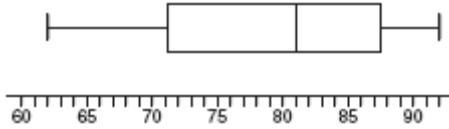1. 010301a, P.I. A.S.6

The accompanying diagram shows a box-and-whisker plot of student test scores on last year's Mathematics A midterm examination.

What is the median score?

[A] 81   [B] 62   [C] 92   [D] 71

2. 010302a, P.I. G.G.59

Triangle $A'B'C'$ is the image of $\triangle ABC$ under a dilation such that $A'B' = 3AB$. Triangles ABC and $A'B'C'$ are

[A] neither congruent nor similar

[B] congruent but not similar

[C] both congruent and similar

[D] similar but not congruent

3. 010303a, P.I. G.G.26

What is the inverse of the statement "If Mike did his homework, then he will pass this test"?

[A] If Mike did not do his homework, then he will not pass this test.

[B] If Mike passes this test, then he did his homework.

[C] If Mike does not pass this test, then he only did half his homework.

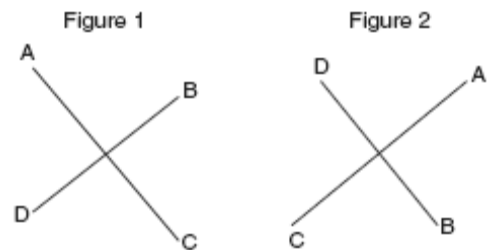[D] If Mike does not pass this test, then he did not do his homework.

4. 010304a, P.I. 7.N.3

In which list are the numbers in order from least to greatest?

[A] $\sqrt{3}, 3.2, \pi, 3\frac{1}{3}$ [B] $\sqrt{3}, \pi, 3.2, 3\frac{1}{3}$

[C] $3.2, \pi, 3\frac{1}{3}, \sqrt{3}$ [D] $3.2, 3\frac{1}{3}, \sqrt{3}, \pi$

5. 010305a, P.I. G.G.56

The accompanying diagram shows a transformation.

Which transformation performed on figure 1 resulted in figure 2?

[A] translation   [B] dilation

[C] reflection   [D] rotation

6. 010306a, P.I. A.A.12

The product of $3x^5$ and $2x^4$ is

[A] $5x^9$ [B] $6x^9$ [C] $6x^{20}$ [D] $5x^{20}$

7. 010307a, P.I. A2.S.9

There are 12 people on a basketball team, and the coach needs to choose 5 to put into a game. How many different possible ways can the coach choose a team of 5 if each person has an equal chance of being selected?

[A] $_5C_{12}$ [B] $_{12}C_5$ [C] $_5P_{12}$ [D] $_{12}P_5$

8. 010308a, P.I. G.G.26

Given the true statement: "If a person is eligible to vote, then that person is a citizen." Which statement must also be true?

[A] Morgan has never voted; therefore, he is not a citizen.

[B] Juan is a citizen; therefore, he is eligible to vote.

[C] Kayla is not a citizen; therefore, she is not eligible to vote.

[D] Marie is not eligible to vote; therefore, she is not a citizen.

9. 010309a

Line P and line C lie on a coordinate plane and have equal slopes. Neither line crosses the second or third quadrant. Lines P and C must

[A] be vertical   [B] be horizontal

[C] form an angle of 45°

[D] be perpendicular

10. 010310a, P.I. A.A.23

The equation $P = 2L + 2W$ is equivalent to

[A] $L = \dfrac{P + 2W}{2}$ [B] $L = P - W$

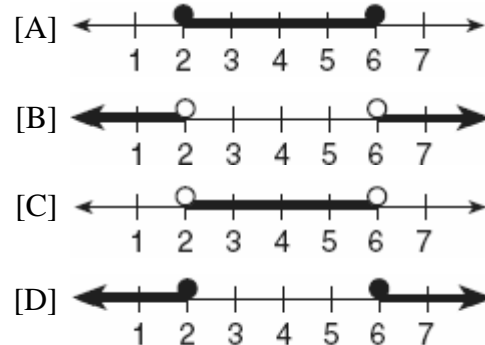[C] $2L = \dfrac{P}{2W}$ [D] $L = \dfrac{P - 2W}{2}$

11. 010311a, P.I. A.N.3

The sum of $\sqrt{75}$ and $\sqrt{3}$ is

[A] 15   [B] 18   [C] $\sqrt{78}$ [D] $6\sqrt{3}$

12. 010312a, P.I. 8.A.13

Which graph represents the solution set for $2x - 4 \le 8$ and $x + 5 \ge 7$?

[A]

[B]

[C]

[D]

13. 010313a, P.I. 8.G.3

If the measure of an angle is represented by $2x$, which expression represents the measure of its complement?

[A] $90 - 2x$ [B] $88x$

[C] $180 - 2x$ [D] $90 + 2x$

14. 010314a, P.I. A.N.1

Which equation illustrates the multiplicative identity element?
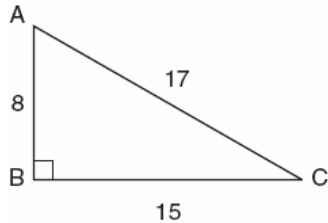
[A] $x - x = 0$ [B] $x \cdot \dfrac{1}{x} = 1$

[C] $x \cdot 1 = x$ [D] $x + 0 = x$

15. 010315a, P.I. 6.S.5

The ages of five children in a family are 3, 3, 5, 8, and 18. Which statement is true for this group of data?

[A] mode > mean   [B] median > mean

[C] median = mode   [D] mean > median

16. 010316a, P.I. A.A.42

In the accompanying diagram of right triangle ABC, $AB = 8$, $BC = 15$, $AC = 17$, and $m\angle ABC = 90$.

What is $\tan \angle C$?

[A] $\dfrac{8}{17}$ [B] $\dfrac{17}{15}$ [C] $\dfrac{15}{17}$ [D] $\dfrac{8}{15}$

17. 010317a, P.I. G.G.22

The locus of points equidistant from two sides of an acute scalene triangle is

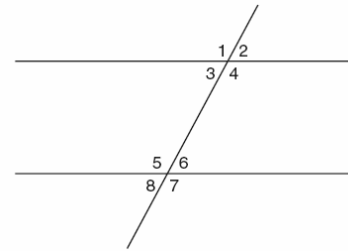[A] the third side   [B] an angle bisector

[C] an altitude   [D] a median

18. 010318a, P.I. A.A.20

What are the factors of $x^2 - 10x - 24$?

[A] $(x + 12)(x - 2)$ [B] $(x - 12)(x + 2)$

[C] $(x - 4)(x + 6)$ [D] $(x - 4)(x - 6)$

19. 010319a, P.I. A.N.4

What is the value of $\dfrac{6.3 \times 10^8}{3 \times 10^4}$ in scientific notation?

[A] 2.1×10^2 [B] 2.1×10^{-4}

[C] 2.1×10^{-2} [D] 2.1×10^4

20. 010320a, P.I. 8.G.4

In the accompanying figure, what is one pair of alternate interior angles?

[A] $\angle 4$ and $\angle 6$ [B] $\angle 1$ and $\angle 2$

[C] $\angle 4$ and $\angle 5$ [D] $\angle 6$ and $\angle 8$

21. 010321a, P.I. A.S.19

If Laquisha can enter school by any one of three doors and the school has two staircases to the second floor, in how many different ways can Laquisha reach a room on the second floor? Justify your answer by drawing a tree diagram or listing a sample space.

22. 010322a, P.I. A.N.5

The world population was 4.2 billion people in 1982. The population in 1999 reached 6 billion. Find the percent of change from 1982 to 1999.

23. 010323a, P.I. A.N.8

Six members of a school's varsity tennis team will march in a parade. How many different ways can the players be lined up if Angela, the team captain, is always at the front of the line?

24. 010324a

A fish tank with a rectangular base has a volume of 3,360 cubic inches. The length and width of the tank are 14 inches and 12 inches, respectively. Find the height, in inches, of the tank.

25. 010325a, P.I. 7.S.6

Mr. Smith's class voted on their favorite ice cream flavors, and the results are shown in the accompanying diagram. If there are 20 students in Mr. Smith's class, how many students chose coffee ice cream as their favorite flavor?

Favorite Ice Cream Flavors

Vanilla 25%
Strawberry 15%
Coffee 10%
Chocolate 50%
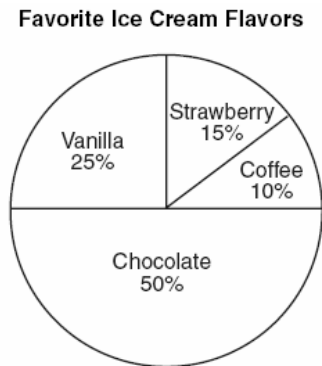
26. 010326a, P.I. A.A.8

Three brothers have ages that are consecutive even integers. The product of the first and third boys' ages is 20 more than twice the second boy's age. Find the age of *each* of the three boys.

27. 010327a, P.I. A.A.7

Arielle has a collection of grasshoppers and crickets. She has 561 insects in all. The number of grasshoppers is twice the number of crickets. Find the number of *each* type of insect that she has.

28. 010328a, P.I. A.G.4

The graph of a quadratic equation is shown in the accompanying diagram. The scale on the axes is a unit scale. Write an equation of this graph in standard form.
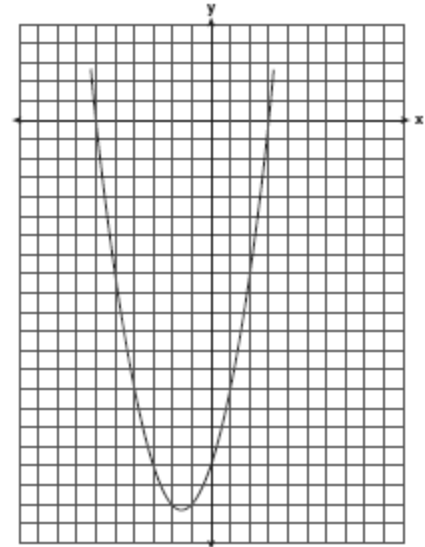
29. 010329a, P.I. A.A.7

Currently, Tyrone has $60 and his sister has
$135. Both get an allowance of $5 each
week. Tyrone decides to save his entire
allowance, but his sister spends all of hers
each week plus an additional $10 each week.
After how many weeks will they each have
the same amount of money? [The use of the
grid is optional.]
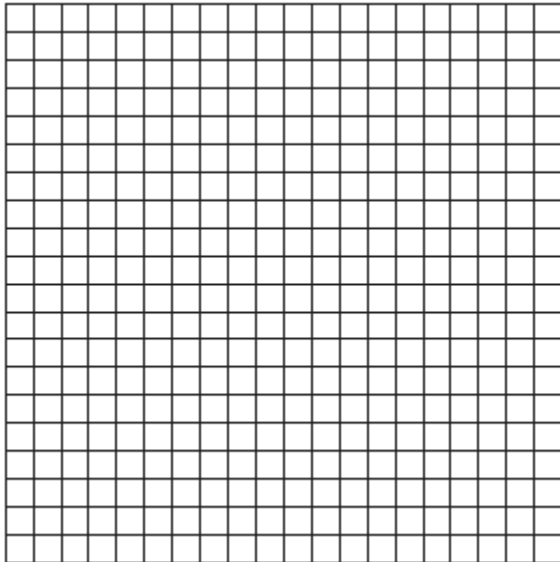
30. 010330a, P.I. A.G.1

A rectangular garden is going to be planted in
a person's rectangular backyard, as shown in
the accompanying diagram. Some
dimensions of the backyard and the width of
the garden are given. Find the area of the
garden to the *nearest square foot*.
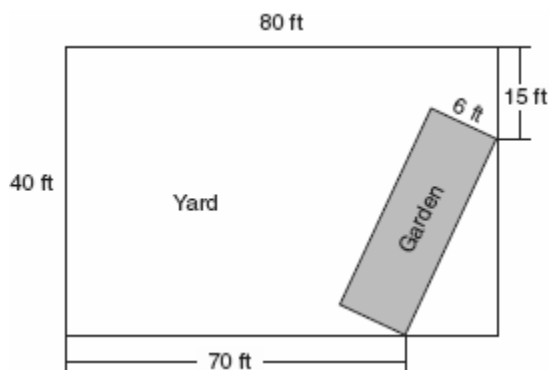
31. 010331a, P.I. A.A.26

At the Phoenix Surfboard Company,
$306,000 in profits was made last year. This
profit was shared by the four partners in the
ratio 3:3:5:7. How much *more* money did the
partner with the largest share make than one
of the partners with the smallest share?

32. 010332a, P.I. A.A.7

Alexandra purchases two doughnuts and three
cookies at a doughnut shop and is charged
$3.30. Briana purchases five doughnuts and
two cookies at the same shop for $4.95. All
the doughnuts have the same price and all the
cookies have the same price. Find the cost of
one doughnut and find the cost of one cookie.

33. 010333a, P.I. G.G.54

On the accompanying grid, draw and label
quadrilateral *ABCD* with points *A*(1,2),
B(6,1), *C*(7,6), and *D*(3,7). On the same set
of axes, plot and label quadrilateral *A'B'C'D'*,
the reflection of quadrilateral *ABCD* in the *y*-
axis. Determine the area, in square units, of
quadrilateral *A'B'C'D'*.
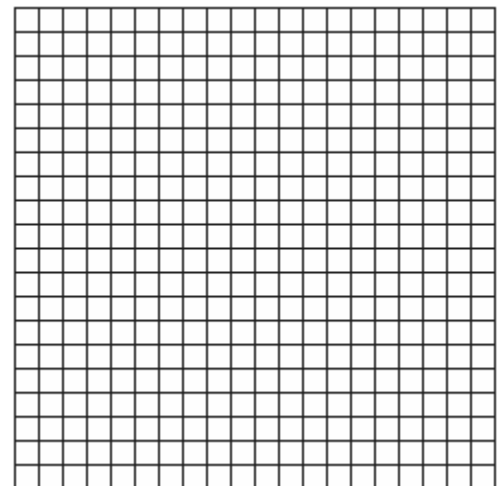
34. 010334a, P.I. A.S.5

Sarah's mathematics grades for one marking period were 85, 72, 97, 81, 77, 93, 100, 75, 86, 70, 96, and 80.

a Complete the tally sheet and frequency table below, and construct and label a frequency histogram for Sarah's grades using the accompanying grid.

Interval (grades)	Tally	Frequency
61–70		
71–80		
81–90		
91–100		
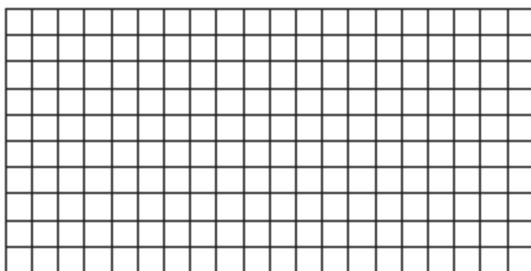
b Which interval contains the 75th percentile (upper quartile)?

35. 010335a, P.I. A.G.1

On the accompanying set of axes, graph and label the following lines:
$$y = 5$$
$$x = -4$$
$$y = \frac{5}{4}x + 5$$

Calculate the area, in square units, of the triangle formed by the three points of intersection.

[1] A

[2] D

[3] A

[4] B

[5] D

[6] B

[7] B

[8] C

[9] A

[10] D

[11] D

[12] A

[13] A

[14] C

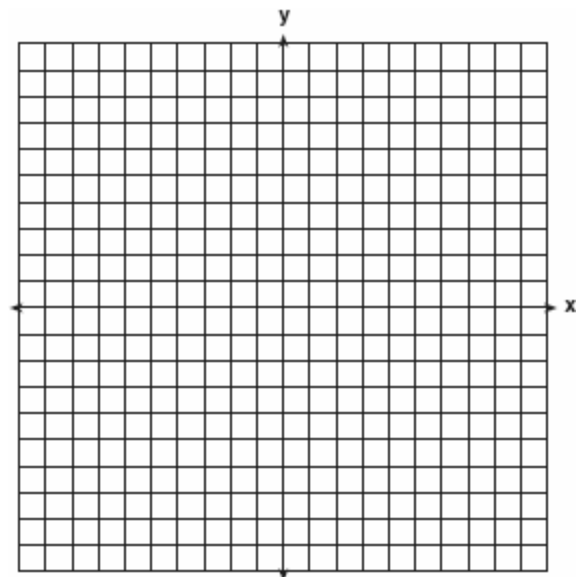[15] D

[16] D

[17] B

[18] B

[19] D

[20] C

[2] 6, and a correct tree diagram is drawn or sample space is listed.
[1] A correct tree diagram is drawn or sample space is listed, but no answer or an incorrect answer is found.
or [1] An appropriate answer is found, based on an incorrect tree diagram or sample space.
or [1] 6, but no tree diagram is drawn or sample space is listed.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[21] incorrect procedure.

[2] 42.85714286 or an equivalent answer, and appropriate work is shown.
[1] Appropriate work is shown, but one computational or rounding error is made.
or [1] An answer of 30 is found by dividing 1.8 by 6.
or [1] An answer of 70 is found by dividing 4.2 by 6.
or [1] 42.85714286 or an equivalent answer, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[22] incorrect procedure.

[2] 120, and appropriate work is shown, such as $1 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$.
[1] Appropriate work is shown, but one computational error is made.
or [1] 720 and $_6P_6$ or 6! is shown.
or [1] 120, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[23] incorrect procedure.

[2] 20, and appropriate work is shown, such as $3,360 \div (14 \times 12)$.
[1] Appropriate work is shown, but one computational error is made.
or [1] 20, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[24] incorrect procedure.

[2] 2, and appropriate work is shown.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown to find the number of students for any flavor other than coffee.
or [1] 2, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[25] incorrect procedure.

[3] 4, 6, and 8, and appropriate work is shown, such as the correct quadratic equation or trial and error with at least three trials and appropriate checks.
[2] The correct quadratic equation is solved, but one computational error is made, but three appropriate ages are listed.
or [2] The correct quadratic equation is solved, but the negative root is not rejected, but three appropriate ages are listed.
or [2] The correct quadratic equation is solved, but only one age is found.
or [2] The trial-and-error method is used to find a correct solution, but only two trials and appropriate checks are shown.
[1] An incorrect equation of lesser difficulty is solved appropriately, and the three ages are listed.
or [1] An incorrect quadratic equation of equal difficulty is solved appropriately, and the three ages are listed.
or [1] The correct quadratic equation is shown, but more than one computational error is made.
or [1] The correct quadratic equation is shown, but no further correct work is shown.
or [1] 4, 6, and 8, but no work or only one trial with an appropriate check is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[26]   incorrect procedure.

[3] 374 grasshoppers and 187 crickets, and appropriate work is shown.
[2] An appropriate equation is solved or appropriate work is shown, but only one correct answer is found, or two correct answers are found but they are not identified clearly as grasshoppers or crickets, or the grasshoppers and crickets are labeled incorrectly.
or [2] Appropriate work is shown, but one computational error is made.
[1] Appropriate work is shown, but more than one computational error is made.
or [1] An incorrect equation of equal difficulty is solved appropriately.
or [1] 374 grasshoppers and 187 crickets, but no work is shown.
[0] 374 and 187, but no work is shown, and the answers are not identified clearly as grasshoppers or crickets.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an
[27]   obviously incorrect procedure.

[3] $y = x^2 + 3x - 18$, and appropriate work leading from the roots to the equation is shown.
[2] Appropriate work is shown, but one computational error is made.
or [2] $x^2 + 3x - 18 = 0$, but appropriate work is shown.
or [2] Only the correct factors $(x + 6)$ and $(x - 3)$ are shown.
[1] Appropriate work is shown, but more than one computational error is made.
or [1] Only the roots –6 and 3 are shown, such as $x = -6$, $x = 3$.
or [1] $y = x^2 + 3x - 18$, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[28]   incorrect procedure.

[3] 5, and appropriate work is shown, such as the equation $60 + 5x = 135 - 10x$, or trial and error with at least three trials and appropriate checks, or a graph.

[2] Appropriate work is shown, but one computational or graphing error is made.

or [2] The trial-and-error method is used to find a correct solution, but only two trials and appropriate checks are shown.

[1] Appropriate work is shown, but more than one computational or graphing error is made.

or [1] 5, but no work or only one trial with an appropriate check is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[29]   incorrect procedure.

_____

[3] 162, and appropriate work is shown.

[2] The Pythagorean theorem is used correctly to find the hypotenuse, but the result is not multiplied by 6.

or [2] Appropriate work is shown, but one computational or rounding error is made.

[1] Appropriate work is shown, but more than one computational or rounding error is made.

or [1] 162, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[30]   incorrect procedure.

_____

[4] $68,000, and appropriate work is shown.

[3] $119,000 and $51,000, and appropriate work is shown, but the answers are not subtracted to find the difference.

or [3] Appropriate work is shown, but one computational error is made.

[2] Appropriate work is shown, but more than one computational error is made.

[1] The value for one share ($17,000) is found, but no further correct work is shown.

or [1] $68,000, but no work is shown.

[0] $17,000 or $119,000 or $51,000, and no work is shown.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[31]   obviously incorrect procedure.

_____

[4] One doughnut is $0.75 and one cookie is $0.60, and appropriate work is shown, such as a system of equations, trial and error with at least three trials and appropriate checks, or a table.
[3] Appropriate work is shown, but one computational error is made.
or [3] Appropriate work is shown, but only one correct answer is found, or two correct answers are found, but they are not identified clearly as doughnuts or cookies, or the doughnuts and cookies are labeled incorrectly.
[2] Appropriate work is shown, but more than one computational error is made.
or [2] Two equations are written, one correct and one incorrect, but two appropriate answers are found.
or [2] The trial-and-error method is used to find a correct solution, but only two trials and appropriate checks are shown.
[1] Two correct equations are written, but no further correct work is shown.
or [1] One doughnut is $0.75 and one cookie is $0.60, but no work or only one trial with an appropriate check is shown.
[0] One correct equation is shown, and no answer or only one appropriate answer is found.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[32]

[4] Quadrilaterals *ABCD* and *A'B'C'D'* are drawn and labeled correctly and 24 is found as the area, and appropriate work is shown.
[3] One graphing error is made in the transformation, but an appropriate area of *A'B'C'D'* is found.
or [3] Correct quadrilaterals are drawn and labeled, but one computational error is made in determining the area.
or [3] Quadrilaterals *ABCD* and *A'B'C'D'* are drawn correctly and 24 is found as the area, but the vertices are not labeled.
[2] Correct quadrilaterals are drawn and labeled, but no further correct work is shown.
or [2] One conceptual error is made, such as reflecting in the *x*-axis, but the correct area is found.
[1] 24, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[33]

a [3] The frequency table is completed correctly, and a histogram is drawn with a correct scale and is labeled correctly.
[2] One or two errors are made in the frequency table, but an appropriate histogram is drawn.
or [2] The frequency table is completed correctly, but one error is made in drawing the histogram.
[1] A correct histogram is drawn, but the frequency table is not completed.
b [1] The interval 91-100 is identified as containing the 75th percentile.
or [1] The appropriate interval is identified, based on an incorrect frequency table in part *a*.
a and *b*
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[34]

[4] All lines are graphed and labeled correctly
and area = 10, and appropriate work is shown.
[3] The lines are graphed and labeled
correctly, but the area of the triangle is
missing or is incorrect.
or [3] One of the lines is graphed incorrectly,
but the area for the given triangle is found
appropriately.
[2] One of the lines is graphed incorrectly,
and the area of the triangle is missing or is
incorrect.
[1] Only one line is graphed and labeled
correctly, and no further correct work is
shown.
or [1] All three lines are graphed incorrectly,
but the area for the given triangle is found
appropriately.
or [1] Area = 10, but no work is shown.
[0] A zero response is completely incorrect,
irrelevant, or incoherent or is a correct
response that was obtained by an obviously
[35]   incorrect procedure.