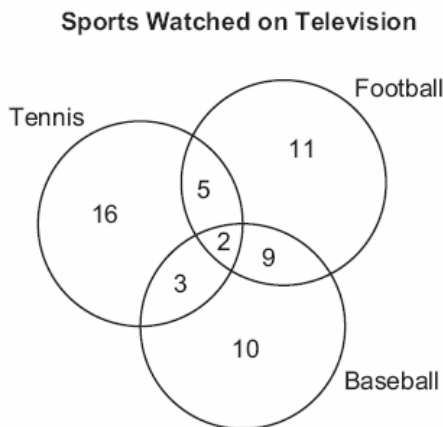


1. 060201a, P.I. A.A.7  
Jamie is 5 years older than her sister Amy. If the sum of their ages is 19, how old is Jamie?  
[A] 12 [B] 7 [C] 5 [D] 14
2. 060202a, P.I. A.S.20  
If the probability that it will rain on Thursday is  $\frac{5}{6}$ , what is the probability that it will *not* rain on Thursday?  
[A]  $\frac{1}{6}$  [B]  $\frac{5}{6}$  [C] 0 [D] 1
3. 060203a, P.I. A.RP.11  
The accompanying diagram shows the results of a survey asking which sports the members of the Key Club watch on television.



Which statement or statements are true?

- I The most watched sport is tennis.
- II The least watched sport is baseball.
- III More Key Club members watch tennis than football.

- [A] I, only [B] II, only  
[C] II and III, only [D] I and II, only

4. 060204a, P.I. A.A.6  
During each marking period, there are five tests. If Vanita needs a 65 average to pass this marking period and her first four grades are 60, 72, 55, and 80, what is the *lowest* score she can earn on the last test to have a passing average?  
[A] 100 [B] 65 [C] 80 [D] 58
5. 060205a, P.I. A.A.37  
What is the slope of the linear equation  $5y - 10x = -15$ ?  
[A] 2 [B] 10 [C] -15 [D] -10
6. 060206a, P.I. A.A.20  
Which expression is a factor of  $n^2 + 3n - 54$ ?  
[A]  $n - 9$  [B]  $n + 6$   
[C]  $n + 9$  [D]  $n^2 + 9$
7. 060207a, P.I. A.N.4  
If  $385 \times 10^6$  is divided by  $385 \times 10^4$ , the result is  
[A] 1 [B] 0.01  
[C]  $3.85 \times 10^{10}$  [D]  $3.85 \times 10^4$
8. 060208a, P.I. G.G.45  
Two triangles are similar. The lengths of the sides of the smaller triangle are 3, 5, and 6, and the length of the longest side of the larger triangle is 18. What is the perimeter of the larger triangle?  
[A] 24 [B] 42 [C] 18 [D] 14
9. 060209a  
Which letter has point symmetry?  
[A] W [B] A [C] H [D] B
10. 060210a  
If two lines are parallel and the slope of one of the lines is  $m$ , what is the product of their slopes?  
[A]  $m^2$  [B] 0 [C] 1 [D]  $2m$

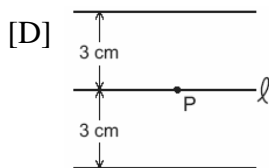
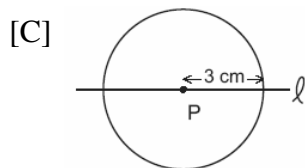
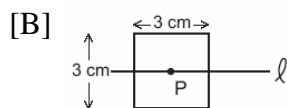
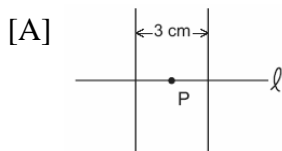
11. 060211a, P.I. 7.N.2

Which is an irrational number?

- [A]  $-\frac{1}{3}$       [B]  $\sqrt{9}$       [C]  $\pi$       [D] 0

12. 060212a, P.I. G.G.22

If point  $P$  lies on line  $\ell$ , which diagram represents the locus of points 3 centimeters from point  $P$ ?



13. 060213a, P.I. G.G.37

What is the measure, in degrees, of each exterior angle of a regular hexagon?

- [A] 45      [B] 60      [C] 135      [D] 120

14. 060214a, P.I. A.A.22

What is the solution of the equation  $3y - 5y + 10 = 36$ ?

- [A] 4.5      [B] 2      [C] 13      [D] -13

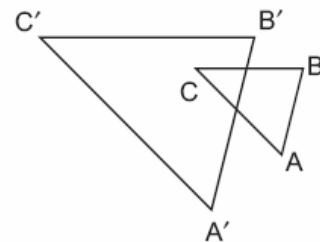
15. 060215a, P.I. G.G.58

If the circumference of a circle is doubled, the diameter of the circle

- [A] is doubled      [B] remains the same  
[C] increases by 2      [D] is multiplied by 4

16. 060216a, P.I. G.G.60

In the accompanying diagram,  $\triangle ABC$  is similar to but not congruent to  $\triangle A'B'C'$ . Which transformation is represented by  $\triangle A'B'C'$ ?



- [A] reflection      [B] rotation  
[C] translation      [D] dilation

17. 060217a, P.I. 7.N.11

The expression  $15 - 3[2 + 6(-3)]$  simplifies to

- [A] -33      [B] -45      [C] 63      [D] 192

18. 060218a, P.I. A.N.3

The expression  $\sqrt{90} \cdot \sqrt{40} - \sqrt{8} \cdot \sqrt{18}$  simplifies to

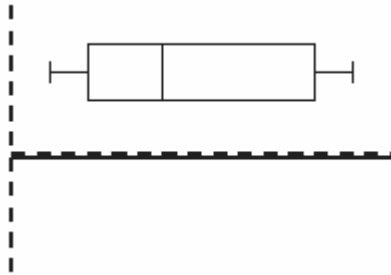
- [A] 22.9      [B] 3,456      [C] 48      [D] 864

19. 060219a, P.I. A.A.23

If  $x = 2a - b^2$ , then  $a$  equals

- [A]  $\frac{b^2 - x}{2}$       [B]  $x + b^2$   
[C]  $\frac{x + b^2}{2}$       [D]  $\frac{x - b^2}{2}$

20. 060220a  
The accompanying diagram is an example of which type of graph?

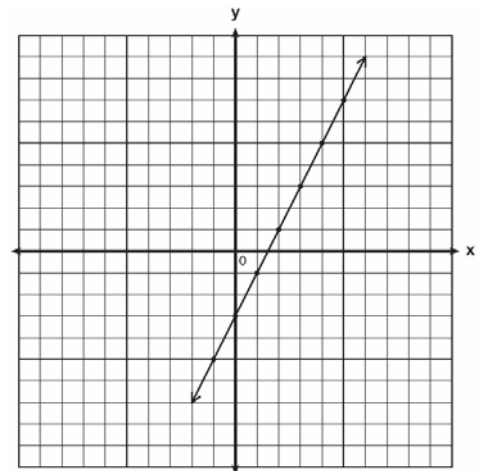


- [A] stem-and-leaf plot  
[B] box-and-whisker plot  
[C] bar graph                      [D] histogram
21. 060221a  
Given the true statement "John is not handsome" and the false statement "John is handsome or smart." Determine the truth value for the statement "John is smart."
22. 060222a, P.I. A.N.5  
Ninety percent of the ninth grade students at Richbartville High School take algebra. If 180 ninth grade students take algebra, how many ninth grade students do *not* take algebra?
23. 060223a, P.I. A.A.26  
If the instructions for cooking a turkey state "Roast turkey at  $325^\circ$  for 20 minutes per pound," how many hours will it take to roast a 20-pound turkey at  $325^\circ$ ?

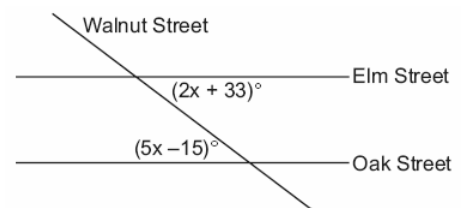
24. 060224a, P.I. A.N.1  
An addition table for a subset of real numbers is shown below. Which number is the identity element? Explain your answer.

+	0	1	2	3
0	0	1	2	3
1	1	2	3	4
2	2	3	4	0
3	3	4	0	1

25. 060225a  
Write the equation for the line shown in the accompanying graph. Explain your answer.

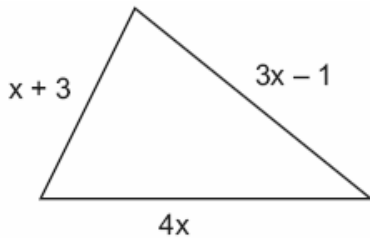


26. 060226a, P.I. 8.A.12  
Two parallel roads, Elm Street and Oak Street, are crossed by a third, Walnut Street, as shown in the accompanying diagram. Find the number of degrees in the acute angle formed by the intersection of Walnut Street and Elm Street.



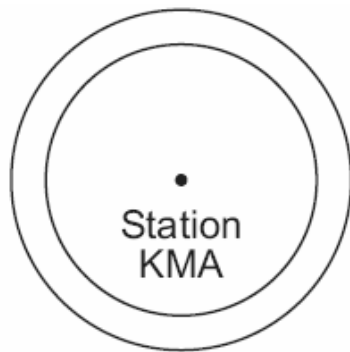
27. 060227a, P.I. G.G.33

The plot of land illustrated in the accompanying diagram has a perimeter of 34 yards. Find the length, in yards, of *each* side of the figure. Could these measures actually represent the measures of the sides of a triangle? Explain your answer.



28. 060228a, P.I. A.G.1

As shown in the accompanying diagram, radio station KMA is increasing its radio listening radius from 40 miles to 50 miles. How many additional square miles of listening area, to the *nearest tenth*, will the radio station gain?

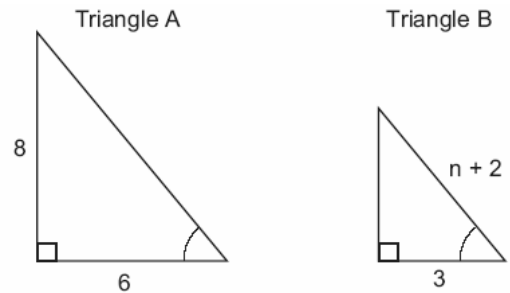


29. 060229a, P.I. A.A.27

Solve for  $x$ :  $x^2 + 3x - 28 = 0$

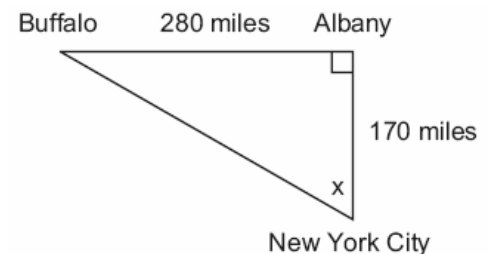
30. 060230a, P.I. G.G.48

In the accompanying diagram, triangle  $A$  is similar to triangle  $B$ . Find the value of  $n$ .



31. 060231a, P.I. A.A.43, G.G.48

As seen in the accompanying diagram, a person can travel from New York City to Buffalo by going north 170 miles to Albany and then west 280 miles to Buffalo.



*a* If an engineer wants to design a highway to connect New York City directly to Buffalo, at what angle,  $x$ , would she need to build the highway? Find the angle to the *nearest degree*.

*b* To the *nearest mile*, how many miles would be saved by traveling directly from New York City to Buffalo rather than by traveling first to Albany and then to Buffalo?

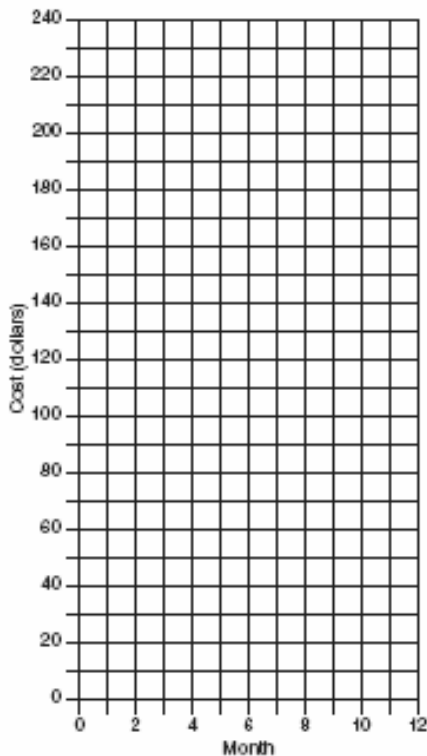
32. 060232a, P.I. A.A.7

At Ron's Rental, a person can rent a big-screen television for \$10 a month plus a one-time "wear-and-tear" fee of \$100. At Josie's Rental, the charge is \$20 a month and an additional charge of \$20 for delivery with no "wear-and-tear" fee.

*a* If  $c$  equals the cost, write one equation representing the cost of the rental for  $m$  months at Ron's Rental and one equation representing the cost of the rental for  $m$  months at Josie's Rental.

*b* On the accompanying grid, graph and label each equation.

*c* From your graph, determine in which month Josie's cost will equal Ron's cost.



33. 060233a, P.I. A.N.5

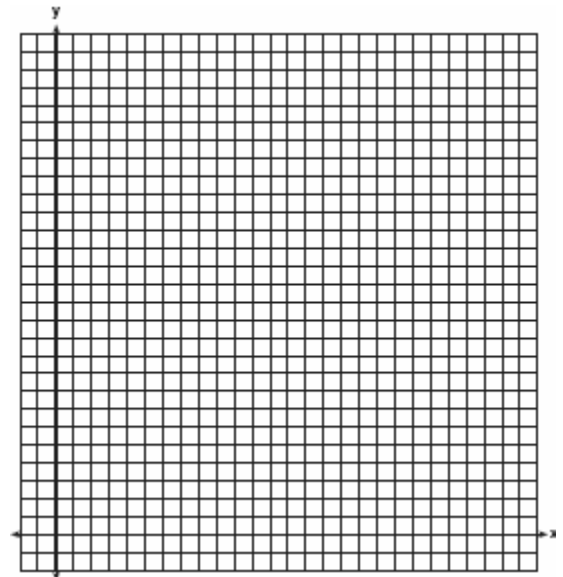
Mr. Perez owns a sneaker store. He bought 350 pairs of basketball sneakers and 150 pairs of soccer sneakers from the manufacturers for \$62,500. He sold all the sneakers and made a 25% profit. If he sold the soccer sneakers for \$130 per pair, how much did he charge for one pair of basketball sneakers?

34. 060234a, P.I. A2.S.12

Alexi's wallet contains four \$1 bills, three \$5 bills, and one \$10 bill. If Alexi randomly removes two bills without replacement, determine whether the probability that the bills will total \$15 is greater than the probability that the bills will total \$2.

35. 060235a, P.I. A.G.9

A rocket is launched from the ground and follows a parabolic path represented by the equation  $y = -x^2 + 10x$ . At the same time, a flare is launched from a height of 10 feet and follows a straight path represented by the equation  $y = -x + 10$ . Using the accompanying set of axes, graph the equations that represent the paths of the rocket and the flare, and find the coordinates of the point or points where the paths intersect.



[1] A

[2] A

[3] B

[4] D

[5] A

[6] C

[7] A

[8] B

[9] C

[10] A

[11] C

[12] C

[13] B

[14] D

[15] A

[16] D

[17] C

[18] C

[19] C

[20] B

[2] False, and an appropriate explanation is given.

[1] Appropriate work is shown, but the truth value is missing or is incorrect.

[0] False, but no explanation is given.

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

[21] obviously incorrect procedure.

[2] 20, and appropriate work is shown, such as  $(180 \div 0.9) - 180$ .

[1] A partial answer is found, such as 200 students are enrolled, but 180 is not subtracted from the answer.

or [1] An appropriate equation is shown, but one computational error is made, but 180 is subtracted.

or [1] An answer of 18 is found by subtracting  $180 \times 0.9$  from 180.

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

[22] incorrect procedure.

[2]  $6\frac{2}{3}$  or 6 hr 40 min or  $6.\overline{66}$  or an

equivalent answer, and appropriate work is shown.

[1] 400 min, but the answer is not converted into hours.

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

or [1] Appropriate work is shown, but the answer is rounded to the nearest hour.

or [1] 6 or 6 hr 40 min or  $6.\overline{66}$  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

[23] incorrect procedure.

[2] 0, and an appropriate explanation is given, such as 0 is the number that when added to any number results in that number or does not change it, or  $1 + 0 = 1$ ,  $2 + 0 = 2$ , and  $3 + 0 = 3$ .

[1] 0, but no explanation or an incorrect explanation is given.

[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]  $y = 2x - 3$  or an equivalent equation, and appropriate work is shown, or an appropriate explanation is given, such as the slope is 2 and the y-intercept is -3.
- [1]  $y = 2x - 3$ , but the slope and intercept are incorrect, or the explanation is not given or is incorrect, such as  $m = 2$  and  $b = -3$ .
- or [1] The slope and intercept are explained correctly, but the equation is incorrect.
- or [1]  $y = 2x - 3$ , but no work is shown and no explanation is given.
- [0] The equation is incorrect, and the explanation of slope and intercept is not given or is incorrect.
- or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- 
- [25]

- [3] 65, and appropriate work is shown, such as setting the given angles equal to each other and determining the value of x to be 16, and correct substitution is shown.
- [2] The given angles are set equal to each other, the correct value of x is determined, but no substitution is shown.
- or [2] The given angles are set equal to each other, and substitution is shown, but one computational or substitution error is made.
- [1] The given angles are set equal to each other, but no further work is shown.
- or [1] An incorrect equation is solved appropriately, such as  $5x - 15 + 2x + 33 = 180$ .
- or [1] 65, 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.
- 
- [26]

- [3] 7, 11, 16, and yes, and appropriate work is shown, and an appropriate explanation of the Triangle Inequality theorem is given.
- [2] 7, 11, 16, and yes, and appropriate work is shown, but no explanation or an incorrect explanation of the Triangle Inequality theorem is given.
- or [2] One computational error is made, but appropriate substitution is shown, and an appropriate explanation is given.
- or [2] The correct equation is written but not solved, but the Triangle Inequality theorem is stated correctly.
- [1] Appropriate work is shown, and  $x = 4$  is determined, but no further work is shown.
- or [1] The Triangle Inequality theorem is stated correctly but not evaluated for the sides, or the correct equation is written, but no further work is shown.
- or [1] 7, 11, 16, and yes, 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.
- 
- [27]
- [3] 2,827.4, and appropriate work is shown, such as  $50^2\pi - 40^2\pi$ .
- [2] The areas of both circles are found correctly, but the two areas are not subtracted.
- or [2] Appropriate work is shown, but one computational error is made.
- [1] The correct area is found for only one of the circles.
- or [1] The circumference formula is used, but the appropriate difference is shown, such as  $100\pi - 80\pi = 20\pi$ .
- or [1] 2,827.4, 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.
- 
- [28]

- [3]  $-7$  and  $4$ , and appropriate work is shown, such as factoring.  
[2] Correct factoring  $(x + 7)(x - 4)$  is shown, but only one correct value of  $x$  is found.  
or [2] Correct factoring is shown, but the negative value of  $x$  is rejected.  
[1] Correct factoring is shown, but the values of  $x$  are not found.  
or [1] Incorrect factoring is shown, but appropriate values are found.  
or [1] Only one value is found by trial and error.  
or [1]  $-7$  and  $4$ , 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.
- 

- [29] [3]  $3$ , and appropriate work is shown, such as using a  $3:4:5$  right triangle, correct proportions, or the Pythagorean theorem with a proportion.  
[2] Appropriate work is shown, and the value of the side is determined to be  $5$ , but  $n = 3$  is not found.  
[1] A correct proportion is set up, but no answer or an incorrect answer is found.  
or [1]  $3$ , 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.
- 

[30] incorrect procedure.

- a [2]  $59$ , and the equation  $\tan x = \frac{280}{170}$  is shown, or the Pythagorean theorem is used first to find the hypotenuse, and either sine or cosine is used correctly to find  $x$ .  
[1] Appropriate work is shown, but one computational or rounding error is made.  
or [1]  $59$ , but no work is shown.  
b [2]  $122$ , if the Pythagorean theorem is used or if a trigonometric function of the angle is used before it was rounded to  $59^\circ$ .

or [2]  $120$ , if  $\cos 59 = \frac{170}{hyp}$  is used.

or [2]  $123$ , if  $\sin 59 = \frac{170}{hyp}$  is used.

- [1] Appropriate work is shown, but one computational or rounding error is made.  
or [1]  $122$  or  $120$  or  $123$ , but no work is shown.

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.

[31]

a [1]  $c = 10m + 100$  for Ron's Rental and  $c = 20m + 20$  for Josie's Rental.

b [2] Two lines, rays, or segments are graphed and labeled correctly, using values arrived at by using a table or by using the slope and  $y$ -intercept.

[1] Two lines, rays, or segments are graphed correctly, but they are not labeled.

or [1] One line, ray, or segment is graphed and labeled correctly, using values arrived at by using a table or by using the slope and  $y$ -intercept.

c [1]  $8$

or [1] An appropriate number of months is found, based on an incorrect graph in part b.

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

[32]

obviously incorrect procedure.



- [4] \$167.50, and appropriate work is shown, such as  $350x + (150)(130) = 1.25(62,500)$  or trial and error with at least three trials with appropriate checks.
- [3] Appropriate work is shown, but one computational error is made.
- [2] Appropriate work is shown, but more than one computational error is made.
- or [2] \$167.50, but only one trial with an appropriate check is shown.
- [1] \$167.50, 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] [4] No, and an appropriate explanation is given, such as  $P(15) = \frac{6}{56} < P(2) = \frac{12}{56}$ .
- [3] One of the two probabilities is found correctly, but one computational error is made in finding the other, but an appropriate conclusion is drawn, based on the values found.
- or [3] Replacement is used to conclude  $P(15) = \frac{6}{64} < P(2) = \frac{12}{64}$ .
- or [3] The two probabilities are found correctly, but no conclusion or the incorrect conclusion is drawn.
- [2] One of the probabilities is found correctly, but one computational error is made in finding the other, and no conclusion or the incorrect conclusion is drawn.
- [1] An appropriate method is used, such as a tree diagram or sample space, but the probabilities are not determined or are determined incorrectly.
- or [1]  $P(15) = \frac{6}{56} < P(2) = \frac{12}{56}$ , but no work is shown.
- [0] No, but 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 obviously incorrect procedure.
- 
- [34] [4] (10,0) and (1,9), and both graphs are drawn correctly.
- [3] Both graphs are drawn correctly, but only one solution is stated correctly.
- or [3] One graph of equal difficulty is drawn incorrectly, but the solutions are appropriate, based on the graphs.
- [2] (10,0) and (1,9), but the problem is solved algebraically instead of graphically.
- or [2] One graph of equal difficulty is drawn incorrectly, and only one solution is appropriate, based on the graphs.
- [1] Both the parabola and the line are graphed incorrectly, but the solutions are appropriate, based on the graphs.
- or [1] Incorrect solutions result from an algebraic method.
- or [1] (10,0) and (1,9), 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.
- 

- 
- [35] [4] (10,0) and (1,9), and both graphs are drawn correctly.
- [3] Both graphs are drawn correctly, but only one solution is stated correctly.
- or [3] One graph of equal difficulty is drawn incorrectly, but the solutions are appropriate, based on the graphs.
- [2] (10,0) and (1,9), but the problem is solved algebraically instead of graphically.
- or [2] One graph of equal difficulty is drawn incorrectly, and only one solution is appropriate, based on the graphs.
- [1] Both the parabola and the line are graphed incorrectly, but the solutions are appropriate, based on the graphs.
- or [1] Incorrect solutions result from an algebraic method.
- or [1] (10,0) and (1,9), 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.
-