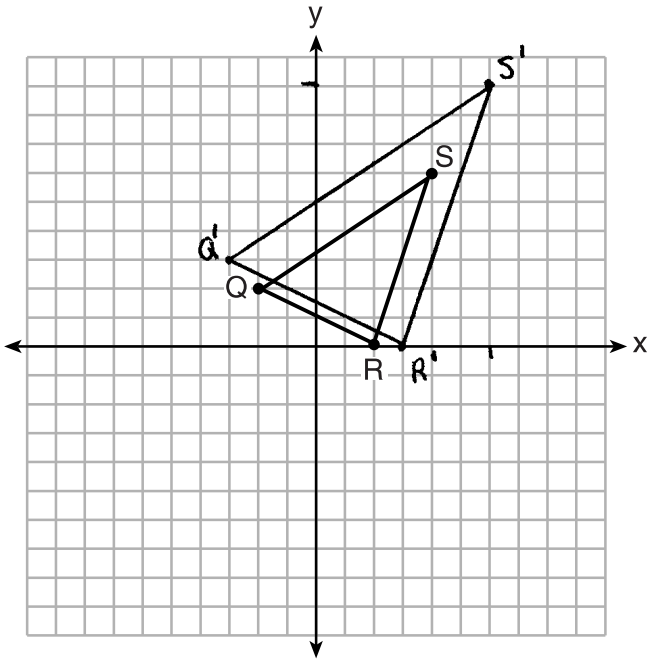
Question 32

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.

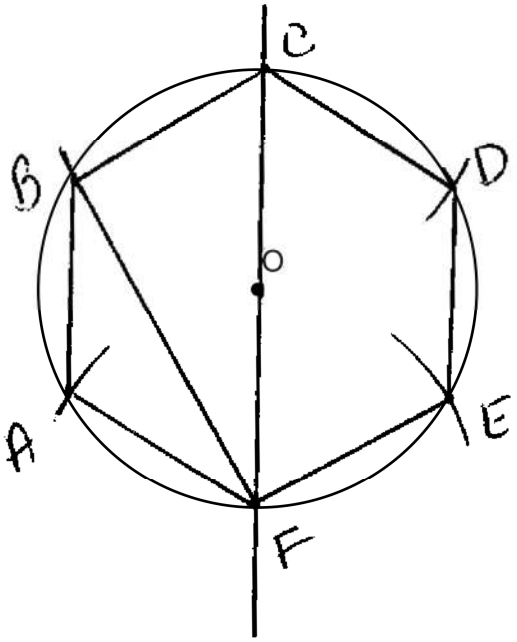
Use slopes to explain why $\overline{Q'R'} \parallel \overline{QR}$.

A dilation will preserve the slopes of lines so the slope of $\overline{Q'R'}$ will be the same as the slope of $\overline{QR}$. Because the slopes are equal then $\overline{Q'R'} \parallel \overline{QR}$.

Score 4: The student had a complete and correct response.

Question 33

33 Using a compass and straightedge, construct a regular hexagon inscribed in circle O below. Label it $ABCDEF$. [Leave all construction marks.]



If chords $\overline{FB}$ and $\overline{FC}$ are drawn, which type of triangle, according to its angles, would $\triangle FBC$ be? Explain your answer.

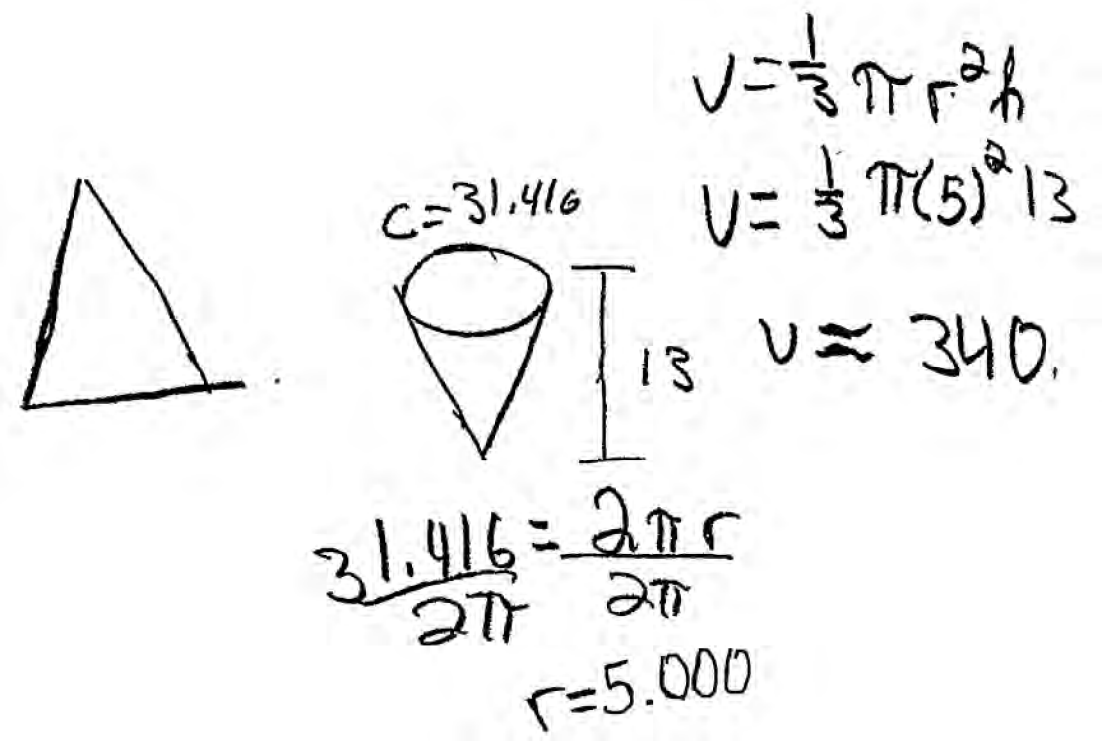
Right Δ, because ∠CBF is inscribed in a semi-circle.

Score 4: The student had a complete and correct response.

Question 34

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

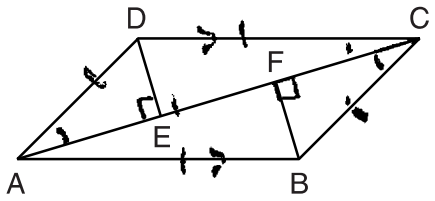
The height of the candle is 13 cm and the circumference of the candle at its widest measure is 31.416 cm. Use modeling to approximate how much wax, to the *nearest cubic centimeter,* is needed to make this candle. Justify your answer.



Score 4: The student had a complete and correct response.

Question 35

35 In quadrilateral $ABCD$, $\overline{AB} \cong \overline{CD}$, $\overline{AB} \parallel \overline{CD}$, and $\overline{BF}$ and $\overline{DE}$ are perpendicular to diagonal $\overline{AC}$ at points F and E.



$\triangle CDE \cong \triangle ABF$

Prove: $\overline{AE} \cong \overline{CF}$

Statement	Reason
1. quad ABCD $\overline{AB} \cong \overline{CD}$, $\overline{AB} \parallel \overline{CD}$ $\overline{BF} \perp \overline{AC}$, $\overline{DE} \perp \overline{AC}$	1. given
2. $\angle AED$ and $\angle CFB$ are rt. $\angle$'s	2. $\perp$ lines form rt. $\angle$'s
3. $\angle AED \cong \angle CFB$	3. all rt. $\angle$'s are $\cong$
4. ABCD is a parallelogram	4. a quad that has one pair of sides $\cong$ and $\parallel$ is a parallelogram
5. $\overline{AD} \parallel \overline{BC}$	5. parallelograms have opposite sides $\parallel$.
6. $\angle DAE \cong \angle BCF$	6. when 2 $\parallel$ lines are cut by a transversal, alt. int. $\angle$'s are $\cong$
7. $\overline{DA} \cong \overline{BC}$	7. parallelograms have 2 pairs of $\cong$ sides
8. $\triangle ADE \cong \triangle CBF$	8. AAS $\cong$ AAS
9. $\overline{AE} \cong \overline{CF}$	9. CPCTC

Score 6: The student had a complete and correct response.

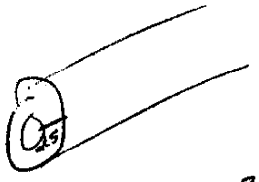
Question 36

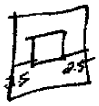
36 New streetlights will be installed along a section of the highway. The posts for the streetlights will be 7.5 m tall and made of aluminum. The city can choose to buy the posts shaped like cylinders or the posts shaped like rectangular prisms. The cylindrical posts have a hollow core, with aluminum 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?





$V = \pi r^2 h - \pi r^2 h$

$V = \pi(26.7)^2(750) - \pi(24.2)^2(750)$

$V = 534667.5\pi - 439230\pi$

$V = 95437.5\pi$

$V = 299825.7489\ cm^3$

$V = lwh - lwh$

$V = 40 \cdot 40 \cdot 750 - 35^2(750)$

$V = 1200000 - 918750$

$V = 281250\ cm^3$

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

Question 36 continued

$\frac{299825.7489\ cm^3}{1}\left(\frac{2.7g}{cm^3}\right)\left(\frac{1kg}{1000g}\right)\left(\frac{\$0.38}{1kg}\right)$

$\$307.6212183$

$\$307.62$

$\frac{281250\ cm^3}{1}\left(\frac{2.7g}{cm^3}\right)\left(\frac{1kg}{1000g}\right)\left(\frac{\$1.38}{1kg}\right)$

$\$288.5625$

$\$288.56$

307.62
− 288.56
$\$19.06$ saved to use the rectangles

Score 6: The student had a complete and correct response.