

OALCF Tasks for the Apprenticeship Goal Path: Prepared for the Project, *Developing Best Practices for Increasing, Supporting and Retaining Apprentices in Northern Ontario (2014)*

OALCF Task Cover Sheet

Task Title: Calculate volumes of concrete required

Learner Name:	
Date Started:	Date Completed:
Successful Completion: Yes ___ No ___	
Goal Path: Employment <input checked="" type="checkbox"/> Apprenticeship <input checked="" type="checkbox"/> Secondary School ___ Post Secondary ___ Independence ___	
<p>Task Description: Carpenters calculate volumes of window sills, thrust blocks and columns to determine the amount of concrete required.</p> <p>*Tasks 1, 3, & 4 'C3' tasks are higher than Level 3 OALCF *Task 3 has been identified as authentic to this particular trade and may need some prior knowledge of the trade to complete</p>	
<p>Competency: A: Find and Use Information C: Understand and Use Numbers D: Use Digital Technology</p>	<p>Task Group(s): A2: Interpret documents C3: Use measures C4: Manage data</p>
<p>Level Indicators: A2.1: Interpret very simple documents to locate specific details C3.3: Use measures to make multi-step calculations; use specialized measuring tools C4.1: Make simple comparisons and calculations D2: Perform well-defined, multistep digital tasks</p>	
Performance Descriptors: see chart on last page	
<p>Materials Required:</p> <ul style="list-style-type: none"> • Pencil • Calculator • Concrete Building Objects diagram 	

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Carpenters calculate volumes of window sills, thrust blocks and columns to determine the amount of concrete required. They usually use calculators to ensure accuracy.

Learner Information and Tasks:

The carpenter calculates the volume (V) of concrete required for building objects. Use the Concrete Building Objects drawings provided for Tasks 1, 3 and 4.

For square or rectangular objects: $V = L \times W \times D$, where V = volume, L = length, W = width and D = depth.

For round objects: $V = \pi r^2 \times H$, where V = volume, $\pi = 3.14$, r = radius of circle* and H = height

* Radius is $\frac{1}{2}$ of the diameter (diameter = distance across the circle)

Review the Concrete Building Objects drawing.

Task 1: Calculate the volume (V) of concrete required for the Window Sill in cubic feet (ft³).

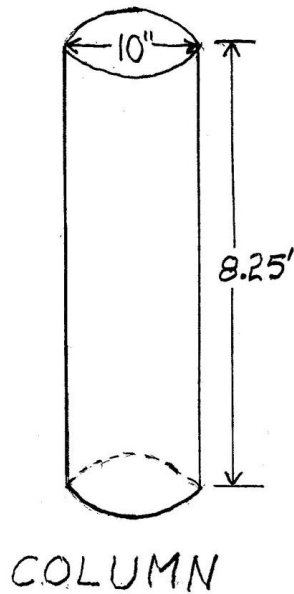
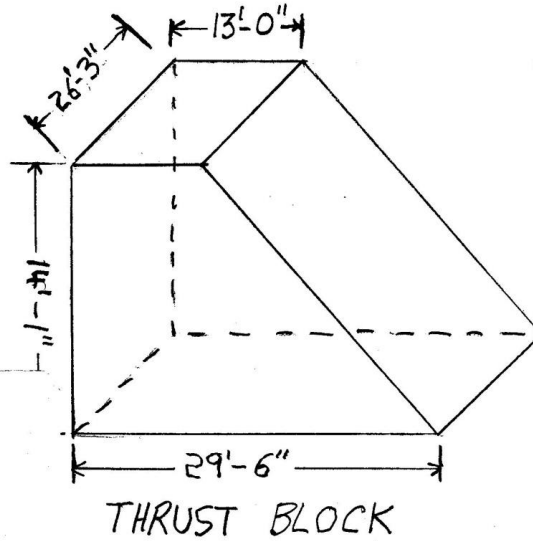
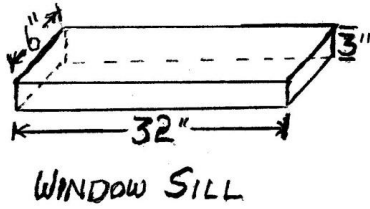
Task 2: A garage floor measures 12' 6" by 13.75'. The concrete pad will be 4" deep. The cement truck contains 1 cubic yard of concrete. Will you need to order more concrete to complete the garage floor? Concrete can be ordered by $\frac{1}{2}$ and full cubic yards.

Task 3: Calculate the volume of concrete required for the Thrust Block, in cubic yards (yd³). The Thrust Block is an odd shape. Consider it as a rectangle (13' x 14' 1" x 26' 3") plus half of another rectangle ((29' 6" - 13') x 14' 1" x 26' 3").

Task 4: Calculate the volume of concrete required for 8 Columns, in cubic yards (yd³); 1 ft³ = 0.037 yd³. (A2.1, C3.3, D2)

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Concrete Building Objects Diagram



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Answer Key

Task 1: $V = L \times W \times H$
 Convert measurements to feet
 $32'' = 32 / 12 = 2.67'$
 $6'' = .5'$
 $3'' = .25'$
 $V = 2.67'' \times .5'' \times .25''$
 $V = .334$ cubic feet (or $.334 \text{ ft}^3$)

Task 2: $V = L \times W \times H$
 Convert measures to feet.
 $12' 6'' = 12.5'$
 $4'' = .33'$
 $V = 13.75 \times 12.5 \times .33$
 $V = 56.2 \text{ ft}^3$
 $1 \text{ yd}^3 = 27 \text{ ft}^3$
 $56.2 / 27 \text{ ft}^3 = 2.08 \text{ yd}^3$

Yes, you will need to order more concrete.

Task 3: This is one method of solving the problem. The Thrust Block will be viewed as two geometric figures: a rectangle and a triangle (1/2 a rectangle).

$$V = L \times W \times H \text{ (Rectangle)}$$

$$V = 13' \times 26' 3'' \times 14' 1''$$

$$V = 13' \times 26.25' \times 14.08'$$

$$V = 4804.8 \text{ ft}^3$$

$$V = (L \times W \times H) / 2$$

$$L = 29.5' - 13'$$

$$L = 16.5'$$

$$V = (16.5' \times 26.25' \times 14.08') / 2$$

$$V = (6156.48 \text{ ft}^3) / 2$$

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$$V = 3078.24 \text{ ft}^3$$

The volume of the Thrust Block is $4804.8 + 3078.24 = 7883.04 \text{ ft}^3$

Convert 7883.04 ft^3 to yd^3

$$7883.04 / 27 \text{ ft}^3 = 291.964 \text{ yd}^3$$

The volume of the Thrust Block is 291.964 yd^3 .

Task 4:

$$V = \pi r^2 \times H$$

$$V = 3.14 \times 5''^2 \times 8.25'$$

Convert $5''$ to a fraction of a foot

$$5/12 = .417$$

$$V = 3.14 \times .417\text{ft}^2 \times 8.25'$$

$$V = 1.309 \text{ ft}^2 \times 8.25'$$

$$V = 8.572 \text{ ft}^3$$

To convert ft^3 to yd^3 :

$$1 \text{ ft}^3 = 0.037 \text{ yd}^3$$

$$V = 8.572 \times 0.037$$

$$V = 0.317 \text{ yd}^3 \text{ (for one Column)}$$

Total concrete required for 8 Columns is $8 \times 0.317 \text{ yd}^3$ or **2.537 yd^3** .

(Note: some rounding has been done so the answer provided is approximate.)

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Performance Descriptors		Needs Work	Completes task with support from practitioner	Completes task independently
A2.1	<ul style="list-style-type: none"> Scans to locate specific details 			
	<ul style="list-style-type: none"> Interprets brief text and common symbols 			
C3.3	<ul style="list-style-type: none"> Calculates using numbers expressed as whole numbers, fractions, decimals, percentages and integers 			
	<ul style="list-style-type: none"> Calculates the radius, diameter and circumference of circles 			
	<ul style="list-style-type: none"> Understands and uses properties of angles and triangles to solve problems 			
	<ul style="list-style-type: none"> Understands and uses formulas for finding the perimeter, area and volume of non-rectangular, composite shapes 			
	<ul style="list-style-type: none"> Chooses and performs required operations; makes inferences to identify required operations 			
	<ul style="list-style-type: none"> Selects appropriate steps to solutions from among options 			
	<ul style="list-style-type: none"> Interprets, represents and converts measures using whole numbers, decimals, percentages, ratios and fractions 			
	<ul style="list-style-type: none"> Uses strategies to check accuracy (e.g. estimating, using a calculator, repeating a calculation, using the reverse operation) 			
C4.1	<ul style="list-style-type: none"> adds, subtracts, multiplies and divides whole numbers and decimals 			
	<ul style="list-style-type: none"> identifies and compares quantities of items 			
	<ul style="list-style-type: none"> identifies and performs required operation 			
	<ul style="list-style-type: none"> interprets and represents values using whole numbers, decimals, percentages and simple, common fractions (e.g. $\frac{1}{2}$, $\frac{1}{4}$) 			
	<ul style="list-style-type: none"> follows apparent steps to reach solutions 			

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D2	<ul style="list-style-type: none"> selects and follows appropriate steps to complete tasks 			
	<ul style="list-style-type: none"> locates and recognizes functions and commands 			

This task: was successfully completed____ needs to be tried again____

Learner Comments

Instructor (print)

Learner Signature