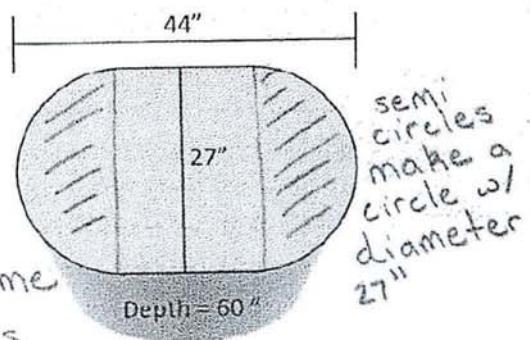


Mr. Gerard's Oil Tank

Mr. Gerards bought a house that contained an empty heating oil tank with the dimensions shown in the drawing. The left and right arcs of the tank are perfect semi-circles. If heating oil costs \$3.50 per gallon, how much would it cost Mr.

Gerards to fill this tank? (There are 231 cubic inches in a gallon.) Need to figure out the volume of the tank in cubic inches then convert it into gallons.



$$\text{Area of Circle: } A = \pi r^2 \quad 27'' = 2r \quad r = 13\frac{1}{2}''$$

+ Leftover:

$$A = \pi (13.5)^2 = 182.25 \pi = 572.265 \text{ in}^2 + \text{Rectangle}$$

$$+ 459 = 1031.265 \text{ in}^2$$

Area of Tank: Area of ^{Top} Circle \times Depth

$$\frac{572.265 (60)}{1031.265} = \frac{34,335.9 \text{ in}^3}{61,875.9 \text{ in}^3}$$

Converting to Gallons: 1 gallon = 231 in³

$$\frac{61,875.9 \text{ in}^3}{34,335.9 \text{ in}^3} = \frac{267.86 \text{ gallons}}{231 \text{ in}^3} = 118.64 \text{ gallons}$$

Cost: \$3.50 per gallon

$$\$3.50 \times \frac{267.86}{118.64} \text{ gallons}$$

It would cost Mr. Gerards ~~\$520.24~~ ^{\$937.51} to fill the tank.

Scores and Commentary: Mr. Gerard's Oil Tank, Paper #A7

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating and Reasoning (CR)	Accuracy (Acc)	Reflecting and Evaluating (RS)
5	4	5	4	4

MS 5: The interpretation and translation are thoroughly developed by the use of formulas and graphics. However, the work is not enhanced with connections or extensions.

RS 4: The strategy is effective and complete but not complex, elegant, or enhanced.

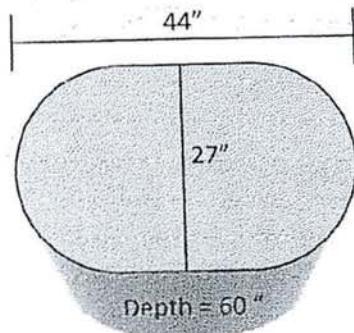
CR 5: The work is enhanced by graphics (sectioning the drawing) and the labeled sections that allow the reader to move easily from one thought to another.

Acc 4: The solution is correct, justified and supported by the work. It does not include extensions, connections or generalizations.

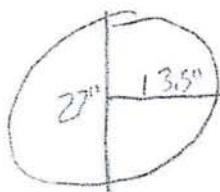
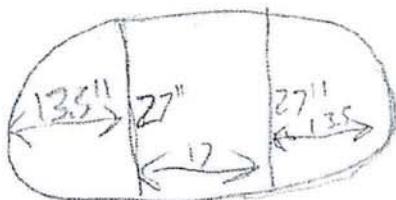
RE 4: The reflection justifies the solution completely, evidenced by the corrections shown to the composition of the tank's base, the calculations, and the reasonableness of the original final answer. If the student had addressed how the error was discovered, this reflection would have been stronger.

Mr. Gerard's Oil Tank

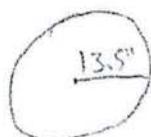
Mr. Gerards bought a house that contained an empty heating oil tank with the dimensions shown in the drawing. The left and right arcs of the tank are perfect semi-circles. If heating oil costs \$3.50 per gallon, how much would it cost Mr. Gerards to fill this tank? (There are 231 cubic inches in a gallon.)



Depth = 60."



$$+ \begin{array}{l} \text{top area} \\ [13.5 \times 27] \end{array}$$



$$\text{Area} = \pi r^2 =$$

$$\pi (13.5)^2 + (12 \cdot 27) = \text{top area}$$

$$572.5 \text{ in}^2 + 459 \text{ in}^2 = 1031.5 \text{ in}^2$$

$$1,031.5 \text{ in}^2 \times 60 \text{ in} = 61,893 \text{ in}^3$$

(Depth)

To see how many gallons

$$\frac{61,893 \text{ in}^3}{231 \text{ in}^2} = 268 \text{ gal.} \times \$3.50 = \$937.77$$

(Price to fill tank)

Scores and Commentary: Mr. Gerard's Oil Tank, Paper #A8

Making Sense of <u>the Task (MS)</u>	Representing and Solving <u>the Task (RS)</u>	Communicating and <u>Reasoning (CR)</u>	Accuracy (Acc)	Reflecting and <u>Evaluating (RS)</u>
4	4	4	4	1

MS 4: All necessary elements and steps are adequately developed and displayed but not enhanced.

RS 4: The strategy is effective. The diagrams and calculations leading to the solution are complete.

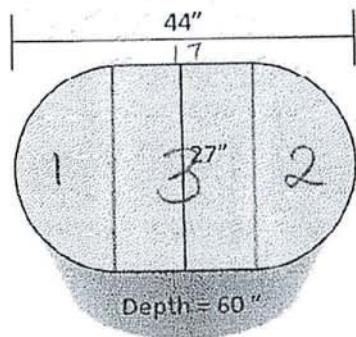
CR 4: Mathematical language and reasoning is clear and follows a logical process which leads to a clearly identifiable solution.

Acc 4: The solution is correct and mathematically justified and supported by the work.

RE 1: The reflection is not evident.

Mr. Gerard's Oil Tank

Mr. Gerards bought a house that contained an empty heating oil tank with the dimensions shown in the drawing. The left and right arcs of the tank are perfect semi-circles. If heating oil costs \$3.50 per gallon, how much would it cost Mr. Gerards to fill this tank? (There are 231 cubic inches in a gallon.)



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

$$V_{1+2} = 2 \times \left(\frac{\pi \times (13.5)^2 \cdot 60}{2} \right) = 10,935\pi \text{ in}^3 \approx 34,353.3 \text{ in}^3$$

$$V_3 = 27 \times 17 \times 60 = 27,540 \text{ in}^3$$

$$V_{\text{tank}} = 34,353.3 + 27,540 = 61,893.3 \text{ in}^3$$

$$\begin{aligned} 231 \text{ in}^3 &= 1 \text{ gallon} \\ 61,893.3 \text{ in}^3 &\approx 267.94 \text{ gallons.} \end{aligned}$$

$$\$ = 3.50 \times 267.94 = 937.79$$

It costs \$937.79 to fill that tank.

Scores and Commentary: Mr. Gerard's Oil Tank, Paper #A18

Making Sense of <u>the Task (MS)</u>	Representing and Solving <u>the Task (RS)</u>	Communicating and <u>Reasoning (CR)</u>	Accuracy <u>(Acc)</u>	Reflecting and <u>Evaluating (RS)</u>
5	4	5	4	1

MS 5: The interpretation of the task is thoroughly developed by numbering the sections of the tank and relating the calculation of the volumes to the sections. The detail provided in the calculations adds to the thoroughness.

RS 4: The strategy and representations used are effective and complete. All the necessary elements and calculations are evident.

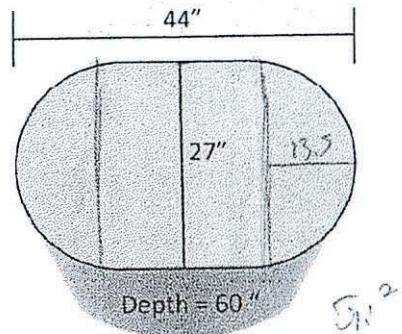
CR 5: The use of labeling the volumes related to the diagram helps the reader to move easily from one thought to another.

Acc 4: The solution is correct and mathematically justified and supported by the work. It does not include extensions, connections or generalizations.

RE 1: The reflection is not evident.

Mr. Gerard's Oil Tank

Mr. Gerards bought a house that contained an empty heating oil tank with the dimensions shown in the drawing. The left and right arcs of the tank are perfect semi-circles. If heating oil costs \$3.50 per gallon, how much would it cost Mr. Gerards to fill this tank? (There are 231 cubic inches in a gallon.)



$$\begin{array}{r} 572.55 \\ + 45.9 \\ \hline 618.55 \\ - 60 \\ \hline 558.55 \\ - 231 \\ \hline 327.435 \\ \times 3.50 \\ \hline 937.775 \end{array}$$

H.G1.5 A23
H.G2.2

Scores and Commentary: Mr. Gerard's Oil Tank, Paper #A23

Making Sense of <u>the Task (MS)</u>	Representing and Solving <u>the Task (RS)</u>	Communicating and <u>Reasoning (CR)</u>	Accuracy (Acc)	Reflecting and <u>Evaluating (RS)</u>
3	3	2	4	1

MS 3: The translation of the task is partially displayed. The results of the calculations are shown, but not how the results were achieved.

RS 3: The representations used are partially complete. If this student had recorded the formulas used and/or the calculations performed, this paper could have earned a 4.

CR 2: Use of mathematical language, reasoning, and communication is underdeveloped and minimal.

Acc 4: The solution is correct and supported by the work.

RE 1: The reflection is not evident.