Literacy Northwest
Regional Literacy & Basic Skills Network

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 Angles

Learner Name:	
Date Started:	**Date Completed:**
Successful Completion: Yes___ No___	
Goal Path: Employment ✓ Apprenticeship ✓ Secondary School___ Post Secondary ___ Independence___	
Task Description: Carpenters calculate angles to construct trusses and stairs	
Competency: A: Find and Use Information C: Understand and Use Numbers D: Use Digital technology	**Task Group(s):** A2: Interpret documents C1: Manage money C3: Use measures

Level Indicators:

A1.2: Read texts to locate and connect ideas and information
A2.1: Interpret very simple documents to locate specific details
A2.2: Interpret simple documents to locate and connect information
C1.2: Make low-level inferences to calculate costs and expenses that may include rates such as taxes and discounts
C3.3: Use measures to make multi-step calculations; use specialized measuring tools
D.2: Perform well-defined, multi-step digital tasks

Performance Descriptors: see chart on last page

Materials Required:

- Pencil
- Calculator
- ANGLES DRAWINGS document

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

Task Title: Calculate Angles

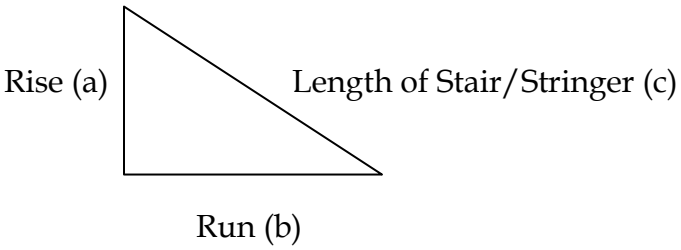
Carpenters use calculators and formulas to calculate angles to meet safety regulations and to determine amounts of material required.

Learner Information and Tasks:

Review the ANGLES DRAWINGS document.

All measurement answers are to be in feet or decimals of feet.

Carpenters use the $a^2 + b^2 = c^2$ formula to calculate lengths of stairs and stringers (c) where a = height or rise and b = length or run.



Task 1: Look at the diagram labelled 'LADDER' from the ANGLE DRAWINGS document. Calculate the range of allowable distance between the wall and the bottom of the ladder when the ladder is not securely fastened, according to the LADDERS Section of the Ontario Health and Safety Act.

Task 2: Look at the diagram labelled 'TRUSS' from the ANGLE DRAWINGS document.

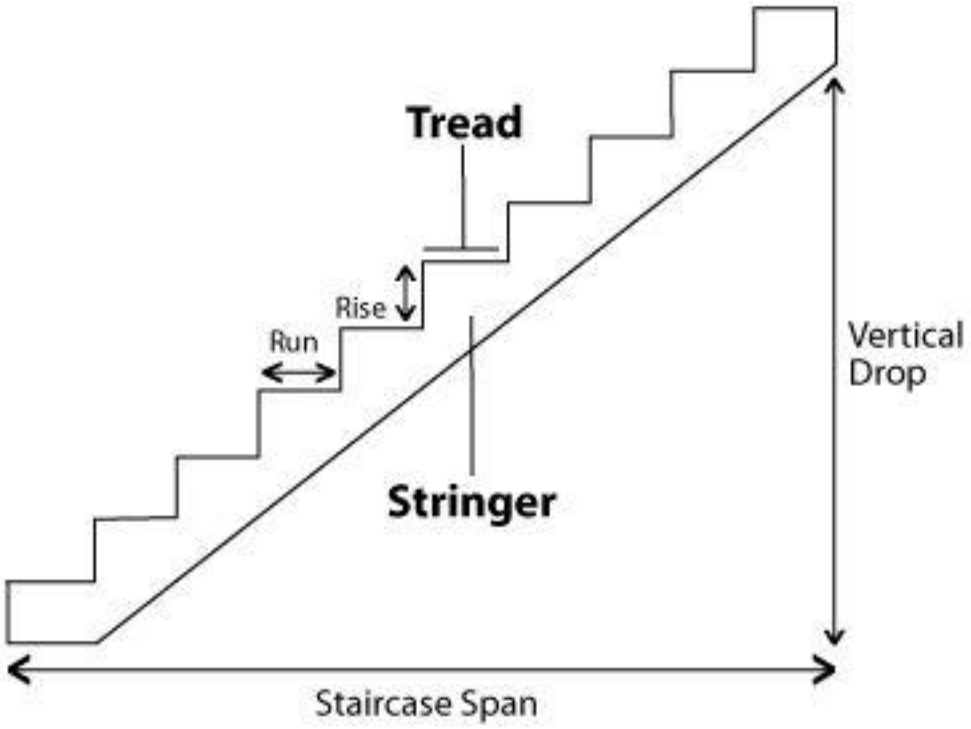
a) Calculate the length of the remaining sides of the truss.

b) If 2X4 lumber is 36¢/linear foot, plus HST, how much will the lumber cost for the truss?

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

Task 3: A staircase is to be built from the second floor of the house to the patio. The staircase will join the second floor deck twelve feet above the ground and rest on the patio nine feet from the house.

How long will each stringer be?



Occupational Health and Safety Act

ONTARIO REGULATION 67/93

HEALTH CARE AND RESIDENTIAL FACILITIES

83. When a ladder is being used it shall,

(a) be placed on a firm footing and secured against slipping;

(b) if the ladder is between six and nine metres in length, be securely fastened or be held in place by one or more workers while being used;

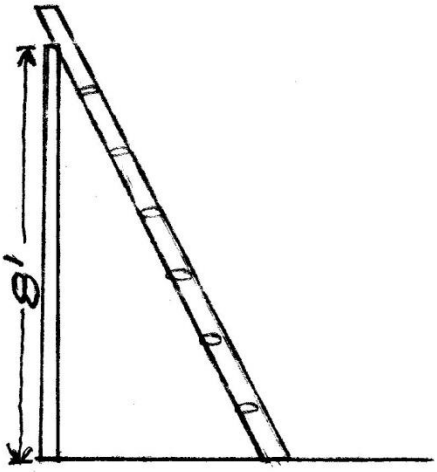
(c) if the ladder exceeds nine metres in length, be securely fastened or stabilized to prevent it from tipping or falling;

(d) when not securely fastened, be inclined so that the horizontal distance from the top support to the foot of the ladder is not less than one-quarter and not more than one-third of the length of the ladder; and

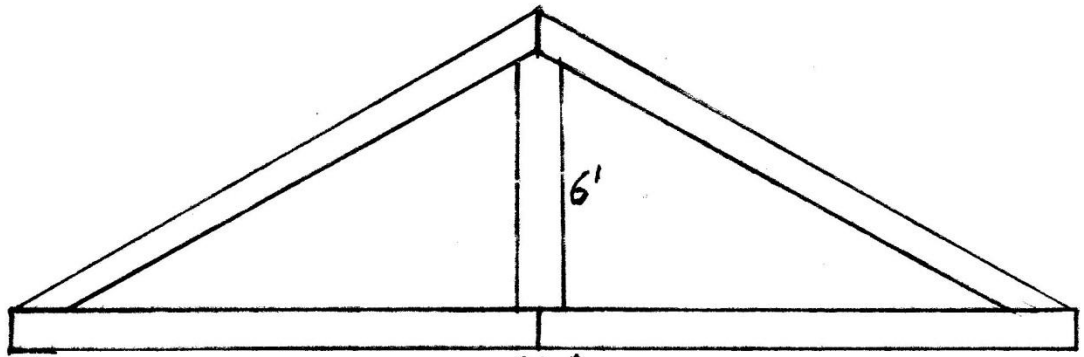
(e) if the ladder is likely to be endangered by traffic, have a worker stationed at its foot to direct such traffic or have barriers or warning signs placed at its foot. O. Reg. 67/93, s. 83.

Internet, November 17, 2013.

ANGLE DRAWINGS



LADDER



TRUSS

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

Task Title: Calculate Angles

Answer Key

Task 1: The carpenter scans the Section of the Act presented; locates the reference to a ladder "not securely fastened". The carpenter scans the 'Ladder' diagram on the Angle Drawings document to determine the height of the ladder (from the ground to its resting place).

The distance of the foot of the ladder from the wall must be at least ¼ of the height but not more than 1/3 of the height.

Height = 8'

Distance = ¼ x 8' = 2' (minimum)

Distance = 1/3 x 8' = 2.7'

The distance between the wall and the bottom of the ladder must be **at least 2' but not more than 2.7'**.

Task 2: a) $a^2 + b^2 = c^2$, where a = 6' and b = 24/2 = 12'

$6^2 + 12^2 = c^2$

$36 + 144 = c^2$

$180 = c^2$

13.42' = c

The truss will require one length of a (**6'**), two lengths of b (2 x 12' = **24'**) and two lengths of c (2 x 13.42' = **26.84'**).

c) Total amount of lumber = 6' + 24' + 26.84'

Total amount of lumber = 56.84'

Total cost of lumber = 56.84' x 36¢ + HST

Total cost of lumber = $20.46 + ($20.46 x .13)

Total cost of lumber = 20.46 x $2.66

Total cost of lumber = **$23.12**

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

Task 3: $a^2 + b^2 = c^2$ where a = height and b = length

$12^2 + 9^2 = c^2$

$144 + 81 = c^2$

$225 = c^2$

$15 = c$

Each stringer will be 15' long.

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

Task Title: Calculate Angles

Performance Descriptors		Needs Work	Completes task with support from practitioner	Completes task independently
A1.2	• scans text to locate information			
	• locates multiple pieces of information in simple texts			
	• makes low-level inferences			
	• reads more complex texts to locate a single piece of information			
A2.1	• scans to locate specific details			
	• interprets brief text and common symbols			
	• locates specific details in simple documents, such as labels and signs			
A2.2	• performs limited searches using one or two search criteria			
	• locates information in simple graphs and maps			
	• makes low-level inferences			
C1.2	• calculates using numbers expressed as whole numbers, fractions, decimals, percentages and integers			
	• calculates percentages			
	• interprets and applies rates (e.g. $/kg, $/1)			
	• chooses and performs required operation(s); may make inferences to identify required operation(s)			
	• selects appropriate steps to reach solutions			
	• represents costs and rates using monetary symbols, decimals and percentages			

	• interprets, represents and converts amounts using whole numbers, decimals, percentages, ratios and simple, common fractions (e.g. ½, ¼)			
C3.3	• calculates using numbers expressed as whole numbers, fractions, decimals, percentages and integers			
	• understands and uses properties of angles and triangles to solve problems			
	• understands and uses formulas for finding the perimeter, area and volume of non-rectangular, composite shapes			
	• chooses and performs required operations; makes inferences to identify required operations			
	• selects appropriate steps to solutions from among options			
	• interprets, represents and converts measures using whole numbers, decimals, percentages, ratios and fractions			
D2	• selects and follows appropriate steps to complete tasks			
	• locates and recognizes functions and commands			

This task: was successfully completed___ needs to be tried again___

Learner Comments

_____ _____

Instructor (print) **Learner Signature**