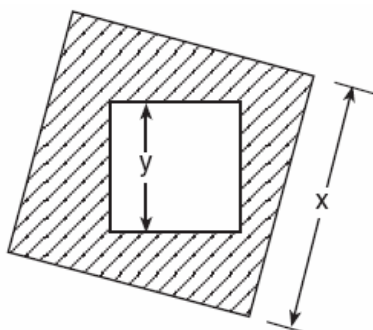


NAME: _____

1. 060302a, P.I. A.G.1

The accompanying diagram shows a square with side y inside a square with side x .

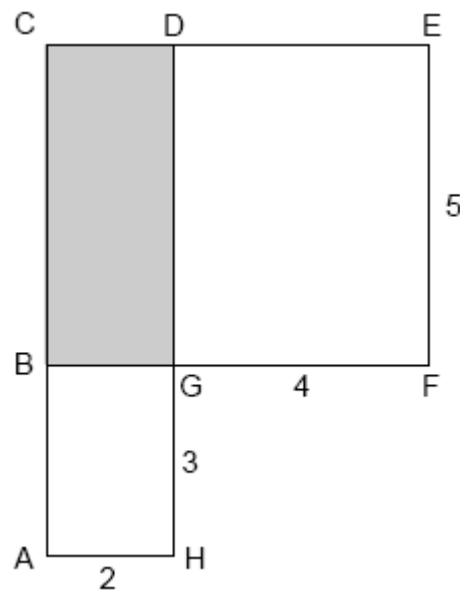


Which expression represents the area of the shaded region?

- [A] y^2 [B] x^2
 [C] $y^2 - x^2$ [D] $x^2 - y^2$

2. 069916a, P.I. A.G.1

In the accompanying figure, $ACDH$ and $BCEF$ are rectangles, $AH = 2$, $GH = 3$, $GF = 4$, and $FE = 5$.

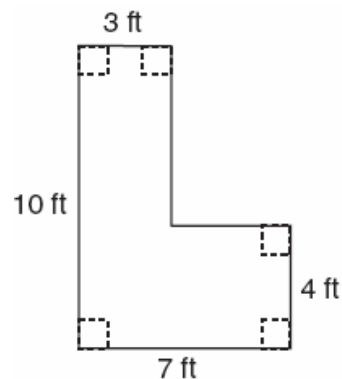


What is the area of $BCDG$?

- [A] 10 [B] 8 [C] 20 [D] 6

3. 060132a, P.I. A.G.1

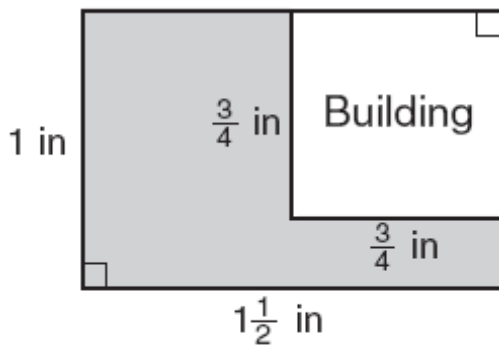
Keesha wants to tile the floor shown in the accompanying diagram. If each tile measures 1 foot by 1 foot and costs \$2.99, what will be the total cost, including an 8% sales tax, for tiling the floor?



NAME: _____

4. 080738a, P.I. A.G.1

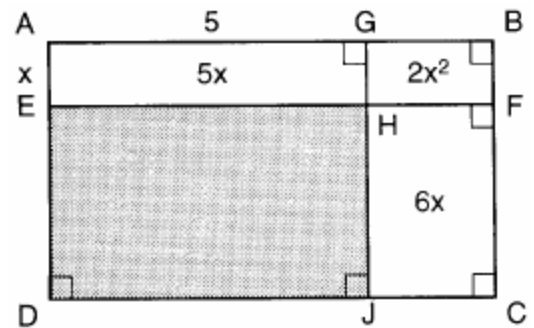
The accompanying diagram represents a scale drawing of the property where Brendan's business is located. He needs to purchase rock salt to melt the ice on the parking lot (shaded area) around his building. A bag of rock salt covers an area of 1,500 square feet. How many bags of rock salt does Brendan need to purchase to salt the entire parking lot?



Scale: $\frac{1}{4}$ in = 18 ft

5. 010028a, P.I. A.G.1

In the figure below, the large rectangle, $ABCD$, is divided into four smaller rectangles. The area of rectangle $AEHG = 5x$, the area of rectangle $GHFB = 2x^2$, the area of rectangle $HJCF = 6x$, segment $AG = 5$, and segment $AE = x$.



- Find the area of the shaded region.
- Write an expression for the area of the rectangle $ABCD$ in terms of x .

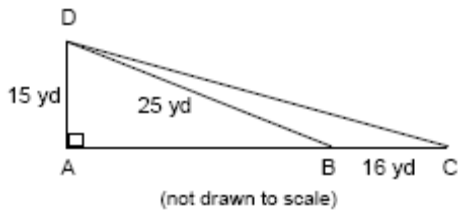
6. 080130b

A small, open-top packing box, similar to a shoebox without a lid, is three times as long as it is wide, and half as high as it is long. Each square inch of the bottom of the box costs \$0.008 to produce, while each square inch of any side costs \$0.003 to produce. Write a function for the cost of the box described above. Using this function, determine the dimensions of a box that would cost \$0.69 to produce.

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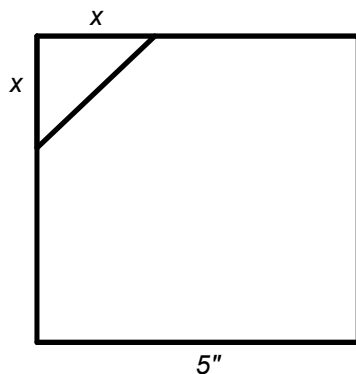
7. 089934a, P.I. A.G.1

Mr. Gonzalez owns a triangular plot of land BCD with $DB = 25$ yards and $BC = 16$ yards. He wishes to purchase the adjacent plot of land in the shape of right triangle ABD , as shown in the accompanying diagram, with $AD = 15$ yards. If the purchase is made, what will be the total number of square yards in the area of his plot of land, $\triangle ACD$?



8. spring9835a, P.I. A.G.1

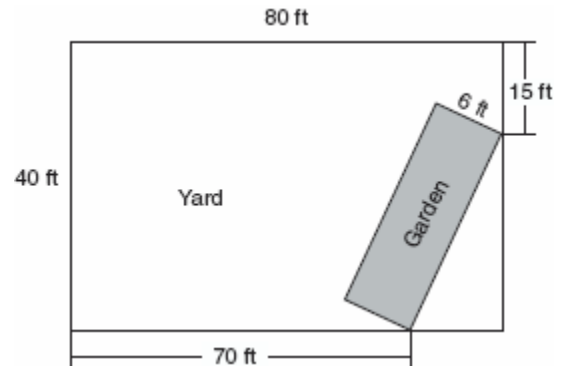
A corner is cut off a 5" by 5" square piece of paper. The cut is x inches from a corner as shown below.



- Write an equation, in terms of x , that represents the area, A , of the paper after the corner is removed.
- What value of x will result in an area that is $\frac{7}{8}$ of the area of the original square piece of paper?

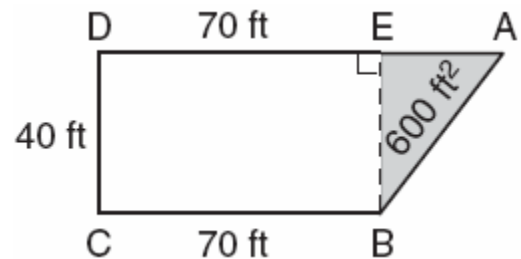
9. 010330a, P.I. A.G.1

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.



10. 060134a, P.I. A.G.1

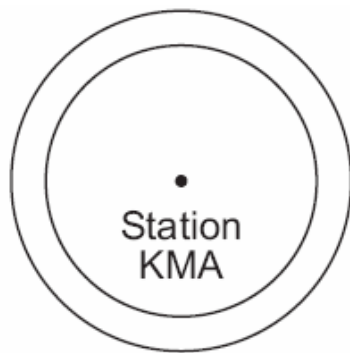
The plan of a parcel of land is represented by trapezoid $ABCD$ in the accompanying diagram. If the area of $\triangle ABE$ is 600 square feet, find the minimum number of feet of fence needed to completely enclose the entire parcel of land, $ABCD$.



NAME: _____

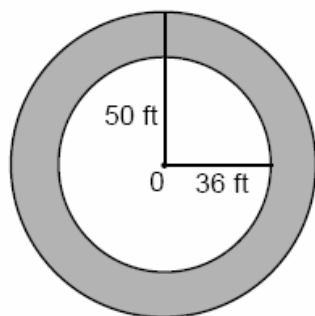
11. 060228a, P.I. A.G.1

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?



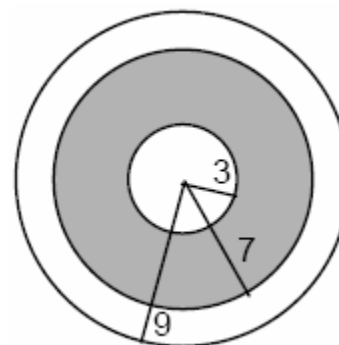
12. 089932a, P.I. A.G.1

If asphalt pavement costs \$0.78 per square foot, determine, to the *nearest cent*, the cost of paving the shaded circular road with center O, an outside radius of 50 feet, and an inner radius of 36 feet, as shown in the accompanying diagram.



13. 069931a, P.I. A.G.1

A target shown in the accompanying diagram consists of three circles with the same center. The radii of the circles have lengths of 3 inches, 7 inches, and 9 inches.

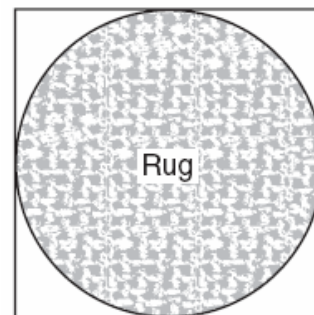


a What is the area of the shaded region to the *nearest tenth of a square inch*?

b To the *nearest percent*, what percent of the target is shaded?

14. 060129a, P.I. A.G.1

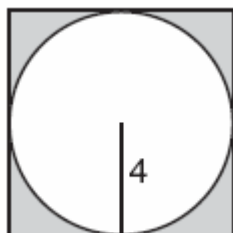
Virginia has a circular rug on her square living room floor, as represented in the accompanying diagram. If her entire living room floor measures 100 square feet, what is the area of the part of the floor covered by the rug?



NAME: _____

15. 080105a, P.I. A.G.1

In the accompanying diagram, a circle with radius 4 is inscribed in a square.



What is the area of the shaded region?

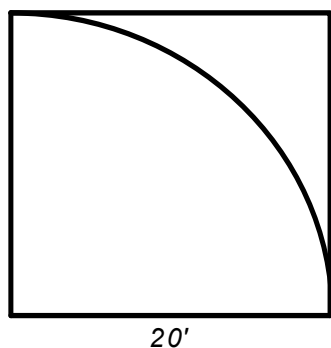
- [A] $64 - 16\pi$ [B] $16 - 16\pi$
 [C] $16 - 8\pi$ [D] $64\pi - 8\pi$

16. 060631a, P.I. A.G.1

Determine the area, in square feet, of the *smallest* square that can contain a circle with a radius of 8 feet.

17. spring9830a, P.I. A.G.1

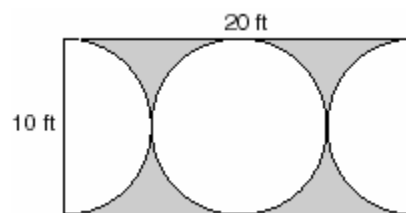
Ms. Brown plans to carpet part of her living room floor. The living room floor is a square 20 feet by 20 feet. She wants to carpet a quarter-circle as shown below.



Find, to the *nearest square foot*, what part of the floor will remain uncarpeted.

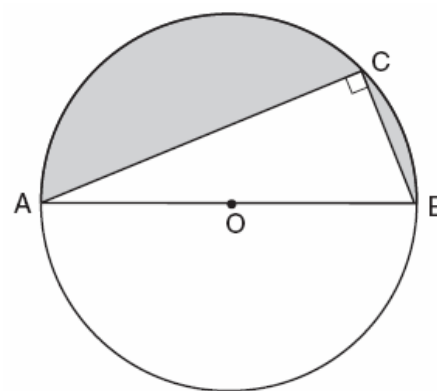
18. 080539a, P.I. A.G.1

Mr. Petri has a rectangular plot of land with length = 20 feet and width = 10 feet. He wants to design a flower garden in the shape of a circle with two semicircles at each end of the center circle, as shown in the accompanying diagram. He will fill in the shaded area with wood chips. If one bag of wood chips covers 5 square feet, how many bags must he buy?



19. 080438a, P.I. A.G.1

In the accompanying diagram, right triangle ABC is inscribed in circle O , diameter $AB = 26$, and $CB = 10$. Find, to the *nearest square unit*, the area of the shaded region.



MEASURING IN THE PLANE AND SPACE: Compositions of Polygons and Circles-AB

www.jmap.org

[1] D _____

[2] A _____

[4] \$148.54, and appropriate work is shown.

[3] The correct pre-tax amount of \$137.54 is found, but no tax or an incorrect tax is shown.

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

[2] The correct area of 46 ft^2 is found, but no cost is shown.

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

or [2] An incorrect area is determined, such as by adding or multiplying all sides, but then a final cost including tax is determined appropriately.

[1] An incorrect area is shown, and one computational error is made.

or [1] \$148.54, 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

[3] incorrect procedure.

[4] 4, and appropriate work is shown.

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

or [3] Appropriate work is shown to find 4,860, the area of the parking lot, but no further correct work is shown.

[2] Appropriate work is shown, but two or more computational or rounding errors are made.

or [2] Appropriate work is shown, but one conceptual error is made, such as using an incorrect conversion.

or [2] The property has been divided into appropriate sections (e.g., 108×72 , the entire property, and 52×52 , the building) and correct areas are found, but no further correct work is shown.

[1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.

or [1] 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

[4] incorrect procedure.

a [2] 15 and an appropriate method is shown, such as finding $GB = JC = 2x$ and $FC = ED = HJ = 3$.

[1] 15 and no work is shown.

or [1] At least one of the values is correct, as shown above, and the area is calculated based on the incorrect value.

b [1] Any form equivalent to $(2x + 5)(x + 3)$ is shown, such as $5x + 2x^2 + 6x + 15$.

or [1] Any correct total area based on the students incorrect answer in part a is found.

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

[5] obviously incorrect procedure.

[4] $c(x) = 0.06x^2$ or an equivalent equation;
width = $\sqrt{11.5}$ inches or an equivalent, length
= $3\sqrt{11.5}$ inches or an equivalent, and height
= $\frac{3}{2}\sqrt{11.5}$ inches or an equivalent, and

appropriate work is shown.

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

or [3] One or more dimensions are represented incorrectly, but all further work is appropriate.

or [3] The correct function is found and solved for x , but no further work is shown.

[2] The dimensions are represented correctly, but the equation is incorrect, but all further work is appropriate.

or [2] The dimensions are represented correctly, and the correct function is written, but further work is incomplete or is incorrect.

[1] The dimensions are represented correctly, but the function is written and solved incorrectly.

or [1] $\sqrt{11.5}$, $3\sqrt{11.5}$, and $\frac{3}{2}\sqrt{11.5}$, 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

[6] incorrect procedure.

[4] 270 and an appropriate method is shown, such as using the Pythagorean theorem or trigonometry to find base $AC = 36$.

[3] An appropriate method is shown, but one computational mistake is made.

[2] An inappropriate formula for the area of the triangle is used, but work is carried to a solution.

or [2] The Pythagorean theorem is used correctly, but only the area of triangle ADB is found, as 150.

or [2] The Pythagorean theorem is used incorrectly arriving at incorrect AB , but work is carried to its appropriate solution for triangle ADC .

[1] Only the area of triangle DBC is found, as 120.

or [1] The Pythagorean theorem is used incorrectly, and the area is not found.

or [1] 270 and 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

[7] incorrect procedure.

(a) [1] Showing $25 - \frac{x^2}{2}$ or $\frac{1}{2}(5 + (5 - x))5$ or an equivalent expression or as an equation $A =$.

(b) [3] Uses an appropriate equation, such as $175 = 200 - 4x^2$ and arrives at an answer of 2.5.

or [3] Uses an appropriate method such as dividing the square into 8 equal triangles to arrive at a correct answer of 2.5.

or [3] Uses an incorrect equation from part (a) and follows it through to an answer.

(Equation must be of equal difficulty, i.e., not linear.)

[2] Uses a correct method or equation and makes one mistake in the solution.

[1] Uses correct or equally difficult incorrect

[8] equation and makes several mistakes.

[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

[9] incorrect procedure.

[4] 260, and appropriate work is shown, such as applying the appropriate area formula,

or $A = \frac{1}{2}bh$ or $A = \frac{1}{2}h(b_1 + b_2)$, to find the

length of \overline{AE} and using the Pythagorean theorem or stating the Pythagorean triple to determine AB .

[3] 300, because \overline{BE} is added to the perimeter.

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.

or [2] Only AB and AE are determined correctly.

[1] Only AB or AE is determined correctly.

or [1] 260, 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

[10] incorrect procedure.

[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

[11] incorrect procedure.

- [4] \$2,950.33 and a correct method is shown, such as area 1204π square feet multiplied by \$0.78.
 or [4] Various correct values of π are used that lead to slightly different totals such as \$2,948.84 (if 3.14 is used).
 [3] The shaded area is found, such as 1204π (or similar values based on π approximation).
 or [3] The correct shaded area is found, but one computational mistake is made in the price, or the final cost is not rounded correctly.
 [2] The two separate areas are found but not correctly used.
 or [2] An inappropriate formula for areas is shown, but work is carried to an appropriate value.
 or [2] Only one appropriate area is found and an appropriate cost is computed.
 or [2] The area found is incorrect but calculated to an appropriate cost.
 [1] Only one appropriate area is found, either 2500π or 1296π .
 or [1] An inappropriate area is found, and one computational mistake is made in calculating the cost.
 or [1] \$2,948.84 through \$2,950.33 and 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.
-
- [12]

- a [2] 125.6 or 125.7 (correct for the value of π used) and appropriate work is shown.
 [1] The area is left as 40π or the answer is not rounded correctly.
 or [1] An appropriate method is shown, but one computational mistake is made.
 or [1] The correct areas of both circles are found, but the two areas are not subtracted.
 or [1] The circumference formula is used correctly for both circles and the circumferences are subtracted for an answer of 25.1.
 or [1] 125.6 or 125.7 and no work is shown.
 b [2] 49 and an appropriate explanation is given.
 or [2] An appropriate percent for an incorrect part a is found and supported by area formulas.
 [1] The answer is left as $\frac{40\pi}{81\pi}$.
 or [1] An appropriate fraction for an incorrect part a is found but not given as a percent.
 or [1] An appropriate percent for an incorrect part a is found and is supported by circumference formulas.
 or [1] 49 and no work is shown.
 [0] $\frac{4}{9}$ or 44% and no work is shown.
 or [0] 4 is found by subtracting the radii.
 or 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.
-
- [13]

- [3] 78.5 square feet or 25π or an equivalent answer, and appropriate work is shown.
 [2] Appropriate work is shown, but one computational error is made.
 or [2] Appropriate work is shown, but the measure of one side of the square is used as the radius of the circle.
 or [2] Appropriate work is shown, but the perimeter is used to find a side of the square.
 [1] The correct length of the side of the square is shown, but further work is missing or is incorrect.
 or [1] The equation for the circumference of the circle instead of the equation for the area of the circle is solved appropriately.
 or [1] Appropriate work is shown, but more than one error is made.
 or [1] 78.5 square feet or 25π , 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.
- [14] _____
- [15] A

- [2] 256, and appropriate work is shown, such as finding the side of the square and calculating the area.
 [1] Appropriate work is shown, but one computational error is made.
 or [1] Appropriate work is shown, but one conceptual error is made.
 or [1] Appropriate work is shown, but only the area of the circle is found.
 or [1] An incorrect value for the side of the square is determined, but an appropriate area is found.
 or [1] A correct value for the side of the square is determined, but the area is not found or is found incorrectly.
 or [1] The area for the square inscribed in the circle is found, resulting in an answer of 128.
 or [1] 256, 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.
- [16] _____
- [3] Correct answer of 86 by showing the area of the quarter-circle 100π or 314 subtracted from the area of the square (400) and rounding off result.
 [2] Appropriate as above without rounded answer.
 or [2] Appropriate method with calculation error for one of the areas and answer rounded as required.
 [1] Answer of 86 with inappropriate or no method shown.
 or [1] Properly calculates quarter-circle area and leaves answer as 100π or 314.
 or [1] Uses wrong formula for the area of the circle but takes $\frac{1}{4}$ of it.
 [0] Shows only the area of the square 400 sq. ft.
- [17] _____

- [4] 9, and appropriate work is shown.
 [3] Appropriate work is shown, but one computational or rounding error is made.
 or [3] Appropriate work is shown, and the areas of the rectangle and one circle are found correctly, but the area of the circle is not doubled, but an appropriate number of bags is found.
 [2] Appropriate work is shown, but two or more computational or rounding errors are made.
 or [2] Appropriate work is shown, but one conceptual error is made, such as using an incorrect formula for the area of a circle, but an appropriate number of bags is found.
 or [2] The areas of the rectangle and the circle are found correctly, but no further correct work is shown.
 [1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
 or [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.
-
- [18]

- [4] 145, and appropriate work is shown, such as $(\frac{1}{2}\pi 13^2) - (\frac{1}{2} \cdot 10 \cdot 24)$.
 [3] Appropriate work is shown, but one computational or rounding error is made or the answer is expressed in terms of π .
 or [3] Appropriate work is shown, but the area of the entire circle is used to calculate the area of the shaded region.
 or [3] The areas of the semicircle and triangle are found correctly, but they are not subtracted to find the shaded area.
 [2] Appropriate work is shown, but two or more computational or rounding errors are made.
 or [2] An incorrect formula is used to find the area of the triangle or the semicircle, but an appropriate shaded area is found.
 or [2] Only the area of the semicircle or the area of the triangle is found correctly, and no further correct work is shown.
 [1] Both the areas of the semicircle and the triangle are found incorrectly, but they are subtracted to find an appropriate shaded area.
 or [1] Only the length of \overline{AC} is found correctly.
 or [1] 145, 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.
-
- [19]