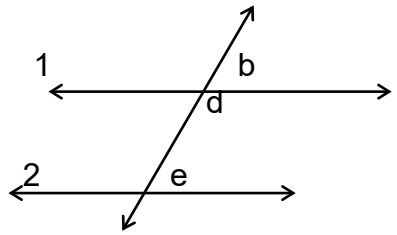
D) identity

47) Given $l_1 \parallel l_2$ (parallel lines 1 & 2) prove $\angle b \cong \angle e$

1) $\angle b \cong \angle d$ 1) vertical angle theorem

2) $\angle d \cong \angle e$ 2) alternate interior angle theorem

3) $\angle b \cong \angle 3$ 3) symmetric axiom of equality



Which step is incorrectly justified?

A) step 1

B) step 2

C) step 3

D) no error

48) Simplify $\dfrac{\frac{3}{4}x^2y^{-3}}{\frac{2}{3}xy}$

A) $\frac{1}{2}xy^{-4}$

B) $\frac{1}{2}x^{-1}y^{-4}$

C) $\frac{9}{8}xy^{-4}$

D) $\frac{9}{8}xy^{-2}$

49) $7t - 4 \cdot 2t + 3t \bullet 4 \div 2 =$

A) 5t

B) 0

C) 31t

D) 18t

50) Solve for x:
$3x + 5 \geq 8 + 7x$

A) $x \geq -\frac{3}{4}$

B) $x \leq -\frac{3}{4}$

C) $x \geq \frac{3}{4}$

D) $x \leq \frac{3}{4}$

51) Solve for x:
$|2x + 3| > 4$

A) $-\frac{7}{2} > x > \frac{1}{2}$

B) $-\frac{1}{2} > x > \frac{7}{2}$

C) $x < \frac{7}{2}$ or $x < -\frac{1}{2}$

D) $x < -\frac{7}{2}$ or $x > \frac{1}{2}$

52) $3x + 2y = 12$
$12x + 8y = 15$

A) all real numbers

B) $x = 4, y = 4$

C) $x = 2, y = -1$

D) $\varnothing$

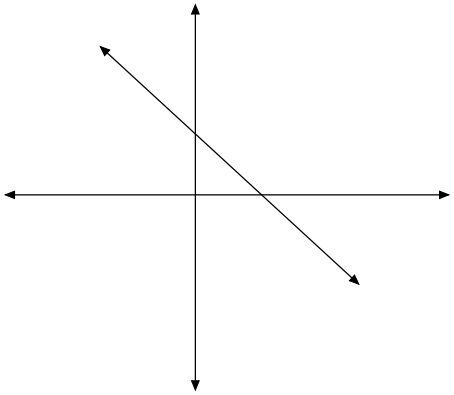
53) $x = 3y + 7$
$7x + 5y = 23$

A) (-1,4)

B) (4, -1)

C) $(\frac{-29}{7}, \frac{-26}{7})$

D) (10, 1)



54) Which equation is represented by the above graph?

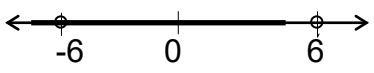
A) $x - y = 3$

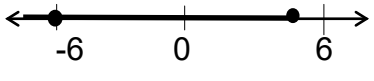
B) $x - y = -3$

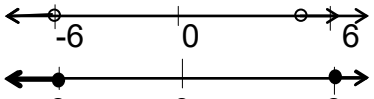
C) $x + y = 3$

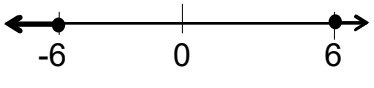
D) $x + y = -3$

55) Graph the solution:
$|x| + 7 < 13$

A)


B)


C)


D)


56) Three less than four times a number is five times the sum of that number and 6. Which equation could be used to solve this problem?

A) $3 - 4n = 5(n + 6)$

B) $3 - 4n + 5n = 6$

C) $4n - 3 = 5n + 6$

D) $4n - 3 = 5(n + 6)$

57) A boat travels 30 miles upstream in three hours. It makes the return trip in one and a half hours. What is the speed of the boat in still water?

A) 10 mph

B) 15 mph

C) 20 mph

D) 30 mph

58) Which set illustrates a function?

A) { (0,1) (0,2) (0,3) (0,4) }

B) { (3,9) (-3,9) (4,16) (-4,16)}

C) { (1,2) (2,3) (3,4) (1,4) }

D) { (2,4) (3,6) (4,8) (4,16) }

59) Give the domain for the function over the set of real numbers:

$$y = \frac{3x + 2}{2x - 3}$$

A) all real numbers

B) all real numbers, $x \neq 0$

C) all real numbers, $x \neq -2$ or 3

D) all real numbers, $x \neq \frac{\pm\sqrt{6}}{2}$

60) Factor completely: $8(x - y) + a(y - x)$

A) $(8 + a)(y - x)$

B) $(8 - a)(y - x)$

C) $(a - 8)(y - x)$

D) $(a - 8)(y + x)$

61) Which of the following is a factor of $k^3 - m^3$?

A) $k^2 + m^2$

B) $k + m$

C) $k^2 - m^2$

D) $k - m$

62) Solve for x.

$$3x^2 - 2 + 4(x^2 - 3) = 0$$

A) $\{-\sqrt{2}, \sqrt{2}\}$

B) $\{2, -2\}$

C) $\{0, \sqrt{3}, -\sqrt{3}\}$

D) $\{7, -7\}$

63) Solve: $\sqrt{75} + \sqrt{147} - \sqrt{48}$

A) 174

B) $12\sqrt{3}$

C) $8\sqrt{3}$

D) 74

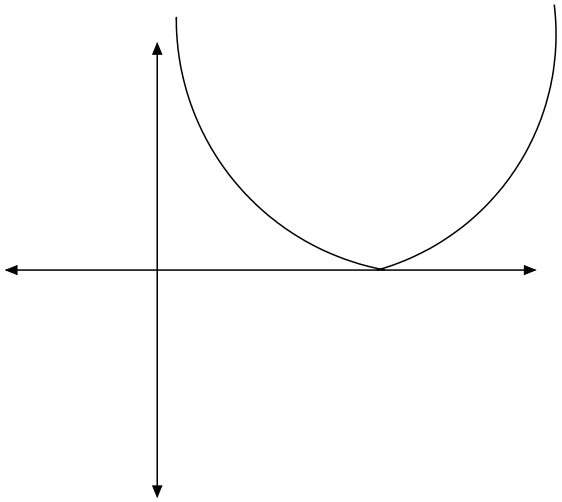
64) The discriminant of a quadratic equation is evaluated anddetermined to be -3. The equation has

A) one real root

B) one complex root

C) two roots, both real

D) two roots, both complex



65) Which equation is graphed above?

A) $y = 4 (x + 3)^2$

B) $y = 4 (x - 3)^2$

C) $y = 3 (x - 4)^2$

D) $y = 3 (x + 4)^2$

66) If y varies inversely as x and x is 4 when y is 6, what is the constant of variation?

A) 2

B) 12

C) 3/2

D) 24

67) If y varies directly as x and x is 2 when y is 6, what is x when y is 18?

A) 3

B) 6

C) 26

D) 36

68) {1,4,7,10, . . .} .

What is the 40th term in this sequence?

A) 43

B) 121

C) 118

D) 120

69) {6,11,16,21, . .}
Find the sum of the first 20 terms in the sequence.

A) 1070

B) 1176

C) 969

D) 1069

70) Two non-coplanar lines which do not intersect are labeled

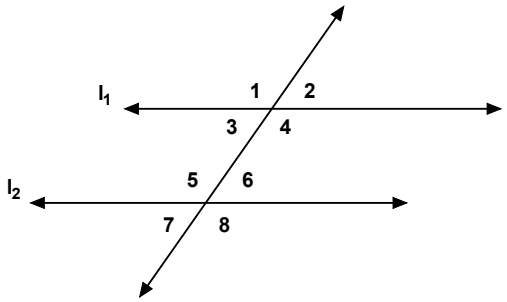
A) parallel lines

B) perpendicular lines

C) skew lines

D) alternate exterior lines

71)



Given $l_1 \parallel l_2$
(parallel lines 1 & 2)
which of the following is true?

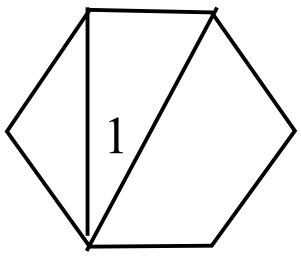
A) $\angle 1$ and $\angle 8$ are congruent and alternate interior angles

B) $\angle 2$ and $\angle 3$ are congruent and corresponding angles

C) $\angle 3$ and $\angle 4$ are adjacent and supplementary angles

D) $\angle 3$ and $\angle 5$ are adjacent and supplementary angles

72)



Given the regular hexagon above, determine the measure of angle $\angle 1$.

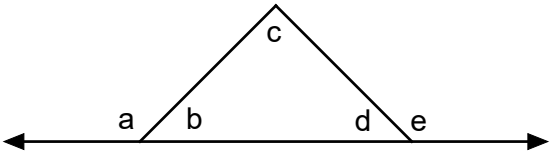
A) 30^o

B) 60^o

C) 120^o

D) 45°

73)



Which of the following statements is true about the number of degrees in each angle?

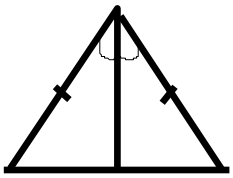
A) $a + b + c = 180^o$

B) $a = e$

C) $b + c = e$

D) $c + d = e$

74)



What method could be used to prove the above triangles congruent?

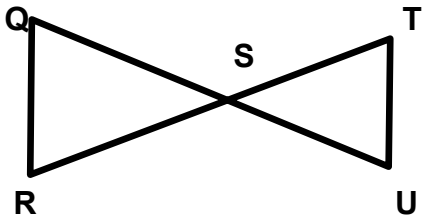
A) SSS

B) SAS

C) AAS

D) SSA

75)



Given QS ≅ TS and RS ≅US, prove ΔQRS ≅ ΔTUS.

I) QS ≅ TS	1) Given
2) RS ≅ US	2) Given
3) ∠TSU ≅ ∠QSR	3) ?
4) ΔTSU ≅ ΔQSR	4) SAS

Give the reason which justifies step 3.

A) Congruent parts of congruent triangles are congruent

B) Reflexive axiom of equality

C) Alternate interior angle Theorem

D) Vertical angle theorem

76) Given similar polygons with corresponding sides 6 and 8, what is the area of the smaller if the area of the larger is 64?

A) 48

B) 36

C) 144

D) 78

77) In similar polygons, if the perimeters are in a ratio of x:y, the sides are in a ratio of

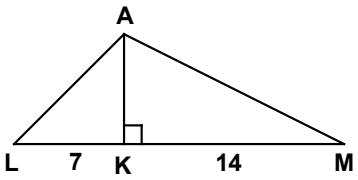
A) x : y

B) $x^2 : y^2$

C) 2x : y

D) 1/2 x : y

78)



Given altitude AK with measurements as indicated, determine the length of AK.

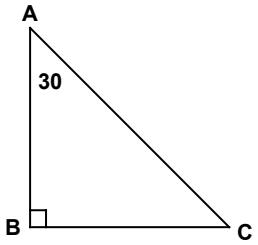
A) 98

B) $7\sqrt{2}$

C) $\sqrt{21}$

D) $7\sqrt{3}$

79)



If AC = 12, determine BC.

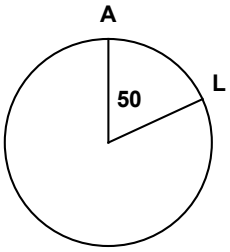
A) 6

B) 4

C) $6\sqrt{3}$

D) $3\sqrt{6}$

80)



What is the measure of major arc AL ?

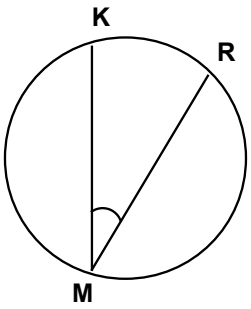
A) 50^o

B) 25^o

C) 100^o

D) 310^o

81)



If arc KR = 70° what is the measure of ∠M?

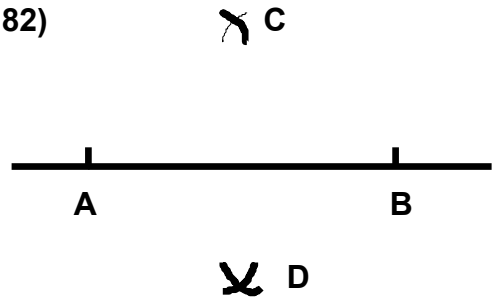
A) 290°

B) 35°

C) 140°

D) 110°

82)



The above construction can be completed to make

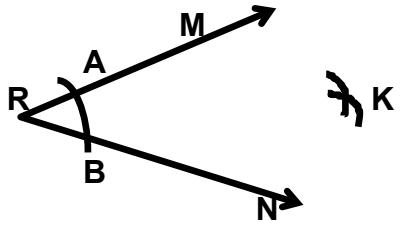
A) an angle bisector

B) parallel lines

C) a perpendicular bisector

D) skew lines

83)



A line from R to K will form

A) an altitude of RMN

B) a perpendicular bisector of MN

C) a bisector of MRN

D) a vertical angle

84) Which is a postulate?

A) The sum of the angles in any triangle is 180°.

B) A line intersects a plane in one point.

C) Two intersecting lines from congruent vertical angles.

D) Any segment is congruent to itself

85) Which of the following can be defined?

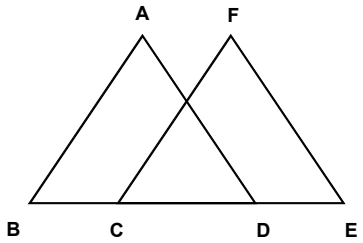
A) point

B) ray

C) line

D) plane

86)



Which theorem could be used to prove ΔABD ≅ ΔCEF, given BC ≅ DE, ∠C ≅ ∠D, and AD ≅ CF?

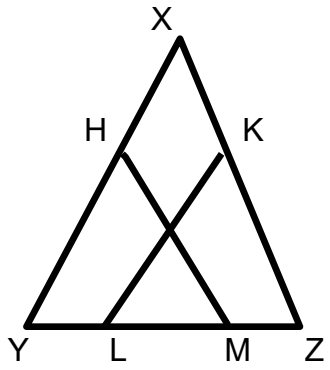
A) ASA

B) SAS

C) SAA

D) SSS

87)



Prove ΔHYM ≅ ΔKZL, given XZ ≅ XY, ∠L ≅ ∠M and YL ≅ MZ

1) XZ ≅ XY	1) Given
2) ∠Y ≅ ∠Z	2) ?
3) ∠L ≅ ∠M	3) Given
4) YL ≅ MZ	4) Given
5) LM ≅ LM	5) ?
6) YM ≅ LZ	6) Add
7) ΔHYM ≅ ΔKZL	7) ASA

Which could be used to justify steps 2 and 5?

A) CPCTC, Identity

B) Isosceles Triangle Theorem, Identity

C) SAS, Reflexive

D) Isosceles Triangle Theorem, Reflexive

88) Find the distance between (3,7) and (-3,4).

A) 9

B) 45

C) $3\sqrt{5}$

D) $5\sqrt{3}$

89) Find the midpoint of (2,5) and (7,-4).

A) (9,-1)

B) (5,9)

C) (9/2 , -1/2)

D) (9/2, 1/2)

90) Given segment AC with B as its midpoint find the coordinates of C if A = (5,7) and B = (3, 6.5).

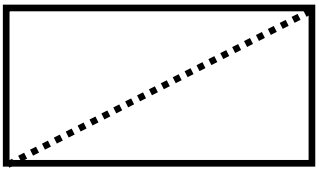
A) (4, 6.5)

B) (1, 6)

C) (2, 0.5)

D) (16, 1)

91)



The above diagram is most likely used in deriving a formula for which of the following?

A) the area of a rectangle

B) the area of a triangle

C) the perimeter of a triangle

D) the surface area of a prism

92) A student turns in a paper with this type of error:

$7 + 16 \div 8 \times 2 = 8$
$8 - 3 \times 3 + 4 = -5$

In order to remediate this error, a teacher should:

A) review and drill basic number facts

B) emphasize the importance of using parentheses in simplifying expressions

C) emphasize the importance of working from left to right when applying the order of operations

D) do nothing; these answers are correct

93) Identify the proper sequencing of subskills when teaching graphing inequalities in two dimensions

A) shading regions, graphing lines, graphing points, determining whether a line is solid or broken

B) graphing points, graphing lines, determining whether a line is solid or broken, shading regions

C) graphing points, shading regions, determining whether a line is solid or broken, graphing lines

D) graphing lines, determining whether a line is solid or broken, graphing points, shading regions

94) Sandra has $34.00, Carl has $42.00. How much more does Carl have than Sandra?

Which would be the best method for finding the answer?

A) addition

B) subtraction

C) division

D) both A and B are equally correct

95) Which is the least appropriate strategy to emphasize when teaching problem solving?

A) guess and check

B) look for key words to indicate operations such as all together-add, more than-subtract, times-multiply

C) make a diagram

D) solve a simpler version of the problem

96) Choose the least appropriate set of manipulatives for a six grade class.

A) graphic calculators, compasses, rulers, conic section models

B) two color counters, origami paper, markers, yarn

C) balance, meter stick, colored pencils, beads

D) paper cups, beans, tangrams, geoboards

97) According to Piaget, at which developmental level would a child be able to learn formal algebra?

A) pre-operational

B) sensory-motor

C) abstract

D) concrete operational

98) Which statement is incorrect?

A) Drill and practice is one good use for classroom computers.

B) Some computer programs can help to teach problem solving.

C) Computers are not effective unless each child in the class has his own workstation.

D) Analyzing science project data on a computer during math class is an excellent use of class time.

98) Given a,b,y, and z are real numbers and ay + b = z, Prove

$$\frac{y = z + -b}{a}$$

Statement	Reason
1) ay + b = z	1) Given
2) -b is a real number	2) Closure
3) (ay +b) + -b = z + -b	3) Addition property of Identity
4) ay + (b + -b) = z + -b	4) Associative
5) ay + 0 = z + -b	5) Additive inverse
6) ay = z + -b	6) Addition property of identity
7) $a = \frac{z + -b}{y}$	7) Division

99) Which reason is incorrect for the corresponding statement?

A) step 3

B) step 4

C) step 5

D) step 6

100) Seventh grade students are working on a project using non-standard measurement. Which would not be an appropriate instrument for measuring the length of the classroom?

A) a student's foot

B) a student's arm span

C) a student's jump

D) all are appropriate

101. Change $.\overline{63}$ into a fraction in simplest form.

A) $63/100$
B) $7/11$
C) $6\ 3/10$
D) $2/3$

102. Which of the following sets is closed under division?

I) {½, 1, 2, 4}
II) {-1, 1}
III) {-1, 0, 1}

A) I only
B) II only
C) III only
D) I and II

103. Which of the following illustrates an inverse property?

A) a + b = a - b
B) a + b = b + a
C) a + 0 = a
D) a + (-a) =0

104. $f(x) = 3x - 2;\ f^{-1}(x) =$

A) $3x + 2$
B) $x/6$
C) $2x - 3$
D) $(x + 2)/3$

105. What would be the total cost of a suit for $295.99 and a pair of shoes for $69.95 including 6.5% sales tax?

A) $389.73
B) $398.37
C) $237.86
D) $315.23

106. A student had 60 days to appeal the results of an exam. If the results were received on March 23, what was the last day that the student could appeal?

A) May 21
B) May 22
C) May 23
D) May 24

107. Which of the following is always composite if *x* is odd, *y* is even, and both *x* and *y* are greater than or equal to 2?

A) $x + y$
B) $3x + 2y$
C) $5xy$
D) $5x + 3y$

108. Which of the following is incorrect?

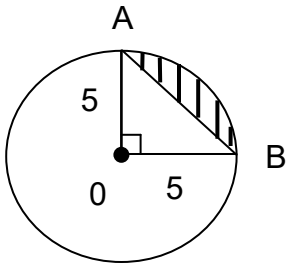
A) $(x^2y^3)^2 = x^4y^6$
B) $m^2(2n)^3 = 8m^2n^3$
C) $(m^3n^4)/(m^2n^2) = mn^2$
D) $(x + y^2)^2 = x^2 + y^4$

109. Express .0000456 in scientific notation.

A) $4.56x10^{-4}$
B) $45.6x10^{-6}$
C) $4.56x10^{-6}$
D) $4.56x10^{-5}$

110. Compute the area of the shaded region, given a radius of 5 meters. 0 is the center.

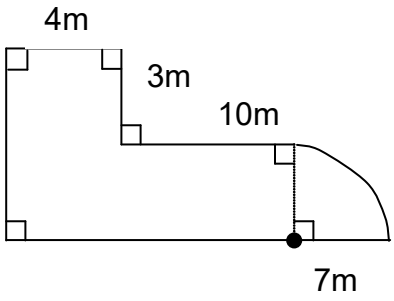
A) 7.13 cm²
B) 7.13 m²
C) 78.5 m²
D) 19.63 m²



111. If the area of the base of a cone is tripled, the volume will be

A) the same as the original
B) 9 times the original
C) 3 times the original
D) 3 π times the original

112. Find the area of the figure pictured below.



A) 136.47 m²
B) 148.48 m²
C) 293.86 m²
D) 178.47 m²

113. The mass of a Chips Ahoy cookie would be approximately equal to:

A) 1 kilogram
B) 1 gram
C) 15 grams
D) 15 milligrams

114. Compute the median for the following data set:

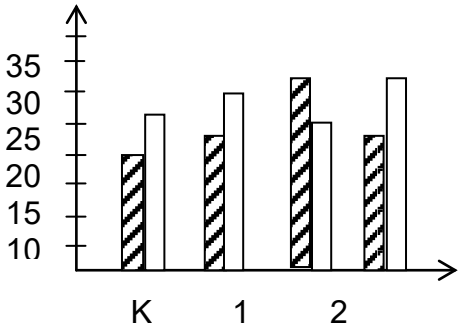
{12, 19, 13, 16, 17, 14}

A) 14.5
B) 15.17
C) 15
D) 16

115. Half the students in a class scored 80% on an exam, most of the rest scored 85% except for one student who scored 10%. Which would be the best measure of central tendency for the test scores?

A) mean
B) median
C) mode
D) either the median or the mode because they are equal

116. What conclusion can be drawn from the graph below?

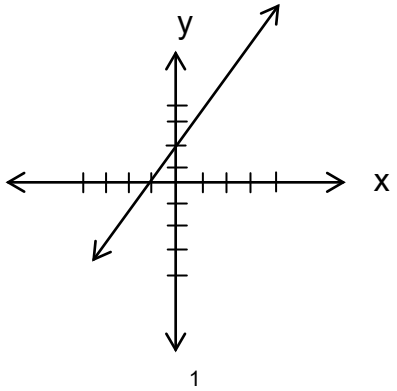


MLK Elementary Student Enrollment ▨ **Girls** □ **Boys**

A) The number of students in first grade exceeds the number in second grade.
B) There are more boys than girls in the entire school.
C) There are more girls than boys in the first grade.
D) Third grade has the largest number of students.

117) State the domain of the function $f(x)=\dfrac{3x-6}{x^2-25}$

A) $x \neq 2$
B) $x \neq 5, -5$
C) $x \neq 2, -2$
D) $x \neq 5$



118. What is the equation of the above graph?

A) $2x+y=2$
B) $2x-y=-2$
C) $2x-y=2$
D) $2x+y=-2$

119. Solve for v_0 **:** $d=at(v_t-v_0)$

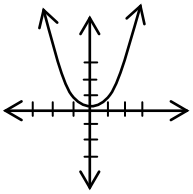
A) $v_0=atd-v_t$
B) $v_0=d-atv_t$
C) $v_0=atv_t-d$
D) $v_0=(atv_t-d)/at$

120. Which of the following is a factor of $6+48m^3$

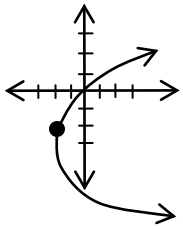
A) (1 + 2m)
B) (1 - 8m)
C) (1 + m - 2m)
D) (1 - m + 2m)

121. Which graph represents the equation of $y = x^2 + 3x$?

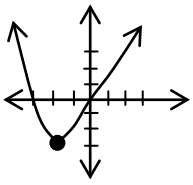
A)



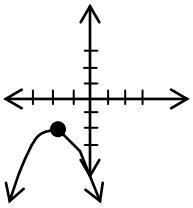
B)



C)



D)



122. The volume of water flowing through a pipe varies directly with the square of the radius of the pipe. If the water flows at a rate of 80 liters per minute through a pipe with a radius of 4 cm, at what rate would water flow through a pipe with a radius of 3 cm?

A) 45 liters per minute
B) 6.67 liters per minute
C) 60 liters per minute
D) 4.5 liters per minute

123) Solve the system of equations for x, y and z.

$$3x + 2y - z = 0$$
$$2x + 5y = 8z$$
$$x + 3y + 2z = 7$$

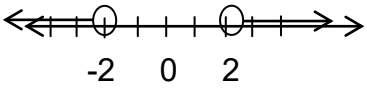
A) $(-1,\ 2,\ 1)$
B) $(1,\ 2,\ -1)$
C) $(-3,\ 4,\ -1)$
D) $(0,\ 1,\ 2)$

124. Solve for x: $18 = 4 + |2x|$

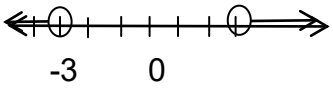
A) $\{-11,\ 7\}$
B) $\{-7\ ,0,\ 7\}$
C) $\{-7,\ 7\}$
D) $\{-11, 11\}$

125. Which graph represents the solution set for $x^2 - 5x > -6$?

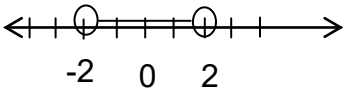
A)



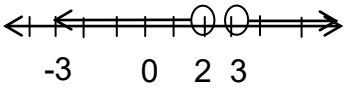
B)



C)



D)



126. Find the zeroes of
$f(x) = x^3 + x^2 - 14x - 24$

A) 4, 3, 2
B) 3, -8
C) 7, -2, -1
D) 4, -3, -2

127. Evaluate $3^{1/2}(9^{1/3})$

A) $27^{5/6}$
B) $9^{7/12}$
C) $3^{5/6}$
D) $3^{6/7}$

128. Simplify: $\sqrt{27} + \sqrt{75}$

A) $8\sqrt{3}$
B) 34
C) $34\sqrt{3}$
D) $15\sqrt{3}$

129. Simplify: $\frac{10}{1+3i}$

A) $-1.25(1-3i)$
B) $1.25(1+3i)$
C) $1+3i$
D) $1-3i$

130. Find the sum of the first one hundred terms in the progression.
(-6, -2, 2 . . .)

A) 19,200
B) 19,400
C) -604
D) 604

131. How many ways are there to choose a potato and two green vegetables from a choice of three potatoes and seven green vegetables?

A) 126
B) 63
C) 21
D) 252

132. What would be the seventh term of the expanded binomial $(2a+b)^8$ **?**

A) $2ab^7$
B) $41a^4b^4$
C) $112a^2b^6$
D) $16ab^7$

133. Which term most accurately describes two coplanar lines without any common points?

A) perpendicular
B) parallel
C) intersecting
D) skew

134. Determine the number of subsets of set *K*.
***K* = {4, 5, 6, 7}**

A) 15
B) 16
C) 17
D) 18

135. What is the degree measure of each interior angle of a regular 10 sided polygon?

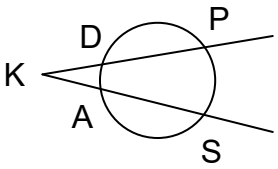
A) 18°
B) 36°
C) 144°
D) 54°

136. If a ship sails due south 6 miles, then due west 8 miles, how far was it from the starting point?

A) 100 miles
B) 10 miles
C) 14 miles
D) 48 miles

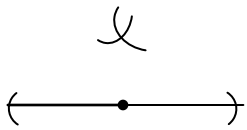
137. What is the measure of minor arc AD, given measure of arc PS is 40° and $m < K = 10^{\circ}$?

A) 50°
B) 20°
C) 30°
D) 25°



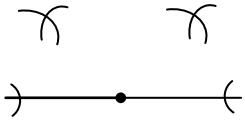
138. Choose the diagram which illustrates the construction of a perpendicular to the line at a given point on the line.

A)

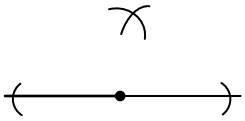


B)

C)



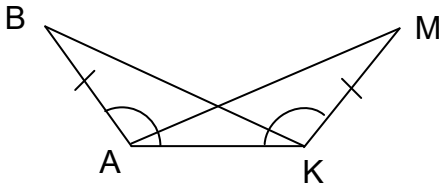
D)



139. When you begin by assuming the conclusion of a theorem is false, then show that through a sequence of logically correct steps you contradict an accepted fact, this is known as

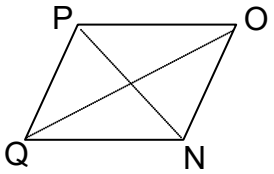
A) inductive reasoning
B) direct proof
C) indirect proof
D) exhaustive proof

140. Which theorem can be used to prove $\Delta BAK \cong \Delta MKA$?



A) SSS
B) ASA
C) SAS
D) AAS

141. Given that QO⊥NP and QO=NP, quadrilateral NOPQ can most accurately be described as a



A) parallelogram
B) rectangle
C) square
D) rhombus

142. Choose the correct statement concerning the median and altitude in a triangle.

A) The median and altitude of a triangle may be the same segment.
B) The median and altitude of a triangle are always different segments.
C) The median and altitude of a right triangle are always the same segment.
D) The median and altitude of an isosceles triangle are always the same segment.

143. Which mathematician is best known for his work in developing non-Euclidean geometry?

A) Descartes
B) Riemann
C) Pascal
D) Pythagoras

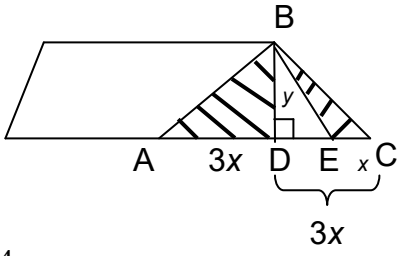
144. Find the surface area of a box which is 3 feet wide, 5 feet tall, and 4 feet deep.

A) 47 sq. ft.
B) 60 sq. ft.
C) 94 sq. ft
D) 188 sq. ft.

145. Given a 30 meter x 60 meter garden with a circular fountain with a 5 meter radius, calculate the area of the portion of the garden not occupied by the fountain.

A) 1721 m²
B) 1879 m²
C) 2585 m²
D) 1015 m²

146. Determine the area of the shaded region of the trapezoid in terms of *x* and *y*.



A) $4xy$
B) $2xy$
C) $3x^2y$
D) There is not enough information given.

Answer Key

1. C	38. D	75. D	112.B
2. C	39. C	76. B	113.C
3. D	40. B	77. A	114.C
4. A	41. C	78. B	115.B
5. B	42. A	79. A	116.B
6. B	43. B	80. D	117.B
7. B	44. B	81 B	118.B
8. D	45. C	82. C	119.D
9. C	46. A	83. C	120.A
10. A	47. C	84. D	121.C
11. B	48. C	85. B	122.A
12. A	49. A	86. B	123.A
13. D	50. B	87. D	124.C
14. D	51. D	88. C	125.D
15. C	52. D	89. D	126.D
16. A	53. B	90. B	127.B
17. B	54. C	91. B	128.A
18. D	55. A	92. C	129.D
19. C	56. D	93. B	130.A
20. D	57. B	94. D	131.A
21. C	58. B	95. B	132.C
22. C	59. D	96. A	133.B
23. A	60. C	97. C	134.B
24. C	61. D	98. C	135.C
25. C	62. A	99. A	136.B
26. A	63. C	100.D	137.B
27. D	64. D	101.B	138.D
28. A	65. B	102.B	139.C
29. B	66. D	103.D	140.C
30. C	67. B	104.D	141.C
31. A	68. C	105.A	142.A
32. D	69. A	106.B	143.B
33. C	70. C	107.C	144.C
34. D	71. C	108.D	145.A
35. C	72. A	109.D	146.B
36. B	73. C	110.B	
37. A	74. B	111.C	

Rationales for Sample Questions

The following statements represent one way to solve each problem and obtain a correct answer.

1) C The rational numbers are not a subset of the irrational numbers. All of the other statements are true.

2) C 5 is an irrational number. A and B can both be expressed as fractions. D can be simplified to -4, an integer and rational number.

3) D A complex number is the square root of a negative number. The complex number is defined as the square root of -1. A is rational, B and C are irrational.

4) A A proper subset is completely contained in, but not equal to, the original set.

5) B Illustrates the identity axiom of addition. A illustrates additive inverse, C illustrates the multiplicative inverse, and D illustrates the commutative axiom of addition.

6) B In simplifying from step a to step b, 3 replaced 7 - 4, therefore the correct justification would be subtraction or substitution.

7) B In order to be closed under division, when any two members of the set are divided the answer must be contained in the set. This is not true for integers, natural, or whole numbers as illustrated by the counter example 11/2 = 5.5.

8) D There are an infinite number of real numbers between any two real numbers.

9) C is inappropriate. A shows a 7x4 rectangle with 3 additional units. B is the division based on A . D shows how mental subtraction might be visualized leaving a composite difference.

10) A According to the order of operations, multiplication is performed first, then addition and subtraction from left to right.

11) B is always false. A, C, and D illustrate various properties of inverse relations.

12) A 12(40) = 480 which is closest to $500.

13) D 5n is always even. An even number added to an even number is always an even number, thus divisible by 2.

14) D x + y is sometimes prime. B and C show the products of two numbers which are always composite. x + y may be true, but not always,

15) C Choose the number of each prime factor that is in common.

16) A Although choices B, C and D are common multiples, when both numbers are even, the product can be divided by two to obtain the least common multiple.

17) B Multiply the decimals and add the exponents.

18) D Express as the fraction 1/8, then convert to a decimal.

19) C Divide the decimals and subtract the exponents.

20) D Cross multiply to obtain 12 = 8x, then divide both sides by 8.

21) C 3/8 is equivalent to .375 and 37.5%

22) C Set up the proportion 3/2 = x/5, cross multiply to obtain 15=2x, then divide both sides by 2.

23) A Let x be the wholesale price, then x + .30x = 520, 1.30x = 520. Divide both sides by 1.30.

24) C There are 8 favorable outcomes: 2,4,5,6,7,8 and 8 possibilities. Reduce 6/8 to 3/4.

25) C The odds are that he will win 3 and lose 7.

26) A In this example of conditional probability, the probability of drawing a black sock on the first draw is 5/10. It is implied in the problem that there is no replacement, therefore the probability of obtaining a black sock in the second draw is 4/9. Multiply the two probabilities and reduce to lowest terms.

27) D With replacement, the probability of obtaining a butterscotch on the first draw is 2/8 and the probability of drawing a butterscotch on the second draw is also 2/8. Multiply and reduce to lowest terms.

28) A Place the numbers in ascending order: 3 6 7 11 14 20. Find the average of the middle two numbers (7+11)12 =9

29) B The median provides the best measure of central tendency in this case, where the mode is the lowest number and the mean would be disproportionately skewed by the outlier $120,000.

30) C George spends twice as much on utilities as on food.

31) A Percentile ranking tells how the student compared to the norm or the other students taking the test. It does not correspond to the percentage answered correctly, but can indicate how the student compared to the average student tested.

32) D The greatest possible error of measurement is $\pm$ + 1/2 unit, in this case .5 cm or 5 mm.

33) C A cookie is measured in grams.

34) D To change kilometers to meters, move the decimal 3 places to the right.

35) C There are 9 square feet in a square yard.

36) B Find the radius by solving $\Pi r^2 = 25$. Then substitute r=2.82 into $C = 2\Pi r$ to obtain the circumference.

37) A Divide the figure into two rectangles with a horizontal line. The area of the top rectangle is 36 in, and the bottom is 20 in.

38) D Find the area of the square $10^2 = 100$, then subtract 1/2 the area of the circle. The area of the circle is Πr^2 = (3.14)(5)(5)=78.5. Therefore the area of the shaded region is 100 - 39.25 - 60.75.

39) C The perimeters of similar polygons are directly proportional to the lengths of their sides, therefore 9/15 = x/150. Cross multiply to obtain 1350 = 15x, then divide by 15 to obtain the perimeter of the smaller polygon.

40) B Divide the figure into a triangle, a rectangle and a trapezoid. The area of the triangle is 1/2 bh = 1/2 (4)(5) = 10. The area of the rectangle is bh = 12(10) = 120. The area of the trapezoid is 1/2(b + B)h = 1/2(6 + 10)(3) = 1/2 (16)(3) = S4. Thus, the area of the figure is 10 + 120 + 24 =154.

41) C If the radius of a right ~~circular~~ cylinder is doubled, the volume is multiplied by four; because in the formula, the radius is squared. Therefore the new volume is 2 x 2 or four times the original.

42) A Solve for the radius of the sphere using $A = 4\Pi r^2$. The radius is 3. Then, find the volume using $4/3\ \Pi r^3$. Only when the radius is 3 are the volume and surface area equivalent.

43) B There are five surfaces which make up the prism. The bottom rectangle has an area 6 x 12 = 72. The sloping sides are two rectangles each with an area of 5 x 12 = 60. The height of the end triangles is determined to be 4 using the Pythagorean theorem. Therefore each triangle has area 1/2bh = 1/2(6)(4) -12. Thus, the surface area is 72 + 60 + 60 + 12 + 12 = 216.

44) B Using the general formula for a pyramid V = 1/3 bh, since the base is tripled and is not squared or cubed in the formula, the volume is also tripled.

45) C The lateral area does not include the base.

46) A The reflexive property states that every number or variable is equal to itself and every segment is congruent to itself.

47) C Step 3 can be justified by the transitive property.

48) C Simplify the complex fraction by inverting the denominator and multiplying: 3/4(3/2)=9/8, then subtract exponents to obtain the correct answer.

49) A First perform multiplication and division from left to right; 7t -8t + 6t, then add and subtract from left to right.

50) B Using additive equality, $-3 \geq 4x$. Divide both sides by 4 to obtain $-3/4 \geq x$. Carefully determine which answer choice is equivalent.

51) D The quantity within the absolute value symbols must be either > 4 or < -4. Solve the two inequalities 2x + 3 > 4 or 2x + 3 < -4

52) D Multiplying the top equation by -4 and adding results in the equation 0 = -33. Since this is a false statement, the correct choice is the null set.

53) B Substituting x in the second equation results in 7(3y + 7) + 5y = 23. Solve by distributing and grouping like terms: 26y+49 = 23, 26y = -26, y = -1 Substitute y into the first equation to obtain x.

54) C By looking at the graph, we can determine the slope to be -1 and the y-intercept to be 3. Write the slope intercept form of the line as $y = -1x + 3$. Add x to both sides to obtain $x + y = 3$, the equation in standard form.

55) A Solve by adding -7 to each side of the inequality. Since the absolute value of x is less than 6, x must be between -6 and 6. The end points are not included so the circles on the graph are hollow.

56) D Be sure to enclose the sum of the number and 6 in parentheses.

57) B Let x = the speed of the boat in still water and c = the speed of the current.

	rate	time	distance
upstream	x - c	3	30
downstream	x + c	1.5	30

Solve the system:

$3x - 3c = 30$

$1.5x + 1.5c = 30$

58) B Each number in the domain can only be matched with one number in the range. A is not a function because 0 is mapped to 4 different numbers in the range. In C, 1 is mapped to two different numbers. In D, 4 is also mapped to two different numbers.

59) D Solve the denominator for 0. These values will be excluded from the domain.

$$2x^2 - 3 = 0$$
$$2x^2 = 3$$
$$x^2 = 3/2$$
$$x = \sqrt{\tfrac{3}{2}} = \sqrt{\tfrac{3}{2}} \bullet \sqrt{\tfrac{2}{2}} = \tfrac{\pm\sqrt{6}}{2}$$

60) C Glancing first at the solution choices, factor (y - x) from each term. This leaves -8 from the first term and a from the second term: (a - 8)(y - x)

61) D The complete factorization for a difference of cubes is $(k - m)(k^2 + mk + m2)$.

62) A Distribute and combine like terms to obtain $7x^2 - 14 = 0$. Add 14 to both sides, then divide by 7. Since $x^2 = 2$, $x = \sqrt{2}$

63) C Simplify each radical by factoring out the perfect squares:

$$5\sqrt{3} + 7\sqrt{3} - 4\sqrt{3} = 8\sqrt{3}$$

64) D The discriminate is the number under the radical sign. Since it is negative the two roots of the equation are complex.

65) B Since the vertex of the parabola is three units to the left, we choose the solution where 3 is subtracted from x, then the quantity is squared.

66) D The constant of variation for an inverse proportion is xy.

67) B y/x-216=x/18, Solve 36=6x.

68) C

69) A

70) C

71) C The angles in A are exterior. In B, the angles are vertical. The angles in D are consecutive, not adjacent.

72) A Each interior angle of the hexagon measures 120^{o}. The isosceles triangle on the left has angles which measure 120, 30, and 30. By alternate interior angle theorem, $\angle 1$ is also 30.

73) C In any triangle, an exterior angle is equal to the sum of the remote interior angles.

74) B Use SAS with the last side being the vertical line common to both triangles.

75) D Angles formed by intersecting lines are called vertical angles and are congruent.

76) B In similar polygons, the areas are proportional to the squares of the sides. ~~36/64 = x/64~~ $6^2:8^2$; 36:64

77) A The sides are in the same ratio.

78) B The altitude from the right angle to the hypotenuse of any right triangle is the geometric mean of the two segments which are formed. Multiply 7 x 14 and take the square root.

79) A In a 30-60- 90 right triangle, the leg opposite the 30^{o} angle is half the length of the hypotenuse.

80) D Minor arc AC measures 50^{o}, the same as the central angle. To determine the measure of the major arc, subtract from 360.

81) C An inscribed angle is equal to one half the measure of the intercepted arc.

82) C The points marked C and D are the intersection of the circles with centers A and B.

83) C Using a compass, point K is found to be equidistant from A and B.

84) D A postulate is an accepted property of real numbers or geometric figures which cannot be proven, A, B. and C are theorems which can be proven.

85) B The point, line, and plane are the three undefined concepts on which plane geometry is based.

86) B To obtain the final side, add CD to both BC and ED.

87) D The isosceles triangle theorem states that the base angles are congruent, and the reflexive property states that every segment is congruent to itself.

88) C Using the distance formula

$$\sqrt{[3-(-3)]^2 + (7-4)^2}$$
$$= \sqrt{36+9}$$
$$= 3\sqrt{5}$$

89) D Using the midpoint formula

x = (2 + 7)/2 y = (5 + -4)/2

90) B

91) B

92) C

93) B

94) D

95) B

96) A

97) C

98) C

99) A

100) D

101) Let N = .636363…. Then multiplying both sides of the equation by 100 or 10^2 (because there are 2 repeated numbers), we get 100N = 63.636363… Then subtracting the two equations gives 99N = 63 or N = $\frac{63}{99} = \frac{7}{11}$.

Answer is B

102) I is not closed because $\frac{4}{.5} = 8$ and 8 is not in the set.

III is not closed because $\frac{1}{0}$ is undefined.

II is closed because $\frac{-1}{1} = -1, \frac{1}{-1} = -1, \frac{1}{1} = 1, \frac{-1}{-1} = 1$ and all the answers are in the set. **Answer is B**

103) **Answer is D** because a + (-a) = 0 is a statement of the Additive Inverse Property of Algebra.

104) To find the inverse, $f^{-1}(x)$, of the given function, reverse the variables in the given equation, y = 3x – 2, to get x = 3y – 2. Then solve for y as follows: x+2 = 3y, and y = $\frac{x+2}{3}$. **Answer is D.**

105) Before the tax, the total comes to $365.94. Then .065(365.94) = 23.79. With the tax added on, the total bill is 365.94 + 23.79 = $389.73. (Quicker way: 1.065(365.94) = 389.73.) **Answer is A**

106) Recall: 30 days in April and 31 in March. 8 days in March + 30 days in April + 22 days in May brings him to a total of 60 days on May 22. **Answer is B.**

107) A composite number is a number which is not prime. The prime number sequence begins 2,3,5,7,11,13,17,…. To determine which of the expressions is <u>always</u> composite, experiment with different values of x and y, such as x=3 and y=2, or x=5 and y=2. It turns out that 5xy will always be an even number, and therefore, composite, if y=2. **Answer is C.**

108) Using FOIL to do the expansion, we get $(x + y^2)^2 = (x + y^2)(x + y^2) = x^2 + 2xy^2 + y^4$. **Answer is D**.

109) In scientific notation, the decimal point belongs to the right of the 4, the first significant digit. To get from 4.56×10^{-5} back to 0.0000456, we would move the decimal point 5 places to the left. **Answer is D.**

110) Area of triangle AOB is .5(5)(5) = 12.5 square meters. Since $\frac{90}{360} = .25$, the area of sector AOB (pie-shaped piece) is approximately .25(π)5^2 = 19.63. Subtracting the triangle area from the sector area to get the area of segment AB, we get approximately 19.63-12.5 = 7.13 square meters. **Answer is B.**

111) The formula for the volume of a cone is V = $\frac{1}{3}Bh$, where B is the area of the circular base and h is the height. If the area of the base is tripled, the volume becomes V = $\frac{1}{3}(3B)h = Bh$, or three times the original area. **Answer is C**.

112) Divide the figure into 2 rectangles and one quarter circle. The tall rectangle on the left will have dimensions 10 by 4 and area 40. The rectangle in the center will have dimensions 7 by 10 and area 70. The quarter circle will have area .25(π)7^2 = 38.48. The total area is therefore approximately 148.48. **Answer is B.**

113) Since an ordinary cookie would not weigh as much as 1 kilogram, or as little as 1 gram or 15 milligrams, the only reasonable answer is 15 grams. **Answer is C.**

114) Arrange the data in ascending order: 12,13,14,16,17,19. The median is the middle value in a list with an odd number of entries. When there are an even number of entries, the median is the mean of the two center entries. Here the average of 14 and 16 is 15. **Answer is C.**

115) In this set of data, the median (see #14) would be the most representative measure of central tendency, since the median is independent of extreme values. Because of the 10% outlier, the mean (average) would be disproportionately skewed. In this data set, it is true that the median and the mode (number which occurs most often) are the same, but the median remains the best choice because of its special properties. **Answer is B.**

116) In kindergarten, first grade, and third grade, there are more boys than girls. The number of extra girls in grade two is more than made up for by the extra boys in all the other grades put together. **Answer is B.**

117) The values of 5 and –5 must be omitted from the domain of all real numbers because if x took on either of those values, the denominator of the fraction would have a value of 0, and therefore the fraction would be undefined. **Answer is B.**

118) By observation, we see that the graph has a y-intercept of 2 and a slope of 2/1 = 2. Therefore its equation is y = mx + b = 2x + 2. Rearranging the terms gives 2x – y = -2**. Answer is B**.

119) Using the Distributive Property and other properties of equality to isolate v_0 gives $d = atv_t - atv_0$, $atv_0 = atv_t - d$, $v_0 = \frac{atv_t - d}{at}$. **Answer is D.**

120) Removing the common factor of 6 and then factoring the sum of two cubes gives $6 + 48m^3 = 6(1 + 8m^3) = 6(1 + 2m)(1^2 - 2m + (2m)^2)$. **Answer is A**.

121) B is not the graph of a function. D is the graph of a parabola where the coefficient of x^2 is negative. A appears to be the graph of $y = x^2$. To find the x-intercepts of $y = x^2 + 3x$, set y = 0 and solve for x: $0 = x^2 + 3x = x(x + 3)$ to get x = 0 or x = -3. Therefore, the graph of the function intersects the x-axis at x=0 and x=-3. **Answer is C.**

122) Set up the direct variation: $\frac{V}{r^2} = \frac{V}{r^2}$. Substituting gives $\frac{80}{16} = \frac{V}{9}$. Solving for V gives 45 liters per minute. **Answer is A.**

123) Multiplying equation 1 by 2, and equation 2 by –3, and then adding together the two resulting equations gives -11y + 22z = 0. Solving for y gives y = 2z. In the meantime, multiplying equation 3 by –2 and adding it to equation 2 gives –y – 12z = -14. Then substituting 2z for y, yields the result z = 1. Subsequently, one can easily find that y = 2, and x = -1. **Answer is A.**

124) Using the definition of absolute value, two equations are possible: 18 = 4 + 2x or 18 = 4 – 2x. Solving for x gives x = 7 or x = -7. **Answer is C**.

125) Rewriting the inequality gives $x^2 - 5x + 6 > 0$. Factoring gives (x – 2)(x – 3) > 0. The two cut-off points on the number line are now at x = 2 and x = 3. Choosing a random number in each of the three parts of the number line, we test them to see if they produce a true statement. If x = 0 or x = 4, (x-2)(x-3)>0 is true. If x = 2.5, (x-2)(x-3)>0 is false. Therefore the solution set is all numbers smaller than 2 or greater than 3. **Answer is D.**

126) Possible rational roots of the equation $0 = x^3 + x^2 - 14x - 24$ are all the positive and negative factors of 24. By substituting into the equation, we find that –2 is a root, and therefore that x+2 is a factor. By performing the long division $(x^3 + x^2 - 14x - 24)/(x+2)$, we can find that another factor of the original equation is $x^2 - x - 12$ or (x-4)(x+3). Therefore the zeros of the original function are –2, -3, and 4. **Answer is D.**

127) Getting the bases the same gives us $3^{\frac{1}{2}}3^{\frac{2}{3}}$. Adding exponents gives $3^{\frac{7}{6}}$. Then some additional manipulation of exponents produces $3^{\frac{7}{6}} = 3^{\frac{14}{12}} = \left(3^2\right)^{\frac{7}{12}} = 9^{\frac{7}{12}}$. **Answer is B**.

128) Simplifying radicals gives $\sqrt{27}+\sqrt{75}=3\sqrt{3}+5\sqrt{3}=8\sqrt{3}$. **Answer is A.**

129) Multiplying numerator and denominator by the conjugate gives $\frac{10}{1+3i}\times\frac{1-3i}{1-3i}=\frac{10(1-3i)}{1-9i^2}=\frac{10(1-3i)}{1-9(-1)}=\frac{10(1-3i)}{10}=1-3i$. **Answer is D**.

130) To find the 100th term: t_{100} = -6 + 99(4) = 390. To find the sum of the first 100 terms: S = $\frac{100}{2}(-6+390)=19200$. **Answer is A.**

131) There are 3 slots to fill. There are 3 choices for the first, 7 for the second, and 6 for the third. Therefore, the total number of choices is 3(7)(6) = 126. **Answer is A.**

132) The set-up for finding the seventh term is $\frac{8(7)(6)(5)(4)(3)}{6(5)(4)(3)(2)(1)}(2a)^{8-6}b^6$ which gives $28(4a^2b^6)$ or $112a^2b^6$. **Answer is C**.

133) By definition, parallel lines are coplanar lines without any common points. **Answer is B.**

134) A set of n objects has 2^n subsets. Therefore, here we have 2^4 = 16 subsets. These subsets include four which have only 1 element each, six which have 2 elements each, four which have 3 elements each, plus the original set, and the empty set. **Answer is B.**

135) Formula for finding the measure of each interior angle of a regular polygon with n sides is $\frac{(n-2)180}{n}$. For n=10, we get $\frac{8(180)}{10}=144$. **Answer is C.**

136) Draw a right triangle with legs of 6 and 8. Find the hypotenuse using the Pythagorean Theorem. $6^2 + 8^2 = c^2$. Therefore, c = 10 miles. **Answer is B.**

137) The formula relating the measure of angle K and the two arcs it intercepts is $m\angle K=\frac{1}{2}(mPS-mAD)$. Substituting the known values, we get $10=\frac{1}{2}(40-mAD)$. Solving for mAD gives an answer of 20 degrees. **Answer is B.**

138) Given a point on a line, place the compass point there and draw two arcs intersecting the line in two points, one on either side of the given point. Then using any radius larger than half the new segment produced, and with the pointer at each end of the new segment, draw arcs which intersect above the line. Connect this new point with the given point. **Answer is D**.

139) By definition this describes the procedure of an indirect proof. **Answer is C.**

140) Since side AK is common to both triangles, the triangles can be proved congruent by using the Side-Angle-Side Postulate. **Answer is C.**

141) In an ordinary parallelogram, the diagonals are not perpendicular or equal in length. In a rectangle, the diagonals are not necessarily perpendicular. In a rhombus, the diagonals are not equal in length. In a square, the diagonals are both perpendicular and congruent. **Answer is C.**

142) The most one can say with certainty is that the median (segment drawn to the midpoint of the opposite side) and the altitude (segment drawn perpendicular to the opposite side) of a triangle may coincide, but they more often do not. In an isosceles triangle, the median and the altitude to the base are the same segment. **Answer is A.**

143) In the mid-nineteenth century, Reimann and other mathematicians developed elliptic geometry. **Answer is B**.

144) Let's assume the base of the rectangular solid (box) is 3 by 4, and the height is 5. Then the surface area of the top and bottom together is 2(12) = 24. The sum of the areas of the front and back are 2(15) = 30, while the sum of the areas of the sides are 2(20)=40. The total surface area is therefore 94 square feet. **Answer is C**.

145) Find the area of the garden and then subtract the area of the fountain: 30(60)-$\pi(5)^2$ or approximately 1721 square meters. **Answer is A.**

146) To find the area of the shaded region, find the area of triangle ABC and then subtract the area of triangle DBE. The area of triangle ABC is .5(6x)(y) = 3xy. The area of triangle DBE is .5(2x)(y) = xy. The difference is 2xy. **Answer is B.**

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