# Geometry
Fall Semester Exam Review

1. What is the coordinate of the midpoint of $\overline{FB}$ if point F is at 0 and point B is at 6?
   A. 3
   B. 2
   C. –3
   D. 0

2. Point U is between points T and B. If $TU = 4x – 5$, $UB = 2x + 1$, and $TB = 5x$, find x.
   A. 3
   B. 4
   C. 5
   D. 6

Refer to the figure at the right for Questions 3, 4 and 5

3. The plane containing S, A, C, K appears to be parallel to the p lane containing which points?.
   A. Q, E, K, S
   B. Q, U, R, E
   C. A, S, Q, U
   D. U, R, C, A

4. Which of the following appear to be skew lines?
   A. lines QE and AC
   B. lines QU and KC
   C. lines QS and AC
   D. lines AC and UR

5. Line EK does *not* appear to be parallel to the plane containing which points?
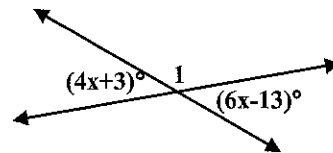   A. U, A, C
   B. Q, U, A
   C. Q, S, C
   D. Q, U, R
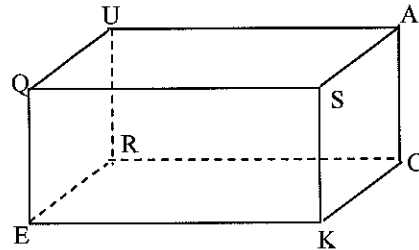
6. Find the length of the segment with endpoints K(0,2) and V(9,14).
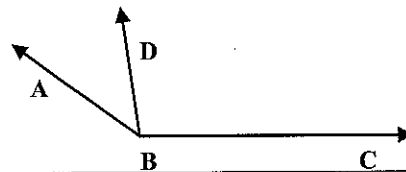   A. 21
   B. 15
   C. 12
   D. 9

7. If $\angle BAT$ and $\angle EAT$ form a linear pair and $\angle BAT$ is obtuse, then $\angle EAT$ is
   A. acute
   B. obtuse
   C. right
   D. straight

8. Find **m∠C** if $\angle C \cong \angle D$, $m\angle C = 3x – 5$, and $m\angle D = 2x + 5$.
   A. 36
   B. 35
   C. 20
   D. 25

9. Find m∠1.
   A. 35
   B. 165
   C. 145
   D. 15

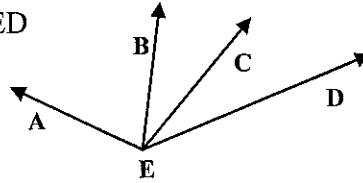 $(4x+3)°$ 1 $(6x-13)°$

10. If $m\angle ABD = 45$ and $m\angle ABC = 120$, find $m\angle DBC$.
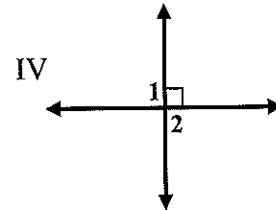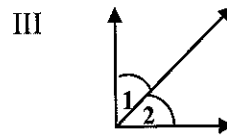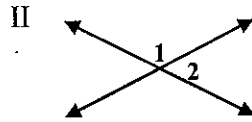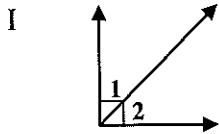   A. 120
    B. 75
    C. 70
    D. 80

11. Find the coordinates of the midpoint of $\overline{MN}$ for M(8,8) and N(-2,2).
    A. (-8,2)
    B. (-2,5)
    C. (5,3)
    D. (3,5)

12. If $\vec{EB}$ bisects $\angle AED$ and $m\angle DEB = 61$, find $m\angle AED$
    A. 90
    B. 180
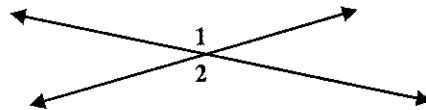   C. 30
    D. 122

13. In which diagram(s) are $\angle 1$ and $\angle 2$ supplementary?

    I   II   III   IV

    A. I only
    B. II only
    C. II and IV
    D. I, III, and IV

14. If $m\angle 1 = 7x - 5$ and $m\angle 2 = 5x + 27$, what is the value of x?
    A. 16
    B. 32
    C. 107
    D. 73

15. $\angle 4$ and $\angle 5$ form a linear pair and $m\angle 4 = 62$. Find $m\angle 5$.
    A. 62
    B. 28
    C. 118
    D. 90

16. If $\angle A$ and $\angle B$ are supplementary angles and $m\angle A$ is x, which equation can be used to find y, $m\angle B$?
    A. $y = 90 + x$
    B. $y = 90 - x$
    C. $y = 180 - x$
    D. $y = 180 + x$

17. The measure of an angle is 38 degrees more than the measure of its complement. Find the measure of the angle.
    A. 26
    B. 64
    B. 71
    D. 109

18. If two points lie in a plane, what must be true about the entire line containing those two points?
    A. The entire line lies in that plane.
    B. The entire line lies outside that plane.
    C. The line contains points that lie outside the plane.
    D. none of these.

19. A television screen measures approximately 15.5 inches high and 19.5 inches wide. A television is advertised by giving the approximate length of the diagonal of its screen. How should this television be advertised?
    A. 20 inches
    B. 25 inches
    C. 30 inches
    D. 35 inches

20. Assign a coordinate system for a baseball diamond and a point A in the field as follows: C(0, 0), D(90, 0), E(90, 90), A(280, 20), B(0, 90). If a right fielder throws the baseball from point A to third base (point B), how far does the ball travel?
    A. 202
    B. 210
    C. 280
    D. 289

A(280,20)
E(90,90)
B(0,90)
D(90,0)
C(0,0)
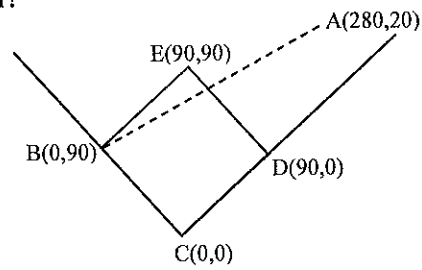
Use the figure at the right for the next 4 questions.

21. Identify the special angle pair name for $\angle 10$ and $\angle 6$.
    A. alternate interior   B. vertical
    C. corresponding   D. alternate exterior

22. Given $l \parallel m$ and $m\angle 5 = 72$, find $m\angle 10$.
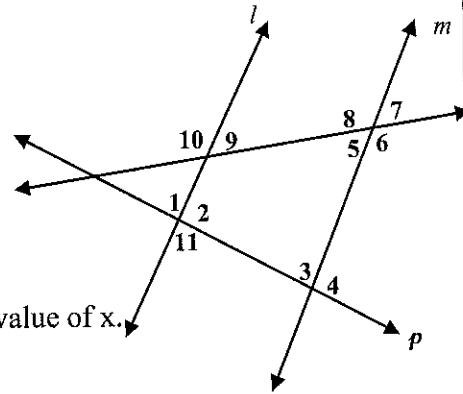   A. 108   B. 72
    C. 18   D. 112

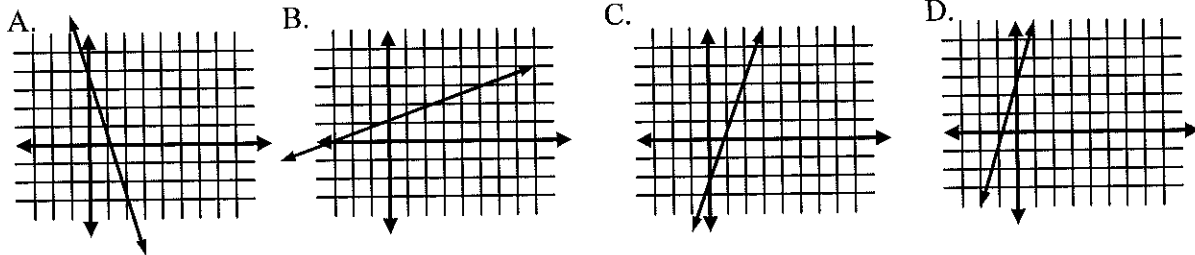23. Given $l \parallel m$, $m\angle 11 = 9x + 5$, and $m\angle 3 = x + 37$, find the value of x.
    A. 32   B. 4
    C. 41   D. 5

24. Given $m\angle 8 = 5x - 2$ and $m\angle 9 = 3x + 70$, find the value of x so that $l \parallel m$.
    A. 16   B. 14
    C. 62   D. 75

25. Which figure shows the line with a slope of -3 passing through P(0,3)?

A.   B.   C.   D.

26. Find the slope of the line passing through J(0,5) and K(-1,2).
    A. -3   B. 3
    C. 1/3   D. -1/3

27. Find the slope of any line parallel to the line passing through G(2,-3) and H(-1,4).
    A. -7/3   B. 3/7
    C. -3/7   D. 7/3

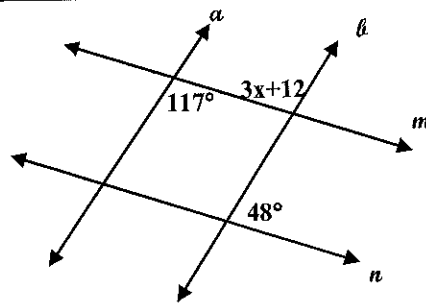28. What is the slope of any line perpendicular to the line y = -3?
    A. 0   B. 3
    C. -3   D. undefined

29. Name the equation of the line whose slope = 5 , and y-intercept = 3/2?
    A. y = ¾x – 3/2   B. y –2 = 5(x – 3)
    C. y = 3/2x – 5   D. y = 5x + 3/2

30. Find the value of x so that $m \parallel n$

A. 12
B. 20
C. 35
D. 40

117°   3x+12

48°

31. Name the equation of the line whose slope = -¾, and passes through (-2, 5)?

A. $y = -¾x - 5$
B. $y + 5 = -¾(x - 2)$
C. $y + 2 = ¾(x - 5)$
D. $y - 5 = -¾(x + 2)$

32. Name the equation of the line through the points (2, 10) and (-2, 2)

A. $y = 2x + 10$
B. $y = ½ x + 9$
C. $y = ½ x + 10$
D. $y = 2x + 6$

33. Name the x and y intercepts for the line $6x + 9y = 18$.

A. (3, 0); (0, 7)
B. (2, 0); (0, 3)
C. (3, 0); (0, 2)
D. (18, 0); (0, 18)

34. Name a point the line $y + 1 = -2(x - 4)$ passes through?

A. (-2, 1)
B. (4, -1)
C. (-4, 2)
D. (-4, 1)

35. Name the slope of the line $y + 3 = -½(x - 1)$.

A. ½
B. -1/3
C. -½
D. 3/1

36. Name the equation of a line parallel to $y = -4x + 9$, passing through point (-2, 7)

A. $y - 7 = -4(x + 2)$
B. $y + 2 = ¼(x + 7)$
C. $y + 7 = 4(x - 2)$
D. $y - 7 = -¼(x - 2)$

37. Name the equation of the line perpendicular to $y - 4 = 3(x - 8)$, with y-intercept = 6.

A. $y = -1/3x + 6$
B. $y = 3x - 6$
C. $y = 1/3x - 4$
D. $y = -1/3x - 6$

The vertices of $\triangle ABC$ are A(2, 18), B(-2, -4), and C(6, 12)

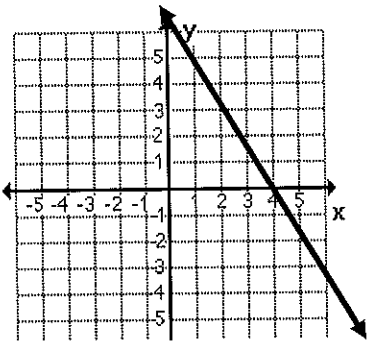38. Write the equation of the line containing the perpendicular bisector of $\overline{BC}$.

A. $y = 2x$
B. $y = -\dfrac{1}{2}x - 5$

C. $y = -\dfrac{1}{2}x + 5$
D. $y = 2x + 4$

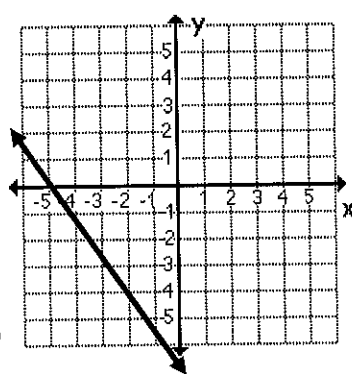39. Write the equation of the line containing the altitude to $\overline{BC}$.

A. $y = -\dfrac{1}{2}x - 5$
B. $y = -\dfrac{1}{2}x + 19$

C. $y = -\dfrac{1}{2}x + 5$
D. $y = -\dfrac{1}{2}x + 15$

40. Which of the following is the graph of $4x + 6y = 24$?
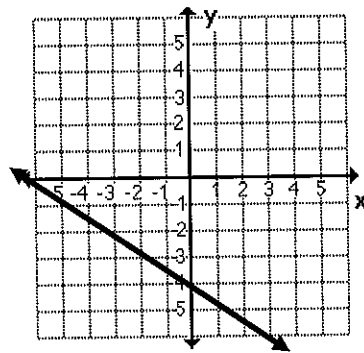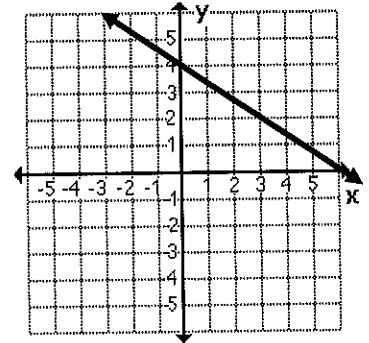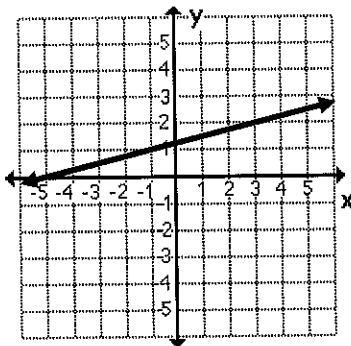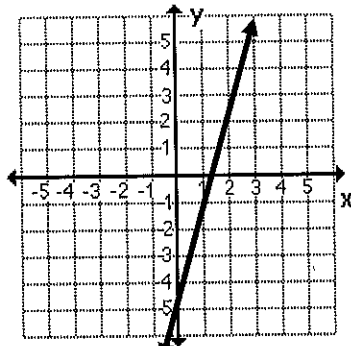
A.

B.

C.

D.

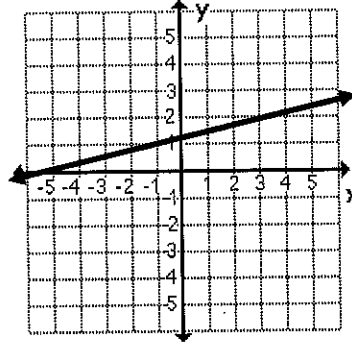41. Which of the following is the graph of $y + 1 = \dfrac{1}{4}(x - 1)$?

A.

B.

C.

D.
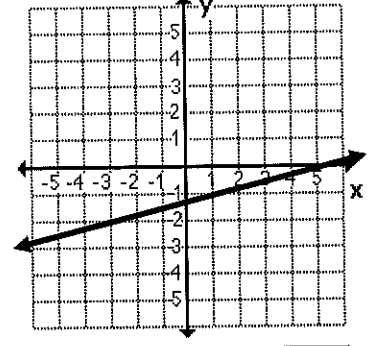
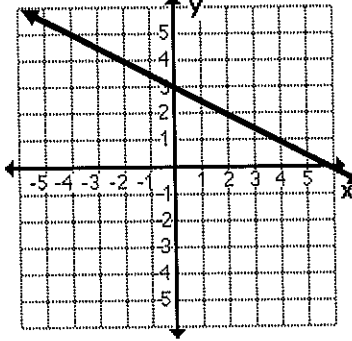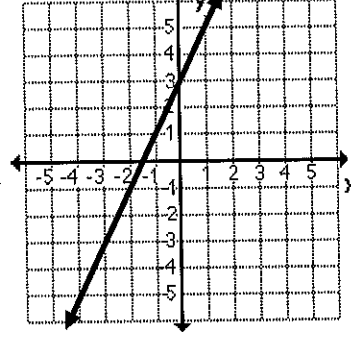42. Which of the following is the graph of $y = 2x + 3$?
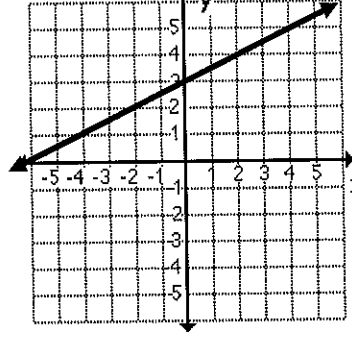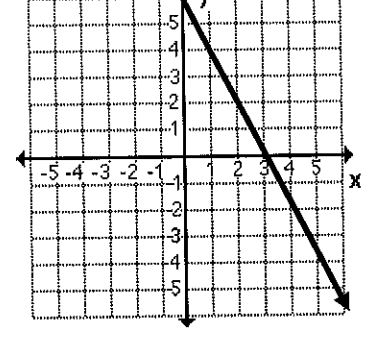
A.

B.

C.

D.

43. Which kind of transformation does not preserve segment length?
   A. reflection   B. translation   C. rotation   D. dilation

44. Which of the capital letters, **G**, **E**, **J**, or **R** has at least one line of symmetry?

   A. **E**   B. **J**   C. **R**   D. **G**

45. The reflection image of figure 1 with respect to y-axis is
   A. figure 2   B. figure 3
   C. figure 4   D. figure 5
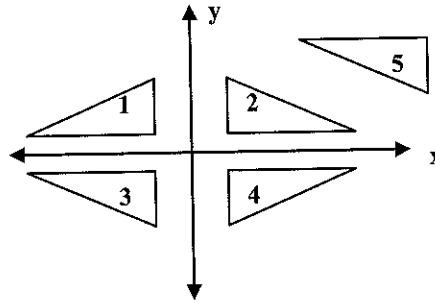
46. Which figure is a rotation of figure 3?
   A. figure 1   B. figure 2
   C. figure 4   D. figure 5

47. Which figure is a translation of figure 5?
   A. figure 1   B. figure 2
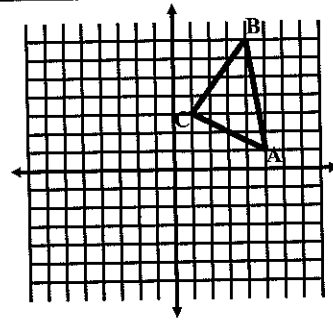   C. figure 3   D. figure 4

48. Which figure is a reflection of figure 2 with respect to the y-axis and then the x-axis?
   A. figure 1   B. figure 3   C. figure 4   D. figure 5

49. The coordinates of the image of $\triangle ABC$ after a reflection over the y-axis are:
   A. A′(5,-1), B′(4,-7), C′(1,-3)
   B. A′(-5,1), B′(-4,7), C′(-1,3)
   C. A′(-1,-5), B′(-7,-4), C′(-3,-1)
   D. A′(-1,5), B′(-7,4), C′(-3,1)

50. The coordinates of the image of quadrilateral DEFG after a slide of 2 units up and 3 units left are:
   A. D′(4,2), E′(6,-2), F′(0,-8), G′(-2,-4)
   B. D′(0,8), E′(2,4), F′(-4,-2), G′(-2,-2)
   C. D′(5,3), E′(7,-1), F′(1,-7), G′(-1,-3)
   D. D′(-1,7), E′(1,3), F′(-5,-3), G′(-7,1)
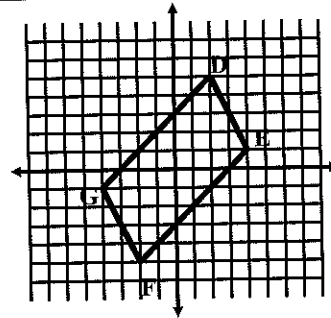
51. The dashed triangle is the image of the solid triangle. What is the scale factor?
   A. ½
   B. 3
   C. 1/3
   D. 2
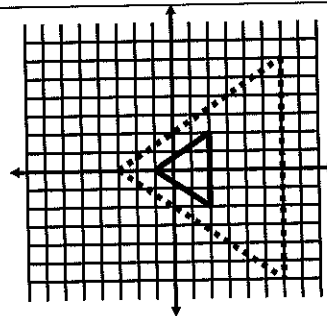
52. The line y = 3x + 6 is reflected over the y-axis.   What is the equation of the reflection?
   A. y = -3x + 6
   B. y = -3x – 6
   C. y = 3x – 6
   D. y = (1/3)x + 6

53. Which of the following transformations would preserve the slopes of lines?
   I. Translations
   II. 180° rotation
   III. Reduction
   IV. Reflection over the y-axis
   V. Vertical Shrink

   A. I, IV, and V
   B. II and III
   C. I, II, and III
   D. I – V

In the next two problems, solve each proportion by using cross products.

54. $\dfrac{5}{9} = \dfrac{x}{108}$

   A. 72   B. 12

   C. $21\dfrac{3}{5}$ D. 60

55. $\dfrac{x}{x+3} = \dfrac{9}{10}$

   A. 3   B. 10
   C. 27   D. 30

56. When he bowls, Jimmy uses the sight marks to aim the ball. Suppose he misses the mark by 5 cm in a bowling alley that is 15 m long. If the mark is 2 m from the point A when the ball is released, by how much will he miss the pin?
   A. 6 cm.
   B. 32.5 cm
   C. 0.67 cm
   D. 37.5 cm

ball

x

5 cm

A

pin

2 m

15 m (A to pin)
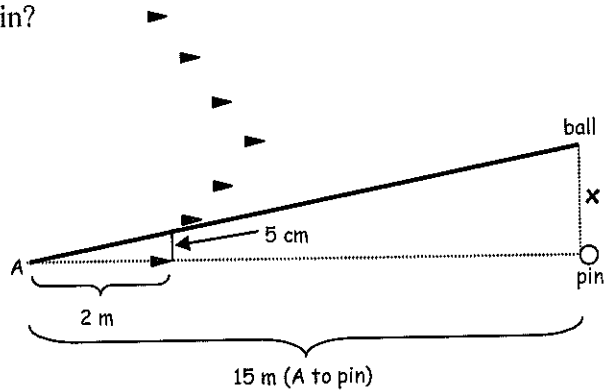
57. In ΔEFG, $\overline{HI} \parallel \overline{GF}$. If EI = 8, IF = 4, and EH = 5, find HG.
   A. 1   B. 2
   C. 2.5   D. 10

G

H
5

E   I   F
   8   4
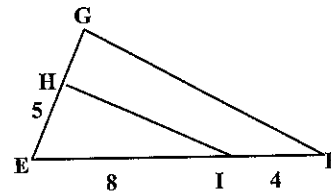
58. To find the distance x across a river, a surveyor located points W, A, T, E, and R through direct measurement. Find the distance across the river.
   A. 98 ft
   B. 32 ft
   C. 72 ft
   D. 84 ft

59. In the figure at the right, $\triangle LMN \sim \triangle PQR$, $\overline{NO}$ is an altitude of $\triangle LMN$, and $\overline{RS}$ is an altitude of $\triangle PQR$. If NO = 2, LN = x, RS = 3, and PR = x + 6, find x.
   A. 4
   B. 6
   C. 9
   D. 12

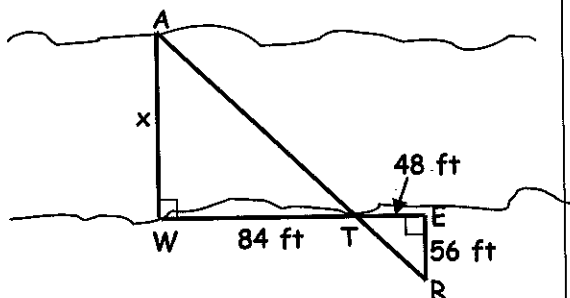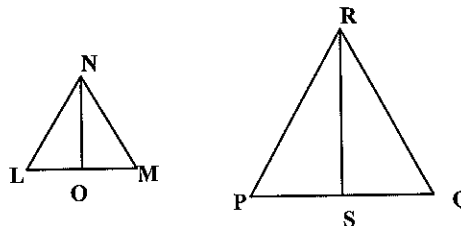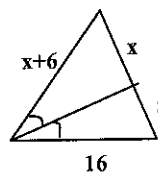60. For the figure at the right, find the value of x.
   A. –2   B. –12
   C. 12   D. 6

61. In $\triangle PQR$, $\overline{JG} \parallel \overline{RQ}$. PJ = 2, JR = 6, JG = 3. Find RQ.
   A. 4
   B. 9
   C. 12
   D. 18
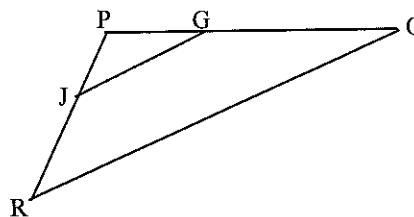
62. Wu wants to build a dollhouse for his sister using a plan he found on the internet. The height of the door for the dollhouse on the plan is 2 inches. The height of the door of the actual doll house will be $1\frac{1}{2}$ feet. What is the similarity ratio of the plan to the actual dollhouse?
   A. $\frac{1}{9}$ B. $\frac{3}{4}$
   C. $\frac{4}{3}$ D. $\frac{9}{1}$

63. Classify $\triangle ABC$ by sides if A(1,5), B(-3,1), and C(-1,-3).
   A. equilateral   B. isosceles
   C. scalene   D. right

64. $\triangle TES$ is isosceles with vertex $\angle E$. Find x.
   A. 1
   B. 2
   C. 3
   D. 4

65. Find the value of x. (see diagram at right).
   A. 2
   B. 12
   C. 23
   D. 26

66. Find m∠A. (see diagram at right)
   A. 73
   B. 41
   C. 33
   D. 40
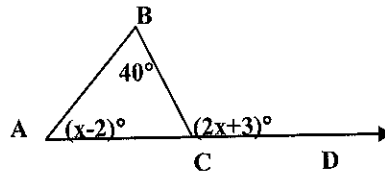
67. Classify ΔKLM if m∠K = 2x +2, m∠L = 3x+5, and m∠M = x-7.
   A. acute
   B. right
   C. obtuse
   D. equiangular

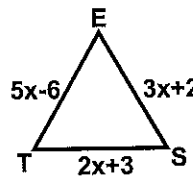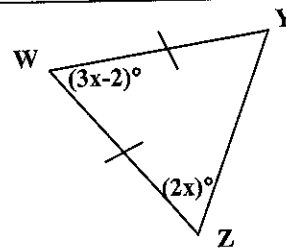68. The perimeter of ΔABC is 63 and AB=x+5, BC=2x-7, and AC=2x+5. Classify the triangle by the lengths of its sides.
   A. scalene
   B. isosceles
   C. equilateral
   D. right

69. In isosceles triangle ABC, ∠C is the vertex angle. If m∠A = 3x – 6 and m∠C = 2x, find the measure of ∠B.
   A. 24
   B. 26
   C. 48
   D. 66

70. Find x so that ΔABC ≅ ΔDEF if AB = x + 4, BC = 11, AC = 3x – 2, and DF = 5x – 4.
   A. 1
   B. 2
   C. 3
   D. 4

71. What additional information do you need to prove ΔABC ≅ ΔSTU by ASA.
   A. $\overline{AC} \cong \overline{US}$
   B. $\overline{BC} \cong \overline{TU}$
   C. ∠A ≅ ∠S
   D. ∠C ≅ ∠T
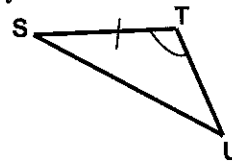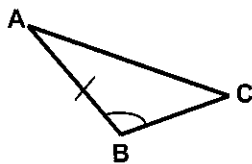
72. E is the midpoint of $\overline{BD}$,
   E is the midpoint of $\overline{AC}$
   ΔABE ≅ ΔCDE by _____ .

   A. AAS
   B. ASA
   C. SAS
   D. SSS
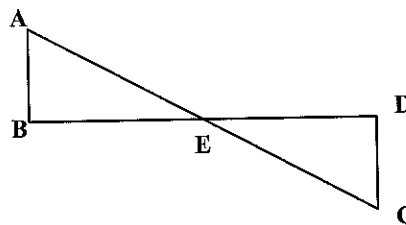
73. $\overline{AB} \perp \overline{BD}$
   $\overline{CD} \perp \overline{BD}$
   $\overline{AB} \cong \overline{CD}$
   ΔABD ≅ ΔCDB by _____ .

   A. HL
   B. HA
   C. LL
   D. LA
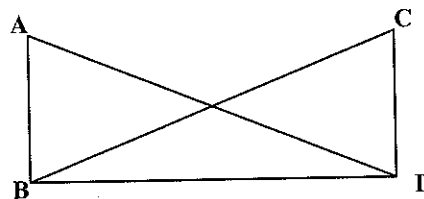
74. $\triangle ABC \cong \triangle ADC$ by what reason?
   A. AAS
   B. ASA
   C. SAS
   D. SSS
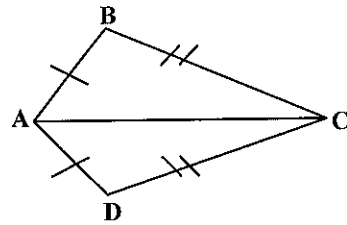
75. $\overline{GL}$ bisects $\overline{HK}$
   $\overline{GH} \perp \overline{HK}$ and $\overline{HK} \perp \overline{KL}$
   $\triangle GHJ \cong \triangle LKJ$ by _____.

   A. HL
   B. HA
   C. LL
   D. LA
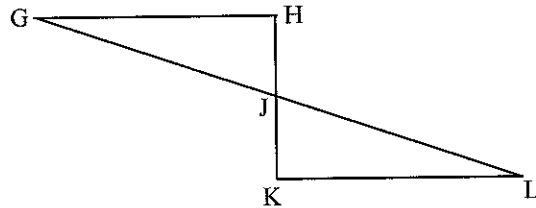
76. In $\triangle ABC$, if $\overline{BF}$ is an angle bisector, find x.
   A. 12
   B. 6
   C. 4
   D. 24
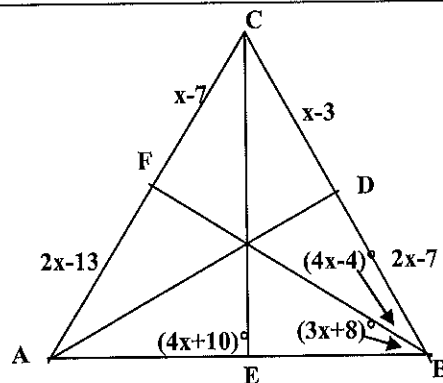
77. Identify the if-then form of the statement:
   All cars have four wheels.
   A. If a vehicle has four wheels, then it is a car.
   B. If a vehicle is a car, then it has four wheels.
   C. If a vehicle is not a car, then it does not have four wheels.
   D. none of these

78. Identify the converse of: If two angles form a linear pair then they are supplementary.
   A. If two angles don't form a linear pair then they are not supplementary.
   B. If two angles are supplementary then they form a linear pair.
   C. If two angles are not supplementary then they do not form a linear pair.
   D. none of these

79. Choose the statement that follows from (i) and (ii)
   (i) If Amy oversleeps then she will miss the bus.
   (ii) If Amy misses the bus then she will be tardy.
   A. If Amy is tardy then she overslept.
   B. If Amy oversleeps then she will be tardy.
   C. If Amy is tardy then she will get detention.
   D. If Amy oversleeps then she stayed up too late.

80. Study the relationships given and write the missing statement.

If you study for the final, then you will get a good grade.
If you get a good grade, your semester average will go up.
If you semester average raises, your parents will be happy.
    (missing sentence)
If your parents buy you a car, you will have lots of friends.

A. If you study for the final then you will have lots of friends.
B. If your parents are happy then they will buy you a car.
C. If your parents buy you a car then your parents will be happy.
D. If your parents aren't happy then you won't get a car.

81. Identify the contrapositive of the statement:
    If today is Tuesday, then tomorrow is Wednesday.
    A. If tomorrow is Wednesday, then today is Tuesday.
    B. If tomorrow is not Wednesday, then today is not Tuesday.
    C. If today is not Tuesday, then tomorrow is not Wednesday.
    D. If today is Tuesday then yesterday was Monday.

82. When the following sentences are sequenced logically (without using contrapositives), which sentence comes second:
    A. If you show a friend how to work the problems then your friend will know the material.
    B. You will know how to work the problems when you do the homework.
    C. Your friend's grade will improve because your friend knows the material.
    D. Since you know how to work the problems, you can show your friend how to work the problems.

Determine if the third statement follows from the first two. If it does, write valid and give the pattern of reasoning (original or contrapositive). If it does not, write invalid and name the error (converse or inverse error).

83. Tom would be a gardener if he had a green thumb.
    If Tom had a green thumb then he would raise tomatoes.
    Therefore, if Tom is a gardener, he would raise tomatoes.
    A. valid, original
    B. valid, contrapositive
    C. invalid, converse error
    D. invalid, inverse error

84. Sunny skies do not produce rain.
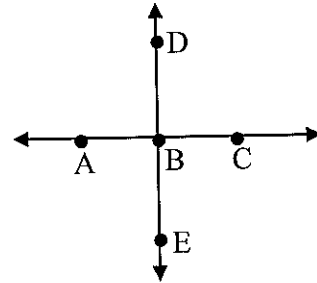   If there is thunder then it is raining.
    Therefore, if the skies are sunny then there is not thunder.
    A. valid, original
    B. valid, contrapositive
    C. invalid, converse error
    D. invalid, inverse error

85. In the figure, AC = 24, AB = 6x – 6, BC = 5x – 3, and BE = 3x + 2. Which do you know is true?

I. $\overline{AC}$ bisects $\overline{DE}$

II. $\overline{DE}$ bisects $\overline{AC}$

III. $\overleftrightarrow{DE}$ bisects $\overline{AC}$

A. I only
B. II only
C. III only
D. I and II only
E. II and III only

86. The measure of the supplement of an angle is 14 less than 3 times the measure of the complement. Find the measure of the complement.
A. 38
B. 52
C. 142
D. 19
E. none of these

87. Find the values of x and y. (The figure is not drawn to scale.)
A. x = 20, y = 34
B. x = 10, y = 52
C. x = 12, y = 18
D. x = 11, y = 7

$(11x+3)°$ $(4x-3)°$
$(2y+9)°$
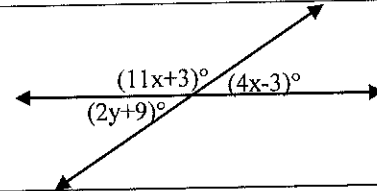
88. In the figure, $\overrightarrow{BD}$ bisects ∠ABE, $\overrightarrow{BE}$ bisects ∠ABG, m∠EBF = 37, and m∠CBG = 44. Find m∠DBF. (The figure is not drawn to scale.)
A. 68
B. 34
C. 82
D. 71
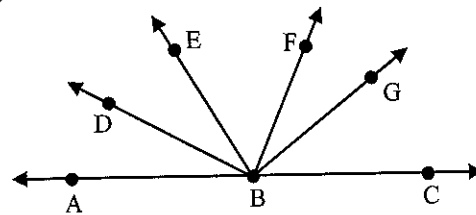
89. ∠ABC and ∠CBD are adjacent congruent angles, and m∠ABD = 160. What are the two possible measures for ∠ABC?
A. 80, 160
B. 100, 160
C. 80, 100
D. 90, 180
E. 160, 200

90. For which of the following statements are the statement, its contrapositive, its converse, and its inverse all true?
I. If a > 1, then $a^2 > a$.
II. Vertical angles are congruent.
III. If two lines form congruent adjacent angles, then the lines are perpendicular.

A. I only
B. II only
C. III only
D. I and III only
E. I, II, and III

91. Planes *K* and *J* are parallel. Line *p* lies in plane *K* and line *q* lies in plane *J*. Which of the following statements must be true?
A. *p* and *q* are always parallel. B. *p* and *q* are sometimes parallel.
C. *p* and *q* are never parallel. D. *p* and *q* are always coplanar
E. *p* and *q* sometimes intersect.
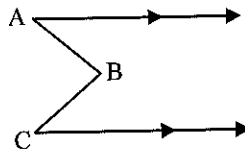
92. Find m∠ABC if m∠A = 48 and m∠C = 46. (The figure is not drawn to scale.)
A. 94
B. 86
C. 84
D. cannot be determined from the information given.

93. Find m∠ADC. (The figure is not drawn to scale.)
A. 53
B. 43
C. 137
D. 127
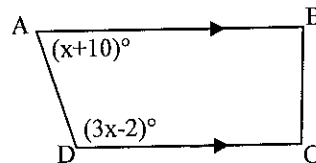
94. In the figure, m∠ABE = m∠EDF=m∠BEC. Which of the following pairs of lines must be parallel?
I. $\overrightarrow{AB}$ and $\overrightarrow{CD}$
II. $\overrightarrow{BE}$ and $\overrightarrow{DF}$
III.. $\overrightarrow{AE}$ and $\overrightarrow{CF}$

A. I only   B. II only
C. III only   D. I and II only
E. I and III only
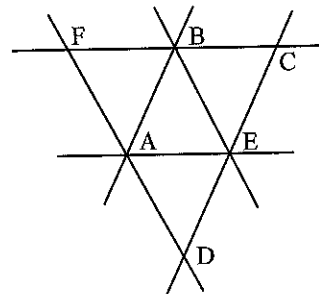
95. In ΔABC, $\overrightarrow{BD}$ and $\overrightarrow{CD}$ are angle bisectors, and $\overleftrightarrow{CE} \Box \overleftrightarrow{BD}$. If m∠BAC = 70, what is m∠DCE?
A. 70
B. 105
C. 125
D. 153.5
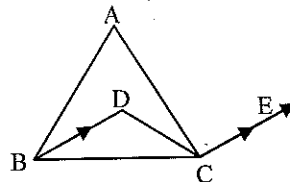
96. $\overleftrightarrow{AB} \Box \overleftrightarrow{CD}$, AB = CD, and AF = FD = DE. What can you conclude? (Figure is not drawn to scale.)
I.   ΔABF ≅ ΔDCE
II.   ΔABF ≅ ΔDBF
III.   ΔDBF ≅ ΔDCE

A. I only   B. II only
C. III only   D. I, II, and III
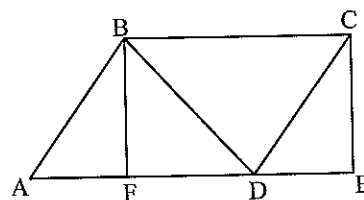
97. $\overline{SR} \square \overline{TV}$, $\overline{TR} \cong \overline{UV}$, and $\overline{TW}$ bisects both $\overline{SU}$ and $\angle RTV$. What can you conclude?

    A. The SAS Postulate can be used to prove that $\triangle RST \cong \triangle VTU$.
    B. The ASA Postulate can be used to prove that $\triangle RST \cong \triangle VTU$.
    C. The SSS Postulate can be used to prove that $\triangle RST \cong \triangle VTU$.
    D. There is not sufficient information to prove that $\triangle RST \cong \triangle VTU$.

98. $\overline{AC}$ bisects $\angle BAD$, $\overline{AB} \perp \overline{BC}$, and $\overline{AD} \perp \overline{CD}$. The given information is sufficient to prove which of the following?
    I. $\overline{AC} \perp \overline{BD}$
    II. $\overline{AC}$ bisects $\overline{BD}$.
    III. $\overline{AB} \square \overline{CD}$
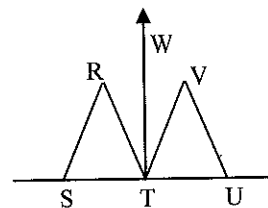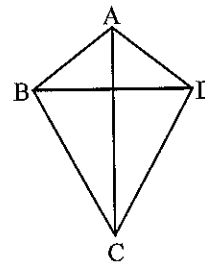
    A. I only
    C. III only
    E. II and III only
    B. II only
    D. I and II only

99. $BA = BE$, $\overline{BE} \square \overline{CD}$, and $m\angle ACD = 56$. Find $m\angle ADC$.
    A. 56
    B. 62
    C. 68
    D. 124
    E. cannot be determined from the information given.
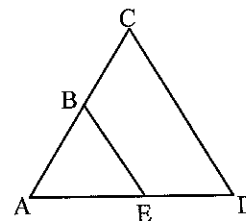
100. The ratio of the measures of two supplementary angles is 7:8. Which proportion(s) could you use to find the measures of the angles?

    I. $\dfrac{x}{y} = \dfrac{7}{8}$ II. $\dfrac{x}{y} = \dfrac{8}{7}$

    III. $\dfrac{x}{180 - x} = \dfrac{7}{8}$ IV. $\dfrac{x}{180 - x} = \dfrac{8}{7}$

    A. I only
    C. I and II only
    E. I, II, III, and IV
    B. II only
    D. III and IV only

101. S and V are the midpoints of $\overline{RT}$ and $\overline{RU}$, respectively. Which of the following is not true?
    A. $\dfrac{c}{f} = \dfrac{b}{a}$
    B. $\dfrac{d}{e} = \dfrac{b}{a}$
    C. $\dfrac{c}{e+d} = \dfrac{f}{e}$
    D. $\dfrac{f}{a} = \dfrac{c}{a+b}$
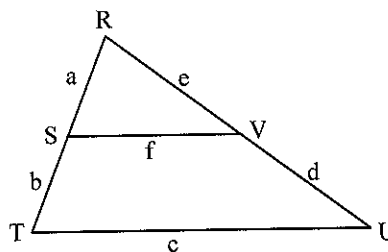
102. Points A, B, and C could be which of the following?
    I.   collinear and coplanar
    II. collinear and noncoplanar
    III. Points in two intersecting or parallel lines

    A. I only
    C. III only
    E. I and III only

    B. II only
    D. I and II only

103. A plane is NOT formed from _____.
    A. three noncollinear points
    C. two intersecting lines
    E. a line and a point outside the line

    B. two skew lines
    D. two parallel lines

104. $\overrightarrow{SU}$ bisects ∠RST, ∠UST and ∠TSV are complementary.
    If m∠RST = 76, find m∠TSV.
    A. 14
    C. 76
    E. 38

    B. 104
    D. 52

105. Two angles form a linear pair. Which of the following CANNOT be true?
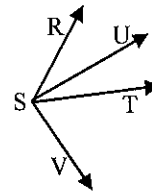   A. One angle is obtuse and the other is acute.
    B. The angles are adjacent but not complementary.
    C. The angles are supplementary, and the nonadjacent rays are opposite rays.
    D. The angles are congruent and are right angles.
    E. Both angles are acute.

106. Which of the following is not necessarily true for the given diagram?
    A. Line n is a transversal.
    B. m∠5 + m∠6 = 180
    C. ∠1 and ∠5 are corresponding angles
    D. l and m are parallel.
    E. ∠1, ∠2, ∠7, and ∠8 are exterior angles.

107. Two right triangles CANNOT be proven congruent by showing the following parts equal.
    A. 2 pairs of corresponding legs
    B. a pair of corresponding legs and the hypotenuses
    C. a pair of corresponding acute angles and the hypotenuses
    D. 2 pairs of corresponding angles
    E. a pair of corresponding legs and a pair of corresponding angles.

108. Assume that the conditional "If Mandy waters her plants, then the plants will grow" is true.
    Which of the following is not necessarily true?
    I.   its converse
    II. its inverse
    III. its contrapositive
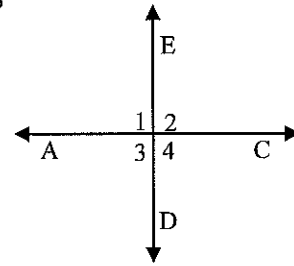
    A. I only
    C. III only
    E. I and III only

    B. II only
    D. I and II only

109. Which of the following statements is not necessarily true?
   A. The nonadjacent rays of two adjacent, complementary angles are perpendicular.
   B. Two intersecting lines form either four congruent right angles or two congruent, acute angles and two congruent, obtuse angles.
   C. Supplementary angles are linear pairs.
   D. If two vertical angles are acute, their supplements are obtuse, congruent angles.
   E. The last statement of a proof should be the statement of what you are trying to prove.

110. If $\overleftrightarrow{ED} \perp \overleftrightarrow{AC}$, what conclusions can be reached in one or more steps?
   I. $\angle 3$ is a right angle
   II. $m\angle 1 = 90$
   III. $m\angle 1 = m\angle 2 = m\angle 3 = m\angle 4$

   A. I only
   C. III only
   E. I, II, and III
   B. II only
   D. I and II only

111. If A, B, C, and D have coordinates (4, 0), (6, 1), (3, 2), and (1, 1), respectively, which of the following are true?
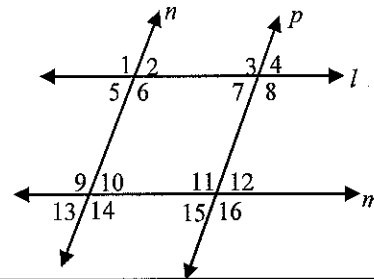   I. $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$

   II. $\overleftrightarrow{AB} \perp \overleftrightarrow{CA}$
   III. $AD = BC$

   A. I only
   C. III only
   E. I, II, and III
   B. II only
   D. I and II only

112. Using the information from the diagram, if $m\angle 1 = m\angle 16$, what can we conclude?
   I. $m\angle 1 = m\angle 3 = m\angle 11 = m\angle 16$
   II. $n \parallel p$
   III. $l \parallel m$

   A. I only
   C. III only
   E. none of these
   B. II only
   D. I, II, and III

113. The measure of an exterior angle of a regular polygon is 12°. Find the sum of the measures of the interior angles of the polygon.
   A. 5400
   C. 2016
   E. none of these
   B. 5040
   D. 2160

114. Line l is contained in plane K and line m is contained in plane H. Which of the following is NOT possible?
   A. The planes intersect and the lines intersect.
   B. The planes are parallel and the lines are parallel.
   C. The planes are perpendicular but the lines are not perpendicular.
   D. The lines are coplanar and the planes are skew.
   E. The planes intersect and the lines are skew.

115. If E bisects $\overline{DC}$ and $\overline{AB}$, then _____.

    A. $\triangle BEC \cong \triangle AED$ B. $\triangle BED \cong \triangle CEA$

    C. $\triangle DEB \cong \triangle BEC$ D. $\triangle DCB \cong \triangle ABC$

    E. $\triangle CDB \cong \triangle CDA$
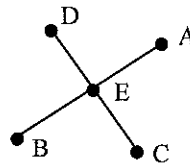
116. Identify the inverse of the statement:

        If a triangle is equilateral, then it is equiangular.

    A. If a triangle is not equiangular, then it is not equilateral.

    B. If a triangle is not equilateral, then it is not equiangular.

    C. An equilateral triangle is equiangular.

    D. An equiangular triangle is not equilateral.

117. The statement that is logically equivalent to a conditional statement is its _____.

    I.   converse

    II. inverse

    III. contrapositive

    A. I only   B. II only

    C. III only   D. all   E. none

118. Given these two statements: All minerals are nonliving.

                                   Calcite is a mineral.

    Which of these is a valid conclusion?

    A. Calcite is nonliving.   B. Nonliving things are all minerals.

    C. All minerals are calcite.   D. Nonliving things are all calcite.

119. The hypothesis of the theorem "Vertical angles are congruent" is _____.

    A. two angles are congruent

    B. vertical angles are congruent

    C. congruent angles are vertical angles

    D. two angles are vertical angles

120. If we can show _____, then $\overline{RT} \perp \overline{VS}$

    A. $\triangle RVS \cong \triangle TVS$

    B. $\triangle RUS \cong \triangle TUS$

    C. $\triangle TUS \cong \triangle RUV$

    D. $\triangle RUS \cong \triangle TUV$