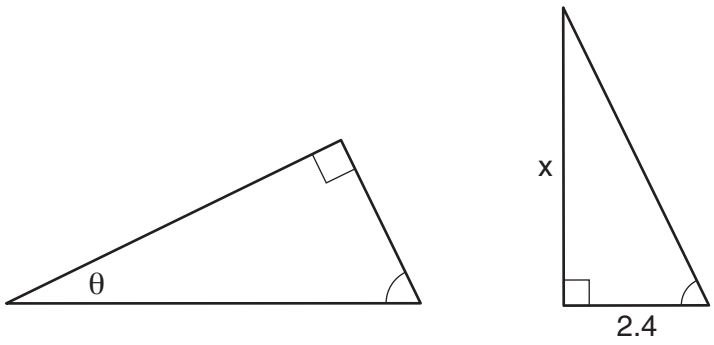
Use this space for computations.

7 The diagram below shows two similar triangles.



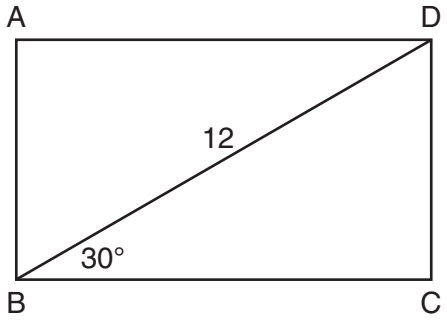
If $\tan \theta = \frac{3}{7}$, what is the value of x, to the *nearest tenth*?

(1) 1.2
(2) 5.6
(3) 7.6
(4) 8.8

8 A farmer has 64 feet of fence to enclose a rectangular vegetable garden. Which dimensions would result in the biggest area for this garden?

(1) the length and the width are equal
(2) the length is 2 more than the width
(3) the length is 4 more than the width
(4) the length is 6 more than the width

9 The diagram shows rectangle *ABCD*, with diagonal $\overline{BD}$.

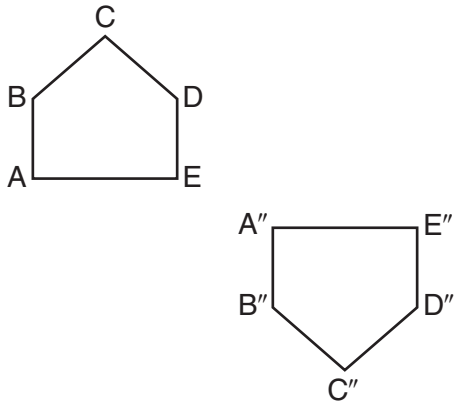


What is the perimeter of rectangle *ABCD*, to the *nearest tenth*?

(1) 28.4
(2) 32.8
(3) 48.0
(4) 62.4

Use this space for computations.

10 Identify which sequence of transformations could map pentagon *ABCDE* onto pentagon *A″B″C″D″E″*, as shown below.



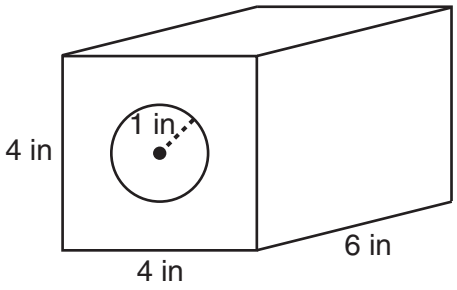
(1) dilation followed by a rotation

(2) translation followed by a rotation

(3) line reflection followed by a translation

(4) line reflection followed by a line reflection

11 A solid metal prism has a rectangular base with sides of 4 inches and 6 inches, and a height of 4 inches. A hole in the shape of a cylinder, with a radius of 1 inch, is drilled through the entire length of the rectangular prism.



What is the approximate volume of the remaining solid, in cubic inches?

(1) 19

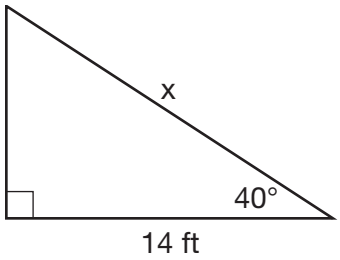
(2) 77

(3) 93

(4) 96

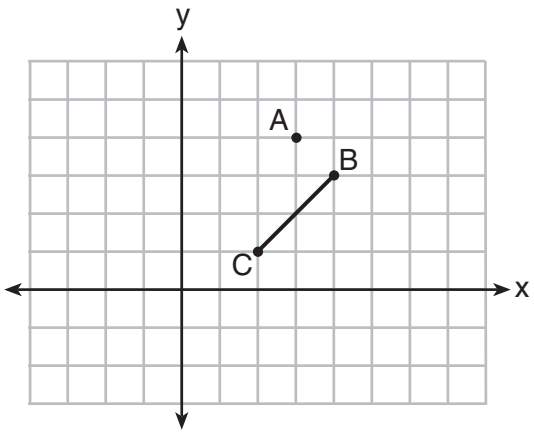
Use this space for computations.

12 Given the right triangle in the diagram below, what is the value of x, to the *nearest foot*?



(1) 11
(2) 17
(3) 18
(4) 22

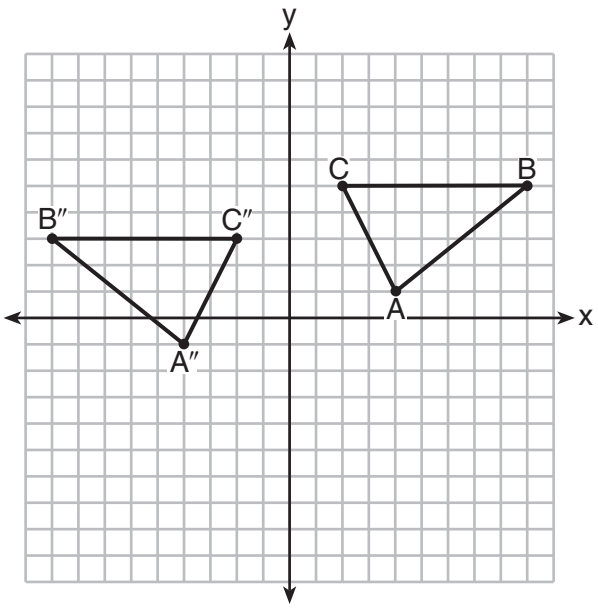
13 On the graph below, point $A(3,4)$ and $\overline{BC}$ with coordinates $B(4,3)$ and $C(2,1)$ are graphed.



What are the coordinates of B' and C' after $\overline{BC}$ undergoes a dilation centered at point A with a scale factor of 2?

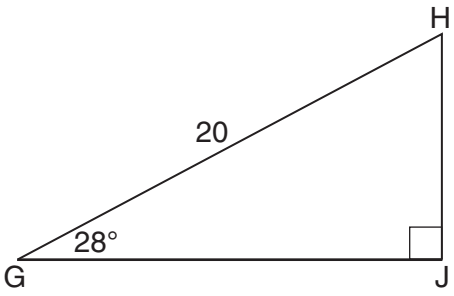
(1) $B'(5,2)$ and $C'(1,-2)$
(2) $B'(6,1)$ and $C'(0,-1)$
(3) $B'(5,0)$ and $C'(1,-2)$
(4) $B'(5,2)$ and $C'(3,0)$

26 The graph below shows $\triangle ABC$ and its image, $\triangle A''B''C''$.

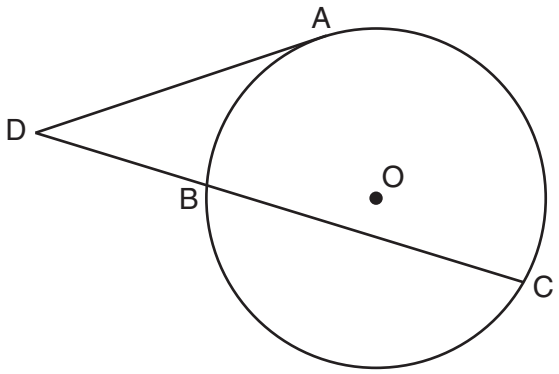


Describe a sequence of rigid motions which would map $\triangle ABC$ onto $\triangle A''B''C''$.

27 When instructed to find the length of $\overline{HJ}$ in right triangle HJG, Alex wrote the equation $\sin 28° = \frac{HJ}{20}$ while Marlene wrote $\cos 62° = \frac{HJ}{20}$. Are both students' equations correct? Explain why.

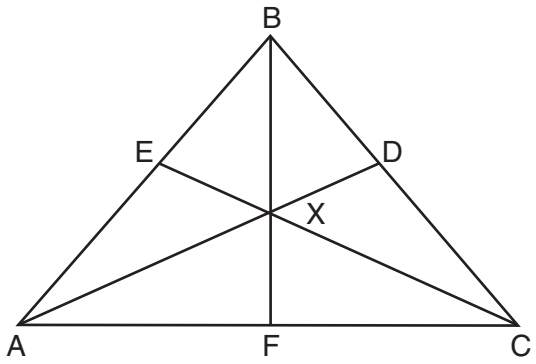


28 In the diagram below, tangent $\overline{DA}$ and secant $\overline{DBC}$ are drawn to circle O from external point D, such that $\widehat{AC} \cong \widehat{BC}$.



If $m\widehat{BC} = 152°$, determine and state $m\angle D$.

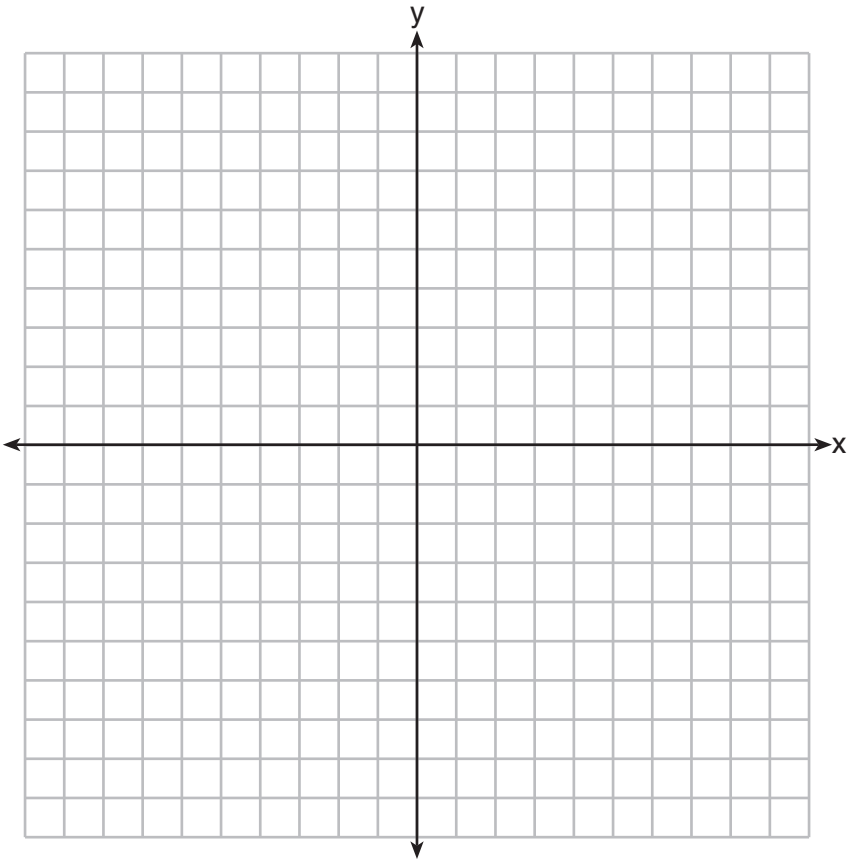
30 In the diagram below of isosceles triangle ABC, $\overline{AB} \cong \overline{CB}$ and angle bisectors $\overline{AD}$, $\overline{BF}$, and $\overline{CE}$ are drawn and intersect at X.



If $m\angle BAC = 50°$, find $m\angle AXC$.

31 In square *GEOM*, the coordinates of *G* are (2,−2) and the coordinates of *O* are (−4,2). Determine and state the coordinates of vertices *E* and *M*.

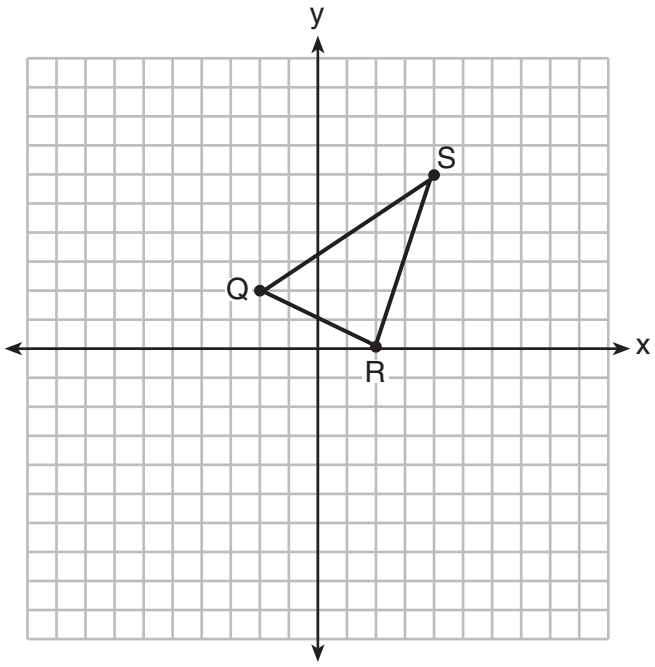
[The use of the set of axes below is optional.]



Part III

Answer all 3 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions 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. [12]

32 Triangle QRS is graphed on the set of axes below.



On the same set of axes, graph and label $\triangle Q'R'S'$, the image of $\triangle QRS$ after a dilation with a scale factor of $\frac{3}{2}$ centered at the origin.

Use slopes to explain why $\overline{Q'R'} \parallel \overline{QR}$.

34 A candle maker uses a mold to make candles like the one shown below.

The height of the candle is 13 cm and the circumference of the candle at its widest measure is 31.416 cm. Use modeling to approximate how much wax, to the *nearest cubic centimeter*, is needed to make this candle. Justify your answer.

36 New streetlights will be installed along a section of the highway. The posts for the streetlights will be 7.5 m tall and made of aluminum. The city can choose to buy the posts shaped like cylinders or the posts shaped like rectangular prisms. The cylindrical posts have a hollow core, with aluminum 2.5 cm thick, and an outer diameter of 53.4 cm. The rectangular-prism posts have a hollow core, with aluminum 2.5 cm thick, and a square base that measures 40 cm on each side.

The density of aluminum is 2.7 g/cm^3, and the cost of aluminum is \$0.38 per kilogram.

If all posts must be the same shape, which post design will cost the town less?

How much money will be saved per streetlight post with the less expensive design?

Work space for question 36 is continued on the next page.