Trades Math - Introduction

Math seems to be one of those subjects that people either really like or really don't like. Many of us learned math once upon a time, but we might not have used these skills in quite some time. Some of us grew up learning and using the metric system – centimetres, metres, kilometres, litres, millilitres, etc. Others used the imperial system of measurement – with inches, feet, yards, miles, pounds, ounces, etc. Few of us learned both, yet it's important to know how to convert from one to the other.

Math is important to apprenticeship training though, and horticulture is no exception. In this module of the toolkit, we focus on some of the types of math you will need to be good at to work as a horticulture technician:

- Metric measurement
- Imperial measurement
- Converting from one measurement system to another
- Basic fractions
- Decimals
- Percentages
- Measurement and geometry
- Ratio and proportion

If you think some of your skills in the above areas haven't been used in some time, we invite you to explore some of the activities and resources in this module.

Just like with foundational skills, if you find you are struggling with math, contact a free local upgrading program to get extra help.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Check Your Skills

First, let's check your understanding of math. We'll then come back and see how you feel at the end of the module. Read each of the statements below and select the response that best describes you today.

Statements	I can do this	I would like to do this better	I can't do this
I understand the imperial measurement system (inches, feet, etc.) and how to convert from one to the other			
I understand the metric measurement system (centimetres, metres, etc.) and how to convert from one to the other			
I understand how to convert imperial to metric (inches to metres) and vice versa			
I know how to do basic fractions			
I know how to work with decimals			
I know how to work with percentages			
I know how to use a measuring tape			
I know how to measure objects			
I know the difference between perimeter, area, and volume and when to use each			
I know how to use schedules and timesheets			
I know how to reduce my anxiety around math			

HORTICULTURAL TRADES ASSOCIATION landscape ontario.com Green for Life! | APPRENTICESHIP Horticultural Technician Landscape Horticulturist

Canada

EMPLOYMENT ONTARIO

Ontario

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Unit

A unit is a number of things grouped together and counted as a whole. Counting in units is something we do every day.

When you know the number in a certain unit, you can add these units together or you can multiply them.

Your supervisor asks you to get 18 marigolds. The marigold trays contain ten flowers each. How many units (trays) will you need? You may have some left over.

Answer = two trays will be enough (2 X 10 = 20 marigolds) and you will have two left over (20-18=2)

Larger Numbers

When you are working with larger units, it helps to figure out how many items are in each unit. Look at the example below.

Tray 1

Tray 2

Both units or trays have the same number of holes for plants. How many plants can be in tray 1 and 2? There are several ways to calculate the answer for this question. You could count each hole in each tray. You could count each hole in one tray and double your answer for the total. Both ways would be correct, but these methods would take a little time.

HORTICULTURAL TRADES ASSOCIATION landscape ontario.com Green for Life! | APPRENTICESHIP Horticultural Technician Landscape Horticulturist

Canada

EMPLOYMENT ONTARIO

Ontario

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

When working with larger numbers, it is faster if you:

- Count the number of items (holes) in one row
- Count the number of rows
- Multiply these numbers together

Solution:

- There are 10 holes in each row
- There are 5 rows in each tray
- There are 2 trays

10 holes × 5 rows × 2 trays = 100 plants ***OR***
10 holes × 5 rows = 50 holes in one tray + 50 holes in the second tray = 100 holes

Rounding Up

It is important to know the maximum number of items in each unit. For example, each tray of petunias has 6 plants (a plant may have more than one flower). Your supervisor has asked you to plant 20 petunias in the small circular bed. How many trays will you need? Since each tray contains 6 plants, you will need to bring 4 trays (6 X 4=24 plants). If you round the number of plants up to the maximum in each tray, you will have enough plants to plant (20) with 4 to spare.

Always make sure you have enough plants. A second trip to the storage shed will cost your employer time and money. Four trays of 6 plants will allow for damage and poor-quality plants. Always round up your number to the maximum number of plants in a tray.

Estimating

You may also need to estimate the number of items you will need to complete a task. When you estimate, you make a rough or approximate calculation. Learning how to quickly estimate the number of plants you will need to complete a planting task is a good skill to develop. Some plant trays may only have six sections while others may have hundreds of sections.

As a new hire, you will not be asked to do a lot of estimating. Estimating comes from experience. When you perform a job task several times, you will begin to get a "feel" for how long something will take to do and how much material you will need to do it. Your supervisor may ask you to bring 250 petunias to a planting site. You will have to work out how many trays you should bring.

When you know the total number of plants equals 250, and the number of plants in each tray equals 24, divide the numbers to find your answer.

Example: 250 ÷ 24 = 10 trays (and 10 extra plants)

Another important reason for estimating is when measuring. For example, place a ruler on the table. Make a fist and put your knuckles on the table along the ruler. Stretch out your thumb and pinky finger along the ruler. What is the distance? Mine is about 8". The information card for the Begonia says to space 12" between each plant. Rather than using the tape measure, I would use my outstretched fist 1 and ½ times to space the Begonias.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Here is a learning activity to help you practice the information you just learned.

Learning Activity – units

1. How many plants/holes are there in the following trays?

=_____

(One tray) =_____

(Both trays) =_____

2. Explain how you reached your answers in question 1. For example, did you add the items one at a time?

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Plant Trays

As you have seen, plant trays come in a wide range of sizes from 6 to 600 cells/spaces per tray. When the numbers are **smaller**, you can count the plants in units. For example, if there are 10 plants in a tray and you need 35 plants:

Count the plants as units of 10s. 10, 20, 30 and 5 more makes 35. So, you will need four trays.
For **larger** numbers, you can group the units in order to make calculations easier. For example, if there are 25 plants in a tray:

Count out four trays - 25, 50, 75, 100. Double it and you get 200.

That's 4 trays of 25 for 100.

That's 8 trays of 25 for 200.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Learning Activity – Planting Table

Fill in the following **Planting Table** by looking at the Hanging Basket Planting Plan (this plan is on the page following the Planting Table). Your job is to plant 30 hanging baskets. Remember, you may have plants left over.

1. Find out how many of each plant you will need for each basket. Fill in the **Number per basket** column in the Planting Table.

2. Work out how many plants you will need to fill 30 baskets. Fill in the **Number per 30 baskets** column in the Planting Table.

3. Each type of plant comes in a different size tray. Look at the table below the hanging basket plan to work out how many whole trays of each plant you will have to pick up. Fill in the **Number of trays** column in the Planting Table.

Planting Table

Plant name	Number per basket	Number per 30 baskets	Number of trays
Bidens aura - 'Sunshine'			
Nepeta - 'Glechoma variegated'			
Geranium - 'Maverick Star'			
Indian mint			
Fuschia - 'La Campanella'			
Petunia - 'Peppermint'			
Begonia - 'Illumination'			
Bacopa - 'Snowflake'			
Geranium - 'Summer Showers'			

HORTICULTURAL TRADES ASSOCIATION landscape ontario.com Green for Life! | APPRENTICESHIP Horticultural Technician Landscape Horticulturist

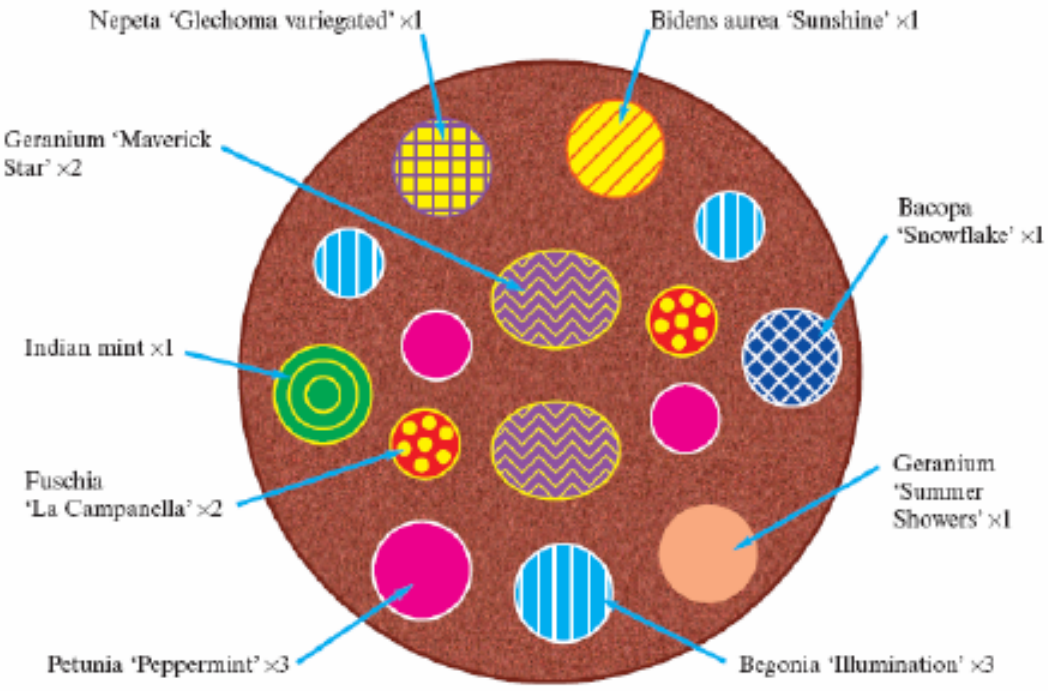
Canada

EMPLOYMENT ONTARIO

Ontario

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Hanging Basket Planting Plan

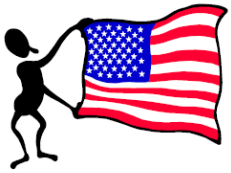


Code	Plant name	Number of plants per basket	Number of plants per tray
	Nepeta 'Glechoma' variegated	1	35 (7 × 5)
	Geranium 'Maverick Star'	2	8 (2 × 4)
	Indian mint	1	42 (6 × 7)
	Fuschia 'La Campanella'	2	6 (2 × 3)
	Petunia 'Peppermint'	3	40 (8 × 5)
	Begonia 'Illumination'	3	63 (7 × 9)
	Bidens aurea 'Sunshine'	1	24 (6 × 4)
	Bacopa 'Snowflake'	1	9 (3 × 3)
	Geranium 'Summer Showers'	1	4 (2 × 2)

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Imperial or Metric?

There are two different systems of weights and measures: imperial (inches) and metric (centimetres).



Americans use **the imperial system**. They measure in inches and feet.

Canadians use **the metric system**. We measure in centimetres and metres. Canada used to use the imperial system. We changed to the metric system in the 1970s.

For whatever reason, a lot of construction and landscape work in Canada is still done using the imperial system. Wood is sold by the foot. Screws are measured in inches. Soil is sold by the yard. Area is calculated by the square foot. Bricks, pavers, gravel, and stone are still sold by the load, measured by weight, most often in tons or pounds. Imperial measurement is still widely used. For this reason, this unit will focus on imperial measurements.

Inches and Feet

The imperial system is based on inches, feet, yards, and miles. The two symbols used in imperial measurement are the ' (apostrophe) and the " (quotation mark).

5' ¾" means five feet and three-quarter inches. 5 ¾" means 5 and ¾ inches.

Sometimes measurements are only written in inches. 5' ¾" can be written as:

60 ¾" or **60- and three-quarter inches**.

To find the total number of inches, we multiply the number of feet by 12, because there are 12 inches in a foot.

1' = 12" (1 × 12 = 12)

2' = 24" (2 × 12 = 24)

3' = 36" (3 × 12 = 36)

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Fractions and Decimals

Landscape Construction

Fractions are used quite a bit in landscape construction. Often the measurements are not whole numbers (2 inches, 3 inches, etc.). A landscaper might measure a piece of wood that is 3 3/8" long. They need to know how to work with this number.

Example:

You have two pieces of wood.

One measures 4 3/4" long and the other is 3 3/8" long.

If the landscaper wants you to find the total measurement of the two pieces of wood, they need to be able to add them together. Some tape measures come with fractions written on the tape but knowing how to add and subtract fractions is a useful skill on any construction project.

Adding Fractions

Look at the fraction below:

1/2

The top number (1) is called the **numerator**. The bottom number (2) is called the **denominator**. This is true whether the fraction is written with a horizontal line ($\frac{1}{2}$) or with a slanted line (½).

It is fairly easy to add two fractions that have the **same denominator**. For example,

What is $\frac{1}{4} + \frac{2}{4}$?

If you got $\frac{3}{4}$, you are correct. To add two fractions with the same denominator, just add the two numerators together (1+2). So, $\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$

However, the denominators are not always the same so let's go back to our previous example (measuring two pieces of wood), where the boards measured $4\frac{3}{4}$" and $3\frac{3}{8}$".

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Notice that the two denominators are **not** the same. If your boss asked you to add the two measurements together, you would have to do the following:

1. First, let's put the whole numbers aside for the moment (4 and 3) and just consider the fractions.

$$\frac{3}{4} + \frac{3}{8} =$$

We can't simply add the two numerators together (3+3), because this time the denominators are different. The two divided lines below will help us to visualize this problem.

A)

B)

Line A represents $\frac{3}{4}$. Line B represents $\frac{3}{8}$. Do you notice anything?

From the above, you can see that $\frac{3}{4}$ is the same length as $\frac{6}{8}$. We can add $\frac{6}{8} + \frac{3}{8}$ because they both have the same denominator. But how do we get this by looking at the numbers alone? What do the numbers 4 and 8 have in common?

Answer: 4 × 2 = 8. Since you can get 8 by multiplying 4 by 2, you can add these fractions by converting them from fourths to eighths.

2. To do this, we multiply the numerator and denominator by 2. This will allow the two fractions to be added because they have the **same** denominator. (Since $\frac{2}{2} = 1$, we are not changing the value of $\frac{3}{4}$).

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

$\frac{3}{4} \times \frac{2}{2} = \frac{6}{8}$

3. Therefore, the first board measures $4\frac{6}{8}$" and the other board measures $3\frac{3}{8}$".

4. To add the measurements of the two boards, add the whole numbers first.

$$\mathbf{4}\frac{6}{8} + \mathbf{3}\frac{3}{8}$$

$$4 + 3 = 7$$

5. Next, add the numerators. (**Do not add the denominators**)

$$\frac{6}{8} + \frac{3}{8} = \frac{9}{8}$$

6. The two boards measure $7\frac{9}{8}$" in total.

7. How many 8ths are in a whole inch? If you look at the divided line B), you can see that if the whole line were shaded in, you would have $\frac{8}{8}$". Whenever the numerator is larger than the denominator, you need to reduce the fraction to a whole number plus a fraction (or a **mixed number**). In order to do this, divide the numerator by the denominator.

In this case, if you divide 9 by 8, you get 1 and some left over. The leftover, in this case, is 1. This leftover is the new **numerator** and is put over the denominator.

$$\frac{9}{8} = \mathbf{1}\frac{1}{8}$$

Answer: The two boards measure (7"+ 1") + $\frac{1}{8}$" = $8\frac{1}{8}$"

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Subtracting Fractions

Subtracting fractions follows the same rules as adding fractions. Let's look at our two boards again. One board measures $4\frac{3}{4}$" and the other is $3\frac{3}{8}$"

Your boss wants both boards to be cut to a length of $3\frac{3}{8}$"

How much must you cut from the longer board? Follow the same steps that you used to add the fractions together, but now subtract the fractions.

$\frac{3}{4} - \frac{3}{8} =$

1. Once again, the fractions must have the same **denominato**r. Look at the two denominators (4 and 8). Do they have something in common?

In this case, 4 × 2 = 8.

2. Multiply the numerator and denominator in the fraction $\frac{3}{4}$ by 2. This will allow the two fractions to be subtracted because they will then have the **same** denominator.

$$\frac{3}{4} \times \frac{2}{2} = 6/8$$

3. Therefore, the longer board measures $4\frac{6}{8}$ and the other board measures $3\frac{3}{8}$.

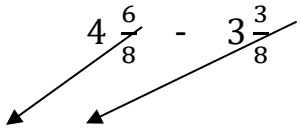
4. Subtract the measurements of the two boards. Subtract the whole numbers **first**.

$$4\frac{6}{8} - 3\frac{3}{8}$$

4 – 3 = _____**1**_____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

5. Next, **subtract** the numerators. (**Do not subtract the denominators. The denominators will stay the same**)



6 – 3 = _____3_____

So $\frac{6}{8}$ **-** $\frac{3}{8}$ **=** $\frac{3}{8}$

So, if your boss wants both boards to be equal, you will need to cut ⅜" off the longer board.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Converting Fractions and Decimals

Sometimes you will have to convert (or change) decimals to fractions or fractions to decimals. Some common conversions that are used in construction are found in the following table. These measures are used often, and you should memorize them.

Common Conversion Table	
Fraction	**Decimal**
1/16	**.0625**
1/8	**.125**
1/4	**.25**
1/2	**.5**

Suppose you were asked to convert $\frac{3}{8}$" to a decimal. You know $\frac{1}{8}$ is the same as 0.125.

To convert $\frac{3}{8}$, you multiply .125 by 3.

.125 × 3 = .375

$\frac{3}{8}$" is the same as .375"

On the next page you will find a learning activity to help you practice the information you just learned.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Learning Activity – Fractions

1. Add the following measurements.

   a) $3\frac{1}{2} + 6\frac{1}{2} =$

   b) $2\frac{3}{4} + 7\frac{1}{8} =$

   c) $4\frac{3}{8} + 1\frac{5}{16} =$

   d) $2\frac{3}{4} + 5\frac{9}{16} =$

2. Subtract the following measurements.

   a) $4\frac{2}{3} - 2\frac{1}{3} =$

   b) $7\frac{2}{4} - 5\frac{3}{8} =$

   c) $9\frac{1}{4} - 7\frac{2}{16} =$

   d) $4\frac{3}{12} - 2\frac{2}{8} =$

3. Using the conversion table from earlier in this unit, convert the following.

   a) $\frac{11}{16}$ to a decimal

   _____

   b) $\frac{7}{8}$ to a decimal

   _____

   c) $\frac{3}{8}$ to a decimal

   _____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

4. Suppose you had two boards measuring $7\frac{5}{8}$" and 3.25". What is the total measurement of the two boards?

   a) As a fraction _____

   b) As a decimal _____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

How to Read a Measuring Tape

The Inch

Inches are clearly marked on a measuring tape. They are shown as whole numbers (1, 2, 3, 4, etc.). They are marked on a tape as the longest lines. In the example below, the 5 and 6 inch marks are labelled.

Half an Inch – 1/2"

The second longest line is the 1/2 (one-half) inch mark. It is one half of the way between two whole numbers. One-half of the way between 1 inch and 2 inches is 1 and 1/2 inches (one and one-half inches or 1 1/2").

Fourths of an Inch – 1/4"

Within an inch, there are two lines that are fourths, or quarters. There are only two of these: 1/4 and 3/4. The 1/4 falls between the whole number and the 1/2-inch mark. The 3/4 falls between the 1/2 and the whole number.

Eighths of an Inch – 1/8"

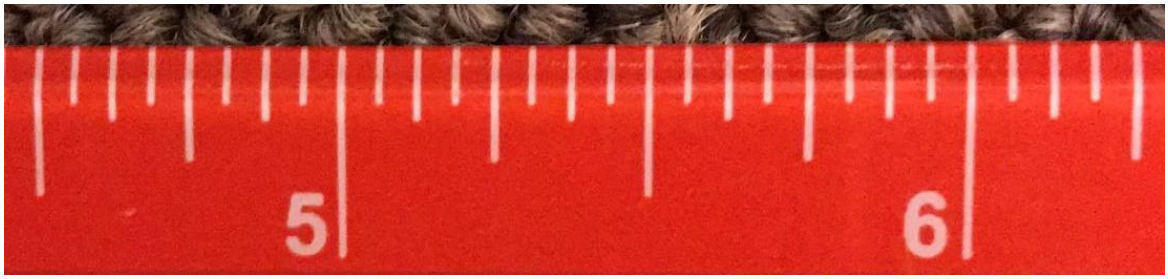
Look at the tape measure again. The lines that are a little shorter than 1/4 are called 8ths. There are four of these: 1/8, 3/8, 5/8, and 7/8.

Sixteenths of an Inch – 1/16"

The shortest lines are called 16ths.They are shorter than the 1/8 of an inch measure. There are eight of these: 1/16, 3/16, 5/16, 7/16, 9/16, 11/16, 13/16 and 15/16.

Note on 32nds of an Inch

Some tape measures even have 32nds of an inch. If present, these lines would then be the very smallest.



This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Learning Activity – Tape Measure

1. Use your tape measure to measure the lines below. Mark your answer on each line.

_____

_____

_____

_____

_____

What Else is on a Tape Measure?

Every foot and every 16" increment is marked on a tape measure. The kind of marking varies from tape measure to tape measure. It may be a coloured box, triangle, or coloured number. Why? The markings are there because construction workers use these marks when they are spacing studs in a wall or when they are putting in floor or roof joists. For walls that are load bearing, studs and joists are placed every 16 inches. For walls that are not load-bearing, they are placed every 24". Having every 16" and 24" clearly marked on a tape measure helps builders to measure correctly and faster.

Still Having Problems Reading a Tape Measure?

If you find that you are having problems reading a tape measure, look for one that clearly marks the fractions of an inch. They aren't as common, but they are available. Learning the names of these markings comes with time and practice. Use your tape measure every day. Carry it with you. Measure random items for practice.

HORTICULTURAL TRADES ASSOCIATION landscape ontario.com Green for Life! | APPRENTICESHIP Horticultural Technician Landscape Horticulturist
Canada
EMPLOYMENT ONTARIO
Ontario

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Learning Activity – Measuring Items

1. With your tape measure, measure five items or spaces that you would find inside a room. Write the items and the measurements in the spaces below.

   a) _____

   b) _____

   c) _____

   d) _____

   e) _____

2. Go outside and measure five items or spaces with your tape measure. Write the items and the measurements in the spaces below.

   a) _____

   b) _____

   c) _____

   d) _____

   e) _____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Fractions of an Inch

One (whole) inch (1"): On most tape measures, each inch is divided into 16 parts. One whole inch, written as a fraction, is 16/16. The divided line below represents one inch (1") divided into 16ths.

One half inch (½"): One half of an inch is 8/16". When we talk about fractions, we talk in **lowest terms**. So, 8/16" can be reduced to 1/2". When you look at the diagram below, you can see that 8/16 is one half of the line, or one half inch. In lowest terms, 8/16" is the same as 1/2".

One quarter inch (¼"): One quarter inch (1 /4"), or one fourth inch, is represented by the shaded squares below. You can see that one fourth is the same as 4/16. When you reduce 4/16 to lowest terms, it is 1/4.

One eighth inch (1/8"): One eighth of an inch is also two sixteenths of an inch, or 2/16", as you can see by the shaded squares below. When you reduce 2/16 to lowest terms, it is 1/8.

One sixteenth inch (1/16"): Look at the line below. One out of a possible 16 squares is shaded. 1/16" is the smallest fraction of an inch on most tape measures.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Learning Activity – Converting Measures

Get out your tape measure or multiply by 12. Use a calculator if you would like. Convert the following measurements to inches.

1. 5' ¾" = 60 ¾"
2. 10' ¾" = _____
3. 3' 5/8" = _____
4. 5' 7/8" = _____
5. 8' 2 ¼" = _____
6. 1' 5 1/8" = _____
7. 4' 5/8" = _____
8. 2' 1/16" = _____
9. 6' 9/16" = _____
10. 4' 4 1/8" = _____
11. 7' ½" = _____
12. 6' 7/16" = _____
13. 8' 6 5/16" = _____
14. 8' 7/8" = _____
15. 7' 7/8" = _____
16. 2' ¾" = _____

Learning Activity – Funbrain Online

A great website: Measure It! @ FunBrain www.funbrain.com/measure/

Start with Easy Inches. When you feel comfortable, move on to Medium, and finally Hard. This site also allows you to practice metric measurements.

More on Measurement

Visual Aids

Comparisons

Most of the math you will need to work as a horticultural technician will be "done in your head" or told to you by your supervisor. Because of the seasonal nature of the business, work must be completed as quickly as possible. Your supervisor will generally mark off sections of ground that are to be worked with spray paint or use chalk lines to guide you in hardscape construction projects.

To save time and money, most employers in this field will give you measurement directions by using visual aids. There often is no time or need for precise calculations. For example, an employer wants you to dig a trench for a retaining wall. A retaining wall needs a deep foundation. They want the trench to be 6 inches (15 cm) deep. To measure 6 inches, as you're digging, would take a lot of time. Instead, using a visual comparison, such as half a spade head or a full spade head, will speed things up. Measurements are often given in this way by experienced landscapers.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Visual aids are usually used for most planting tasks. Let's say you're planting bamboo. Your supervisor may say, "Dig a hole as large as the container and twice as wide."

Spacing plants is often done by hand references such as the distance between your thumb and your baby finger or the width of three fingers together, etc. Planting depths can be given by finger references, for example, "plant up to your second knuckle". These references are used to save time.

Three Common Measures

Square

It is helpful to have a visual reference for some of the common measures that are frequently used in landscaping.

A common measurement used in landscaping is the square foot. A square foot is about the size of most floor tiles.

1 square foot = 1 foot × 1 foot

Area can be defined as the amount of surface of something flat. The formula for area is:

Area = Length × Width, or

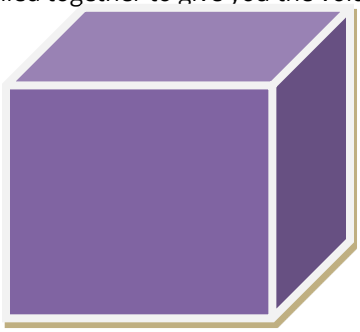
A = L × W

Area is often measured in square feet.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Cubic Measures

Unlike area, which is a **two**-dimensional surface measure (A = L x W), cubic measures tell us the amount in **three**-dimensional spaces. Cubic measures are made up of Length, Width and Height. These distances are multiplied together to give you the volume.



You know you are working with volume when you see the measurement unit has the following notation: 5 yards3 or 5 cubic yards.

What does a cubic yard look like? 27 cubic feet equals 1 cubic yard. A cubic yard of soil weighs 2,700 pounds. Does that help you visualize it?

On the next page you will find a learning activity to help you practice the information you just learned.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Learning Activity – Measurement Fun

1. Using a tape measure, measure the following items.

   a) Your thumb. _____

   b) Your middle finger. _____

   c) The length of your hand from your wrist to the end of your middle finger.

   _____

   d) The width of your three middle fingers together. _____

   e) The length of your foot. _____

2. At home, measure the following items.

   a) A floor tile. _____

   b) The inside rectangular part of your refrigerator. _____

   c) A die (one cube from a pair of dice). _____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Area

Area is the amount of surface of something flat. For example, you would calculate the area of a property to find the amount of sod needed to cover it.

To calculate area, use the formula Area = Length × Width.
This can be written as:

A = LW or A = L × W

The formula tells you to multiply the length by the width. When there are two letters right beside each other, like LW, you also multiply them.

Area is always measured in **square units** like square feet (ft2) or square metres (m2).

When you have to calculate an area, the first step is to write down the formula. After that, you write it again, filling in the blanks with your actual measurements. See the following example.

You're asked to find the area of a yard that is 9 feet long and 5 feet wide.

A = LW

A = 9 × 5

A = 45 feet2

So, what did we just do? We replaced the formula with the numbers that are now known. L (length) was replaced with 9 and W (width) was replaced with 5. 9 X 5 = 45 so we found out the size (or area) of the whole space is 45 square feet.

Now, picture a rectangle with a length of 3 feet and a width of 4 feet. How big is the area? Draw your own picture to help.

A = LW

A = ___ × ____

A = ____

Here is another example: A backyard measures 15 feet long by 20 feet wide. What is the area of the yard?

A = LW

A = ___ × ___

A = _____

Length usually means the longer side, but you can switch them around and still get the same answer.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Here is a scenario:

Joe wants to stain a deck. The deck is 7 feet long and 3 feet wide. He must calculate the area of the deck before he buys the stain. Calculate the area of the deck.

$$A = LW$$

$$A = 7 \times 3$$

$$A = 21 \text{ feet}2$$

Now we know how big an area he has to stain. Let's say Joe buys a gallon of stain. One gallon of stain will cover 378 square feet. What area would Joe be able to stain with the stain that is left over?

378 square feet

– 21 square feet

Answer: 357 square feet

If Joe bought a half-gallon, what area could he stain with what is left?

$$378 \div 2 = 189 \text{ sq. ft.}$$

189 sq. ft. – 21 sq. ft. = 168 square feet

The area of a rectangle is the length times the width. If the width is 6 inches and the length is 4 feet, what is the correct calculation for area?

a) 6 times 4 **or** b) 1/2 foot × 4 feet

b) is **CORRECT**. 6 inches is the same as 1/2 foot. Area is 1/2 foot times 4 feet = 2 square feet (or 2 sq. ft., or 2 ft^2).

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Learning Activity – Area

1. Calculate the area for the following measurements. Draw a rectangle showing the measurements.

    a) Length 13 feet × Width 10 feet = Area _____

    b) Length 42 feet × Width 4 feet = Area _____

    c) Width 2 inches × Length 4 inches = Area _____

2. Sam has been asked to apply fertilizer to a lawn that is a rectangle shape measuring 20 feet wide and 30 feet long. He must find the area of the lawn before he can mix the fertilizer. Calculate the area of the lawn.

    _____

3. Jane works at a public garden. Her boss has asked her to use the drop spreader to apply some new grass seed in the southeast section of the gardens. The space is an *almost* square shape measuring 5 feet wide and 4 feet long. Calculate the area of the section.

    _____

4. Roscoe is laying sod. The ground he must cover is 42 feet long by 89 feet wide. The sod costs $ 0.39 a square yard. How much will it cost Roscoe to do this job?

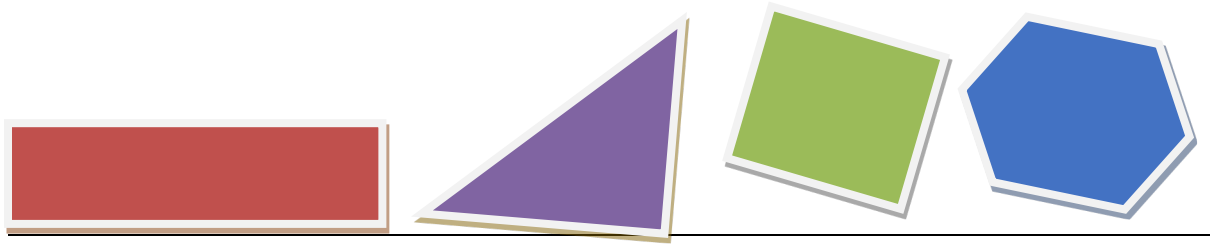
    _____

5. Amy is laying patio blocks for a private residence. The most common size for patio blocks is 8" by 16". The finished patio will total 15 sq. ft. How many patio blocks will Amy need to complete the job? Show your work.

    _____

HORTICULTURAL TRADES ASSOCIATION landscape ontario.com Green for Life! | APPRENTICESHIP Horticultural Technician Landscape Horticulturist | Canada | EMPLOYMENT ONTARIO | Ontario

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.



Shapes

In landscaping, the shapes of the material you work with, and the shape of the space that you work in, determine the way you do your job. For example, if you are mixing fertilizer for a lawn, the shape of the lawn determines the way you would calculate the amount of fertilizer you would mix. If the lawn was circular, you would use a specific calculation; if the lawn was square, you would use a different calculation.

As a horticultural technician, the amount of calculating that will be expected of you is minimal; however, you should have an understanding of the basic shapes that you will be working with and an understanding of how those shapes influence how you do your job. Some of the most common shapes you will be working with are called polygons.

Polygons

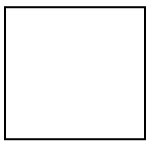
A polygon is a many-sided shape made up of line segments. All polygons have straight sides.

A **regular** polygon has **equal** line segments. When we look at polygons for this course, we should look at the following properties:

1. The number of sides
2. The length of the line segments

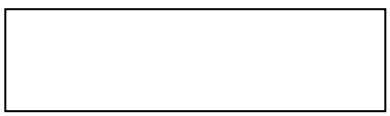
Regular Polygons

Square



- All four sides are of equal length.

Rectangle

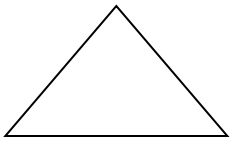


- Opposite sides are of equal length.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

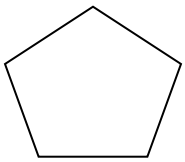
Triangle

- A three-sided enclosed shape. The prefix **tri** means 3.



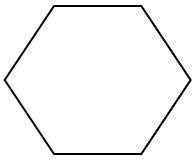
Pentagon

- A 5-sided polygon. The prefix **pent** means 5.



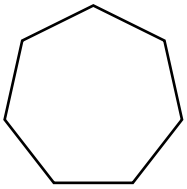
Hexagon

- A 6-sided polygon.



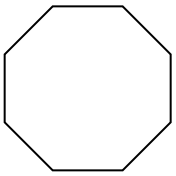
Heptagon

- A 7-sided polygon.



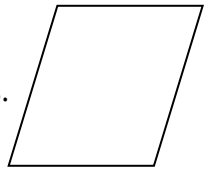
Octagon

- An 8-sided polygon. What traffic sign does the octagon remind you of?



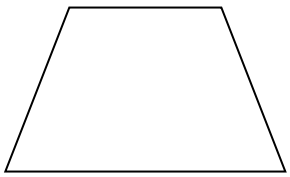
Parallelogram

- Opposite sides are parallel and are equal lengths. Opposite lines never cross.



Trapezoid

- One set of the lines are parallel; the other set is not. One set could cross if you extend the lines far enough.



This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Perimeter

Perimeter is the distance around an area. To calculate the perimeter of an area you **add** all the **sides** together. Let's say you are building a fence in a customer's backyard. You would have to calculate the perimeter of the property to know how much fencing material you would need.

Areas can be different shapes: squares, rectangles, triangles, octagons, etc. If their sides are straight lines, they are called **regular polygons**. To calculate perimeter for regular polygons, use the formula:

$$P = A+B+C+D...$$

The formula tells you to add the lengths of all the sides. The calculation used to determine perimeter for irregular shapes and circles is different. If you want to learn how to calculate perimeter for these shapes, ask your instructor. For the purposes of this course, a general understanding of basic perimeter calculations is sufficient.

On the next page you will find a learning activity to help you practice the information you just learned.

HORTICULTURAL TRADES ASSOCIATION landscape ontario.com Green for Life! | APPRENTICESHIP Horticultural Technician Landscape Horticulturist | Canada | EMPLOYMENT ONTARIO | Ontario

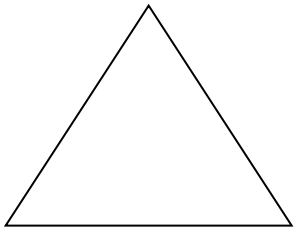
This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Learning Activity – Perimeter

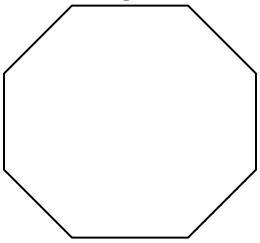
1. Calculate the perimeters of the following shapes.

A

B



C



A = one side is 4 inches — The perimeter of A = _____

B = one side is 5 feet — The perimeter of B = _____

C = one side is 3 cm — The perimeter of C = _____

2. Four Greens Landscaping is building a fence in a customer's backyard.
   a) The distance to be fenced in is called the **run**. Most types of fencing are sold in **8 foot sections**. The property to be fenced in is a **rectangular** shape. The length is 128 feet long and the width is 64 feet. What is the perimeter of the run?

   _____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

b) Calculate the cost of the fence for each of the following fencing options. (Remember always round up. It is better to have some extra than to not have enough.)

Type of Fence	Cost per Section	Section Length	Cost
Basket Weave	$ 8.75	6 ft. by 8 ft.	$_____
PVC	$16.51	6 ft. by 8 ft.	$_____
Iron	$17.41	6 ft. by 8 ft.	$_____
Privacy Wood	$ 7.99	6 ft. by 8 ft.	$_____
Chain Link	$ 4.90	6 ft. by 8 ft.	$_____
Basket Red Cedar	$ 9.30	6 ft. by 5 ft.	$_____

c) What is the cheapest option for completing the fence?

_____

d) What is the most expensive option for completing the fence?

_____

e) The customer has looked at the pricing chart above and has expressed an interest in the Basket Red Cedar fence. You know the customer has a budget of $500 for the fence. Is the Basket Red Cedar fence a good option? If not, explain your answer as you would do with a real-life customer.

_____

_____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

_____

_____

3. Four Greens Landscaping has been hired to edge the perimeter of an octagonal shaped flower bed in an amusement park. One side measures 40 ft. Calculate the perimeter of the bed.

   _____

4. a) How much would the materials cost to install a PVC fence around an irregular shaped pool deck? Use the fencing chart in question 2b. The deck has four irregular sized sides. The measurements are as follows:

   Side 1 = 9 ft.

   Side 2 = 12 ft.

   Side 3 = 13 ft.

   Side 4 = 20 ft.

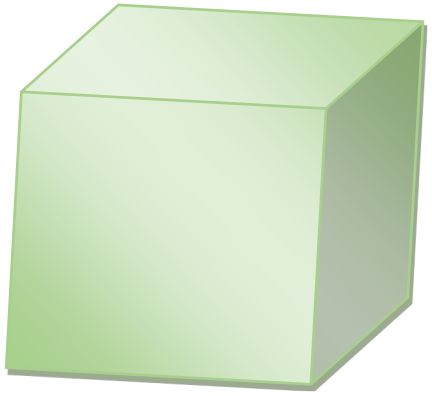
Answer: _____

b) How many sections of fence would you need to order to enclose the pool deck?

_____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Volume



Horticultural technicians often use volume: any materials that are used on site, such as gravel, soil, and mulches, are spread to a specific level. For example, a garden is 50 feet long and 20 feet wide, you need to cover the area with four inches of mulch.

There are three dimensions to think about when you are calculating the amount of mulch needed to complete this task. As a horticultural technician you will not be expected to do the calculation, but it is good to have a general idea of how volume is used. Just as with area, measurements must be converted into the same units (feet, inches) before volumes can be calculated.

To find the volume of squares or rectangles, start with the area (L × W) and then multiply by the height (H). This gives you the volume (V) or cubic measure. The formula is expressed as V = L × W × H. Other shapes such as triangles, cones and circles have different formulas.

Volume is the amount of space occupied by a three-dimensional object. For example, the amount of water in a swimming pool is measured by volume. Volume is used to measure the capacity of objects or spaces. The following formula is used for finding the volume of **rectangular** objects and **cubes**:

$$V = L \times W \times H$$

In landscaping, many of the conversions to volume (in cubic units) involve changing square feet or yards (area) into cubic feet or yards (volume). For example, the amount of soil needed to fill a raised bed is determined first by the size of the bed. Let's say you have to estimate how much soil you will need to fill the bed. The bed is 5 feet long and 4 feet wide. The soil needs to be 18 inches deep. How would you determine the amount of soil you will need? Soil is sold by the cubic yard. The formula is V = L × W × H.

- L = 5 feet
- W = 4 feet
- H – 18 inches

First, we must change the units into the same form. 18 inches = 1.5 feet.

Therefore, 5 × 4 × 1.5 = 30 cubic feet of soil.

Soil, like gravel and mulches, is sold by the cubic yard. On the next page you will find a learning activity to help you practice the information you just learned.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Learning Activity – Volume

1. In the example of the raised bed in the previous section, how many cubic yards of soil must be ordered to complete the task?

   _____

2. List some of the materials that are used in landscaping that are sold by the cubic yard.

   _____

3. What is the formula for calculating volume?

   _____

   It will help to remember: 9 square feet = 1 square yard

   27 cubic feet = 1 cubic yard

4. How many cubic yards would you have to order to cover the following areas? Fill in the chart:

Cubic Feet	Cubic Yards
27	
54	
81	
60	

5. True or False. Circle your answer.
   a) A cubic yard of concrete weighs approx. 2700 lb. (1215 kg).

   True *False*

   b) A cubic foot of concrete weighs approx. 150 lb. (68 kg).

   True *False*

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

c) A cubic yard of sand or gravel weights approx. 2700 lb. (1215 kg).

True *False*

d) A cubic foot of sand or gravel weights approx. 100 lb. (45 kg).

True *False*

e) A cubic foot of 5/8" crushed gravel weighs approx. 95 lb. (43 kg).

True *False*

f) A cubic yard of 5/8" crushed gravel weighs approx. 2500 kg.

True *False*

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Schedules and Timesheets

Many positions available in landscaping and grounds maintenance are seasonal. During the busy seasons, it is not unusual for workers in this industry to work extended workdays and sometimes extended workweeks. Workers may have to work weekend days as part of their weekly shift.

Your supervisor will make a schedule for the staff. The schedule could be a weekly or monthly schedule. Many smaller companies do not pay for lunch breaks, so you may have to subtract the lunch period from your total hours. It is a good idea to copy the schedule so that you can refer to it when you are organizing your week.

Four Greens Landscaping Schedule

Week of July 3-9

Employee	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Sahid	9:00am-3:00pm	OFF	8:00am-8:00pm	8:00am-8:00pm	9:00am-3:00pm	9:00am-4:00pm
Betty	10:00am-6:00pm	9:00am-3:00pm	3:00pm-9:00pm	OFF	10:00am-6:00pm	9:00am-4:00pm
Latisha	9:00am-3:00pm	10:00am-6:00pm	OFF	8:00am-4:00pm	9:00am-5:00pm	9:00am-4:00pm
John	1:00pm-9:00pm	OFF	10:00am-8:00pm	10:00am-8:00pm	1:00pm-9:00pm	9:00am-4:00pm
Rosco	9:00am-3:00pm	3:00pm-9:00pm	OFF	8:00am-4:00pm	9:00am-3:00pm	9:00am-4:00pm
Anne	10:00am-6:00pm	OFF	10:00am-8:00pm	10:00am-8:00pm	10:00am-6:00pm	9:00am-4:00pm
Munzar	1:00pm-9:00pm	9:00am-3:00pm	1:00pm-9:00pm	OFF	8:00am-4:00pm	9:00am-4:00pm
Ipeelee	1:00pm-9:00pm	10:00am-6:00pm	10:00am-6:00pm	9:00am-3:00pm	8:00am-4:00pm	OFF

HORTICULTURAL TRADES ASSOCIATION landscape ontario.com Green for Life! | APPRENTICESHIP Horticultural Technician Landscape Horticulturist

Canada

EMPLOYMENT ONTARIO

Ontario

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Learning Activity – Work Schedules

Use the Four Greens Landscaping schedule to answer the following questions.

1. Which employees have the most shifts for this week? _____

2. Calculate the number of hours that each employee works for the week. At Four Greens Landscaping, employees are not paid for their half-hour lunch.

   Sahid _____

   Betty _____

   Latisha _____

   John _____

   Rosco _____

   Anne _____

   Munzar _____

   Ipeelee _____

3. On what day(s) does Rosco work evenings? _____

4. Which employees are scheduled the earliest on Tuesday? _____

5. How many more hours of work does Ipeelee have than Latisha? _____

6. What are the shortest shifts? _____

7. Is everyone scheduled to work on Saturday? _____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Weather

In smaller landscaping companies, schedules are often varied. Some weeks you may work a set schedule, while other weeks may vary, depending on the job and the weather. Flexibility is something most employers look for in a new hire. In larger companies and municipal offices, schedules are generally more fixed because they are not as dependent on good weather conditions like many of the smaller companies are.

Rain Days

Horticultural technicians generally work in all types of weather conditions. Rainy days are an exception. Some of the work you will be doing cannot be done when it is raining. Larger companies and municipal offices generally pay for rain days, but many smaller, privately-owned businesses do not. Company policies about rain days vary. Some employers will expect you to phone in while others will expect you to show up to work and wait. It is up to you to ask your boss what the company policy is for rain days.

Timesheets

Timesheets are a record of what hours you have worked in a pay period. A pay period may be one week, two weeks or in some cases one month. It is your responsibility to keep track of the hours you have worked. As a horticultural technician, you will likely work at several different sites during your pay period. For example, on Monday you may be helping to build a fence at a private residence, and on Tuesday you may be planting bulbs at the local mall. It is important that you mark down the site location on your timesheet. Your employer includes their labour costs for each job they estimate.

On the next page you will find a learning activity to help you practice the information you just learned.

Learning Activity – Timesheets

Read the following scenario and fill in the **sample timesheet** on the following page with the correct information.

1. Sahid works for Cornwall Interlocking. For the purposes of this exercise, assume that Cornwall Interlocking does not pay for lunch breaks (which are 30 minutes long) or rain days.

   On **Monday** Sahid worked at the Bells' house helping to install a fence. He worked a full day, starting at 9 a.m. and finishing at 5 p.m. **Tuesday**, Sahid was booked off. **Wednesday** he worked a long day helping with the installation of a patio at the Scotts' residence. He was scheduled to work 9 a.m. to 9 p.m. **Thursday** he was back at the Scotts' finishing the job. The crew started at 12 p.m. Sahid was scheduled to work until 9 p.m., but the job was finished at 7 p.m. and everyone was sent home early with full pay. **Friday**, he started grading the yard at the Kazar estate. He started work at 8 a.m. The crew stopped at noon for lunch. At 1:30 it started to rain. The supervisor kept the crew until 2 p.m. before he sent them home for the day. **Saturday**, Sahid worked a full shift at the Kazar estate, starting at 9 a.m. and finishing at 5 p.m.

2. Sahid has bought a house and is moving next week. Where should he include his new address?

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Sample Timesheet

Retail Essential Skills Curriculum

Material reprinted, cited, or adapted with permission from: Literacy Link Eastern Ontario (LLEO), 830A Development Drive, Kingston, ON K7M 5V7; Tel: (613) 389-5307; Toll Free 1-800-465-7323; Fax: (613) 389-5174; e-mail: info@lleo.ca

(Time sheet courtesy of Cornwall Interlocking and Landscaping Depot)

CORNWALL INTERLOCKING & LANDSCAPING DEPOT

TIME SHEET

EMPLOYEE'S NAME _____

FOR THE WEEK OF _____

DATE WORKED	START	FINISH	LUNCH	TOTAL	JOBSITE
MONDAY					
TUESDAY					
WEDNESDAY					
THURSDAY					
FRIDAY					
SATURDAY					
TOTAL					

COMMENTS OR QUESTIONS FOR THE PAYROLL DEPARTMENT

_____

_____

_____

_____

_____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Payroll Slips

Time and Earnings

For most landscaping and grounds maintenance jobs, you will be paid by the hour. Your earnings depend on both the number of hours you work and the rate of pay you are receiving. To figure out your gross earnings you multiply your hourly rate of pay by the number of hours you have worked.

Hourly rate of pay × Hours worked = Gross Earnings

Regular pay plus any other pay make up the gross earnings. This is the total pay before payroll deductions are taken out.

- **Example**: Jacqueline earns $14.15 an hour. She worked 30 hours this week. What are her gross earnings?
- **Solution**: 14.15 × 30 = 424.50
- **Answer:** Jacqueline's gross earnings for the week are $424.50.

Learning Activity – Payroll Slips

1. Find the gross earnings in each example below. You may use a calculator.

   a) Hourly rate $21.56. Hours worked 5.25. Answer _____

   b) Hourly rate $14.56. Hours worked 30.5. Answer _____

   c) Hourly rate $16.15. Hours worked 5. Answer _____

   d) Hourly rate $18.00. Hours worked 20. Answer _____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

2. Find the gross earnings of each individual below. Remember to show all your work, and answer in full sentences. You may use a calculator.

   a) Angela is cutting grass at a golf course. She earns $15.15 an hour. Last week she worked a total of 23 hours. What are her gross earnings for that week?

   _____

   _____

   b) John is being paid $15.32 an hour as a ground's maintenance worker for the local parks department. He worked 32 hours one week and the following week he worked a total of 28 hours. What are his gross earnings for the two weeks?

   _____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Math Anxiety

Sometimes, we may feel anxious about math. Here is a short video that explains why people get so anxious about math, and five tips to help reduce the anxiety.

https://www.youtube.com/watch?v=-93hkiQE-fs

Recheck Your Skills

Now that you've completed the module, let's see how you feel about your math skills. Read each of the statements below and select the response that best describes you.

Statements	I can do this	I would like to do this better	I can't do this
I understand the imperial measurement system (inches, feet, etc.) and how to convert from one to the other			
I understand the metric measurement system (centimetres, metres, etc.) and how to convert from one to the other			
I understand how to convert imperial to metric (inches to metres) and vice versa			
I know how to do basic fractions			
I know how to work with decimals			
I know how to work with percentages			
I know how to use a measuring tape			
I know how to measure objects			
I know the difference between perimeter, area, and volume and when to use each			
I know how to use schedules and timesheets			

Now you can go back to the assessment that you completed prior to starting the module and see where you feel your math skills have improved and areas that you can continue to focus on.

HORTICULTURAL TRADES ASSOCIATION landscape ontario.com Green for Life! | APPRENTICESHIP Horticultural Technician Landscape Horticulturist

Canada

EMPLOYMENT ONTARIO

Ontario

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Additional Resources

Below you will find a list of other resources you can look at to help you with your math skills.

Math for Trades

https://video.bccampus.ca/channel/OER%2Bfor%2BTrades%253A%2BMath%2Bfor%2BTrades/116129

Trades Access Common Core Competency D-1: Solve Trades Mathematical Problems

http://solr.bccampus.ca:8001/bcc/file/0a58e3e0-8003-4005-bf4d-6f3d5802b61b/1/D-1%282%29.pdf

Math for Horticulture, Student Manual

This math study manual from The Ohio State University was developed for educators teaching a math curriculum based on real-life applications. It includes a wide variety of topics that are key to success in the horticulture industry. Each chapter includes information sheets, examples, and practice sheets used for student review or testing.

https://eric.ed.gov/?id=ED369958

The LearningHUB - Apprenticeship Math

https://www.learninghub.ca/apprenticeship-math

This 12-18 hour online course is designed for learners preparing to go into the trades. It focuses on basic math skills using fractions, decimals, percents, converting imperial and metric measurements and how to read a measuring tape. This course includes real workplace examples that can be applied to the trades. If you're interested in this career pathway and need to strengthen your math skills, this course is for you! You should be able to add, subtract, multiply and divide whole numbers before taking this course.

Essential Skills and Apprenticeship: Trades Math Workbook

https://www.canada.ca/en/services/jobs/training/initiatives/skills-success/tools/trades-math.html

The 32-page trades Math Workbook will help you improve your numeracy skills and increase your success in an apprenticeship program. It includes a variety of exercises to help you practice your numeracy skills and learn how these skills are used in the trades.

- Section 1: Measurement and Calculation
- Section 2: Money Math
- Section 3: Scheduling, Budgeting and Accounting
- Section 4: Data Analysis

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Answer Key

Activity – Units

1. 28, 38, 76
2. Answers will vary

Activity – Planting Table

Plant name	Number per basket	Number per 30 baskets	Number of trays
Bidens aura 'Sunshine'	1	30	2
Nepeta 'Glechoma variegated'	1	30	1
Geranium 'Maverick Star'	2	60	8
Indian mint	1	30	1
Fuschia 'La Campanella'	2	60	10
Petunia 'Peppermint'	3	90	3
Begonia 'Illumination'	3	90	2
Bacopa 'Snowflake'	1	30	4
Geranium 'Summer Showers'	1	30	8

Activity – Fractions

1. Addition
   a) 10
   b) 9 7/8
   c) 5 11/16
   d) 8 5/16

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

2. Subtraction
   a) 2 1/3
   b) 2 1/8
   c) 2 1/8
   d) 2

3. Conversion
   a) 0.6875
   b) 0.875
   c) 0.375

4. Measurement
   a) 10 7/8
   b) 10.875

Activity – Tape Measure

Measure the lines

a) 2 13/16”
b) 3 11/16”
c) 5 5/8”
d) 2 3/8”
e) 1 ¼”

Activity – Measuring Items

Answers will vary

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Activity – Converting Measures

1. 5' ¾" = 60¾"
2. 3' ⅝" = 36⅝"
3. 8' 2¼" = 98¼"
4. 10' ¾" = 120¾"
5. 5' ⅞" = 60⅞"
6. 1' 5⅛" = 17⅛"
7. 4' ⅝" = 48⅝"
8. 6' 9/16" = 72 9/16"
9. 7' ½" = 84½"
10. 8' 6 5/16" = 102 5/16"
11. 7' ⅞" = 84⅞"
12. 2' 1/16" = 24 1/16"
13. 4' ⅛" = 52⅛"
14. 6' 7/16" = 72 7/16"
15. 8' ⅞" = 96⅞"
16. 2' 8¾" = 32¾"

Activity – Fun Brain Online

Online activity

Activity – Measurement Fun

Answers will vary

Activity – Area

1.
   a) 130 feet

   b) 168 feet

   c) 8 inches

2. 600 feet

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

3. 20 feet

4. Area = 3738 sq. ft. The student must convert the square feet to square yards. 1 square yard has 9 square feet. 3738 ÷ 9 = 415.33 sq. yds. The sod costs .39 a square yard. Answer: Roscoe must pay $161.98 for the sod.

5. Solution: First you must find the area of the brick:
L × W = 8" × 16" = 128 sq. in.
Convert the square feet to square inches: 1 sq. ft. = 144 sq. in.
15 sq. ft. x 144 sq. in. = 2160 sq. in.
Each brick is 128 sq. in. The area to be covered is 2160 sq. in.
Divide the brick size into the area. You will need 17 bricks to complete the job. (2160 ÷ 128 = 16.875).

Activity – Perimeter

1. Perimeter of the shapes

a) 16 inches
b) 15 feet
c) 21 cm

2. Building a fence

a) Perimeter of the run

Remind students that opposite sides of a rectangle are the same.

128 + 128 + 64 + 64 = 384 ft. or (128 × 2) + (64 × 2).

b) Cost of the fence by various options

- Basket Weave $420.00
- PVC $792.48
- Iron $835.68
- Privacy Wood $383.52
- Chain Link $235.20

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

- Basket – Cedar $716.10 *(The Basket Cedar is sold in 5 ft. sections. You have to round up.)*

c) Chain Link
d) Iron
e) The Basket Red Cedar is sold in 5 ft. sections. The total cost would exceed their budget for the fencing materials. The Privacy Wood may be a better option.

3. Perimeter of the bed
   - 320 ft.

   Reminder: all sides in an octagon are the same size. The octagon has 8 sides.

4. Installing a fence
   a) $891.54
   b) 7 sections

Activity – Cubic Measures

1. 2 cubic yards. Remind the students that many suppliers only sell by the cubic yard (some will offer ½ cubic units), so often you will end up with more than you need. You must round up
2. Gravel, soil, mulches
3. Volume = L × W × H
4. How many cubic yards?
   - 27 cubic feet – 1 cubic yard
   - 54 cubic feet – 2 cubic yards
   - 81 cubic feet – 3 cubic yards
   - 60 cubic feet – 3 cubic yards
5. True or False?
   a) False
   b) True
   c) True
   d) True
   e) True
   f) False

Activity – Work Schedules

1. All of the employees have the same number of shifts.

2. Hours worked per week
   - Sahid – 40.5 hours
   - Betty – 32.5 hours
   - Latisha – 34.5 hours
   - John – 40.5 hours
   - Rosco – 30.5 hours

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

- Anne – 40.5 hours
- Munzar – 34.5 hours
- Ipeelee – 35.5 hours

3. Tuesday
4. Betty and Munzar
5. 1 hour
6. 9-3, 3-9
7. No, Ipeelee is off

Activity – Timesheets

Monday	9	5	.5	7.5	Bell
Tuesday					OFF
Wednesday	9	9	.5	11.5	Scott
Thursday	12	9	.5	8.5	Scott
Friday	8	2	.5	5.5	Kazar
Saturday	9	5	.5	7.5	Kazar
Total	-	-	2.5	40.5	

He should include his new address in the "Comments" section.

Activity – Payroll Slips

1. Find the gross earnings
   a) $113.19
   b) $444.08
   c) $80.75
   d) $360.00
2. Find the gross earnings
   a) Angela's total earnings for the week are $348.45.
   b) John's gross earnings will be $919.20.

The answers in this Answer Key were created by Community Literacy of Ontario and the Tri-County Literacy Council (based on Curriculum originally produced by Literacy Link Eastern Ontario). These organizations have given their permission for Landscape Ontario to use this material.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.