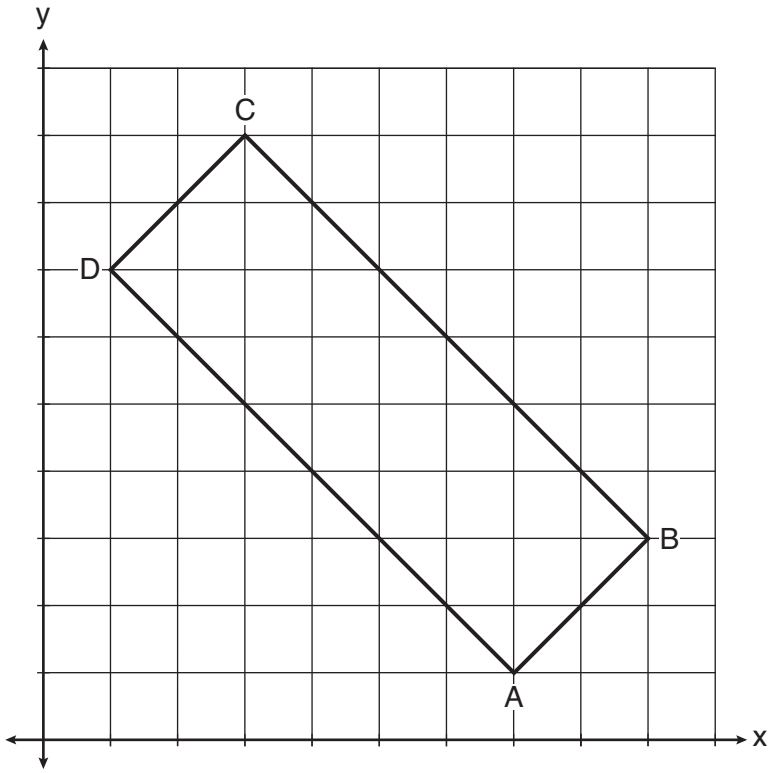
Use this space for computations.

17 In the diagram below, rectangle $ABCD$ has vertices whose coordinates are $A(7,1)$, $B(9,3)$, $C(3,9)$, and $D(1,7)$.



Which transformation will *not* carry the rectangle onto itself?

(1) a reflection over the line $y = x$

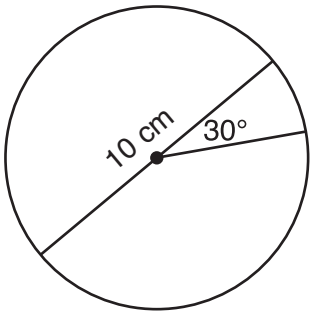
(2) a reflection over the line $y = -x + 10$

(3) a rotation of 180° about the point (6,6)

(4) a rotation of 180° about the point (5,5)

Use this space for computations.

18 A circle with a diameter of 10 cm and a central angle of 30° is drawn below.



What is the area, to the *nearest tenth of a square centimeter*, of the sector formed by the 30° angle?

(1) 5.2
(2) 6.5
(3) 13.1
(4) 26.2

19 A child's tent can be modeled as a pyramid with a square base whose sides measure 60 inches and whose height measures 84 inches. What is the volume of the tent, to the *nearest cubic foot*?

(1) 35
(2) 58
(3) 82
(4) 175

Use this space for computations.

23 Triangle RJM has an area of 6 and a perimeter of 12. If the triangle is dilated by a scale factor of 3 centered at the origin, what are the area and perimeter of its image, triangle $R'J'M'$?

(1) area of 9 and perimeter of 15

(2) area of 18 and perimeter of 36

(3) area of 54 and perimeter of 36

(4) area of 54 and perimeter of 108

24 If $\sin(2x + 7)^\circ = \cos(4x - 7)^\circ$, what is the value of x?

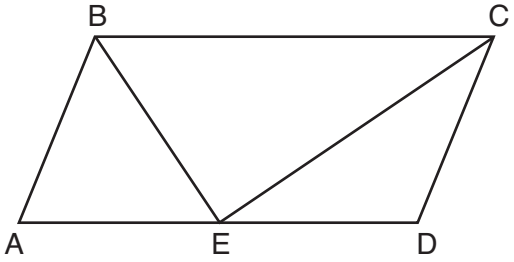
(1) 7

(2) 15

(3) 21

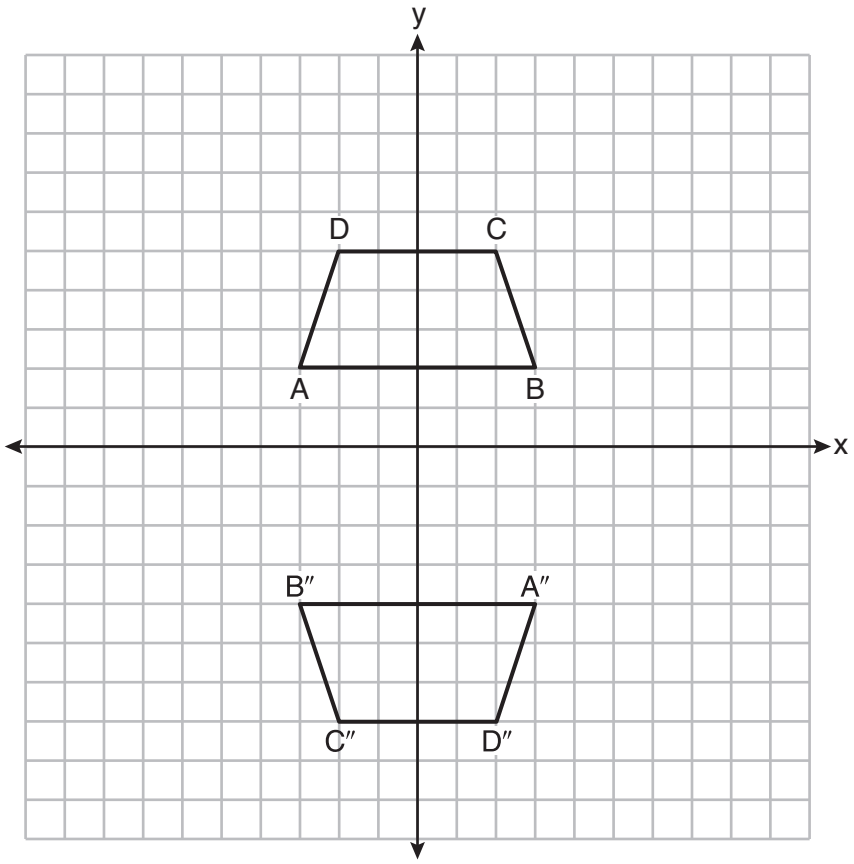
(4) 30

26 In parallelogram $ABCD$ shown below, the bisectors of $\angle ABC$ and $\angle DCB$ meet at E, a point on $\overline{AD}$.



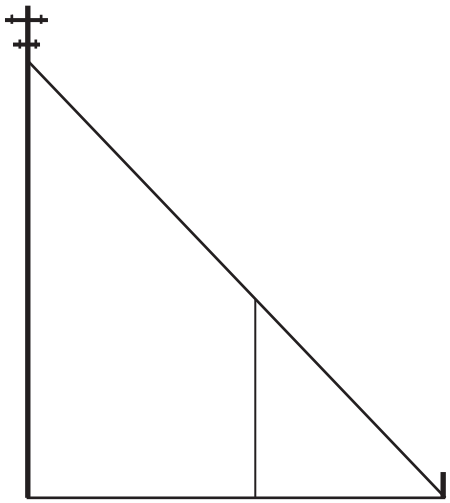
If $m\angle A = 68°$, determine and state $m\angle BEC$.

28 Trapezoids *ABCD* and *A″B″C″D″* are graphed on the set of axes below.



Describe a sequence of transformations that maps trapezoid *ABCD* onto trapezoid *A″B″C″D″*.

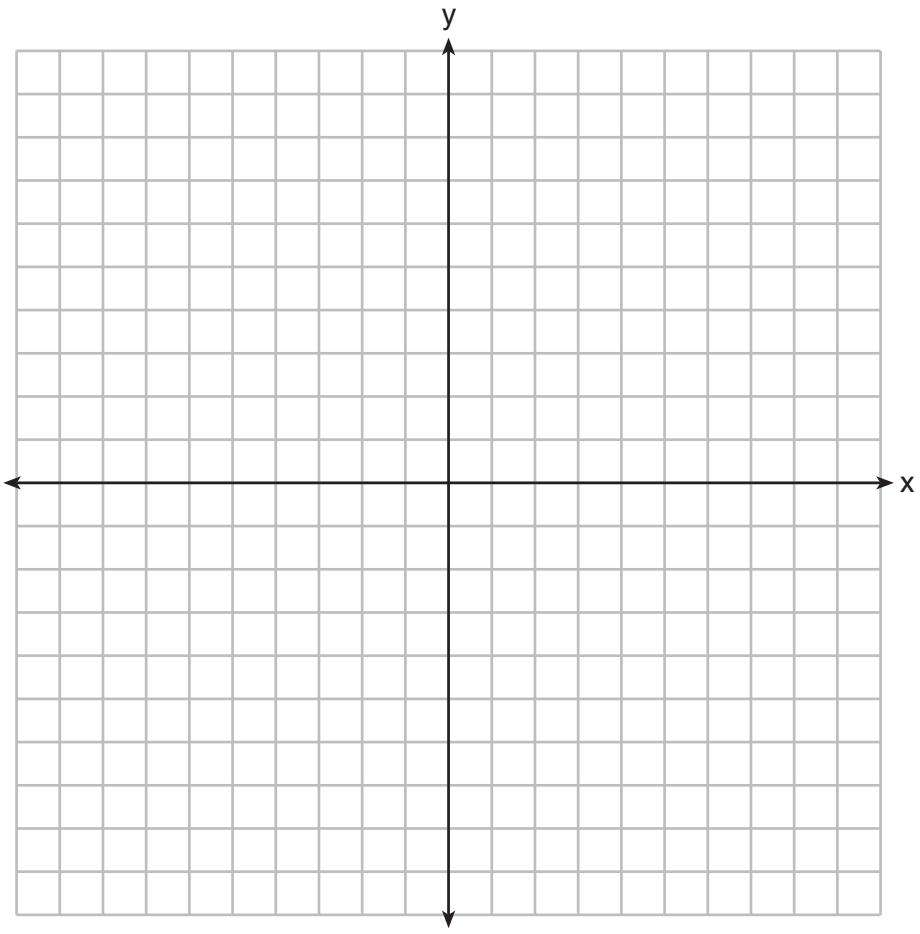
29 In the model below, a support wire for a telephone pole is attached to the pole and anchored to a stake in the ground 15 feet from the base of the telephone pole. Jamal places a 6-foot wooden pole under the support wire parallel to the telephone pole, such that one end of the pole is on the ground and the top of the pole is touching the support wire. He measures the distance between the bottom of the pole and the stake in the ground.



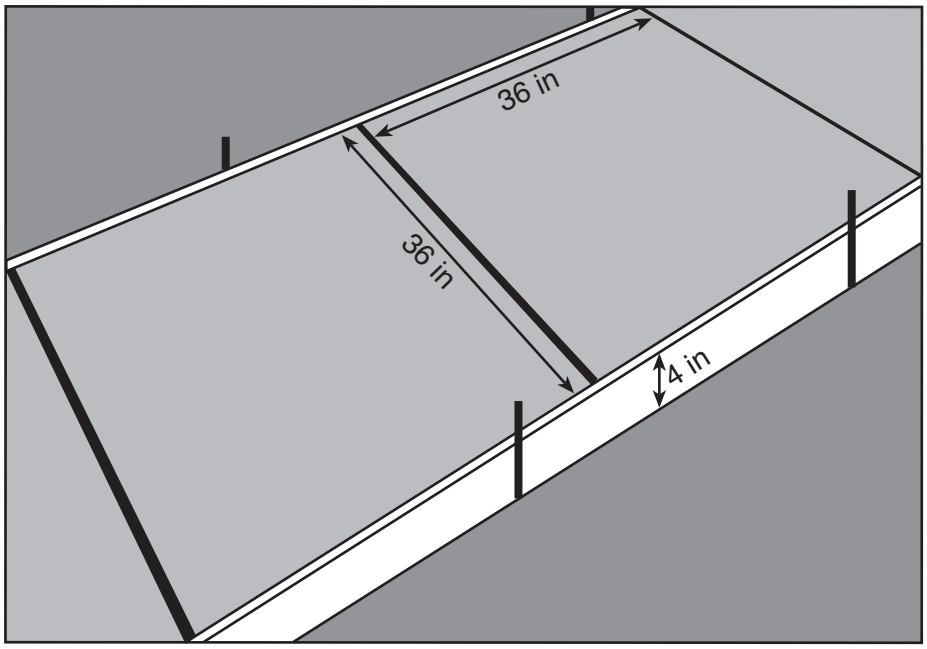
Jamal says he can approximate how high the support wire attaches to the telephone pole by using similar triangles. Explain why the triangles are similar.

30 Aliyah says that when the line $4x + 3y = 24$ is dilated by a scale factor of 2 centered at the point (3,4), the equation of the dilated line is $y = -\frac{4}{3}x + 16$. Is Aliyah correct? Explain why.

[The use of the set of axes below is optional.]

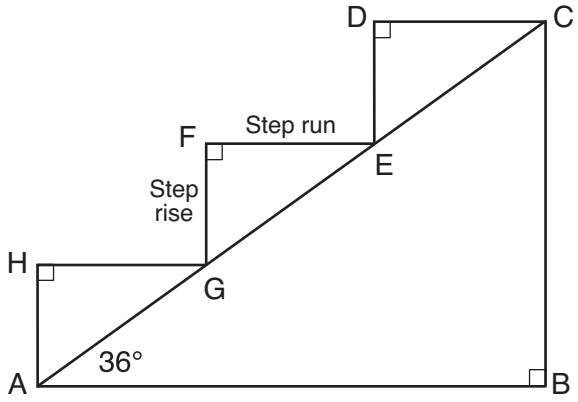


31 Ian needs to replace two concrete sections in his sidewalk, as modeled below. Each section is 36 inches by 36 inches and 4 inches deep. He can mix his own concrete for $3.25 per cubic foot.



How much money will it cost Ian to replace the two concrete sections?

33 A homeowner is building three steps leading to a deck, as modeled by the diagram below. All three step rises, $\overline{HA}$, $\overline{FG}$, and $\overline{DE}$, are congruent, and all three step runs, $\overline{HG}$, $\overline{FE}$, and $\overline{DC}$, are congruent. Each step rise is perpendicular to the step run it joins. The measure of $\angle CAB = 36°$ and $m\angle CBA = 90°$.



If each step run is parallel to $\overline{AB}$ and has a length of 10 inches, determine and state the length of each step rise, to the *nearest tenth of an inch*.

Determine and state the length of $\overline{AC}$, to the *nearest inch*.

34 A bakery sells hollow chocolate spheres. The larger diameter of each sphere is 4 cm. The thickness of the chocolate of each sphere is 0.5 cm. Determine and state, to the *nearest tenth of a cubic centimeter*, the amount of chocolate in each hollow sphere.

The bakery packages 8 of them into a box. If the density of the chocolate is 1.308 g/cm^3, determine and state, to the *nearest gram*, the total mass of the chocolate in the box.

Part IV

Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for the question to determine your answer. Note that diagrams are not necessarily drawn to scale. For the question in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [6]

35 The vertices of quadrilateral *MATH* have coordinates $M(-4,2)$, $A(-1,-3)$, $T(9,3)$, and $H(6,8)$.

Prove that quadrilateral *MATH* is a parallelogram.

[The use of the set of axes on the next page is optional.]

Question 35 is continued on the next page.

Question 35 continued

Prove that quadrilateral *MATH* is a rectangle.

[The use of the set of axes below is optional.]