

Math 10 Chp 1.1

Note Title

2016-07-18

SI Measurement - adopted beginning of 1970 by Trudeau. SI units metres, kelvin, gram, second, candela (luminosity), mole (amount of substance), and ampere.

Metric units -

For this chapter, we are only concerned with length, metre.

SI Conversion for metres	
1 metre (m)	1 metre (m)
10 decimetres (dm)	0.1 decametres (dam)
100 centimetres (cm)	0.01 hectometres (hm)
1000 millimetres (mm)	0.001 kilometres (km)
10^6 micrometres (μm)	10^{-6} megametres (Mm)
10^9 nanometres (nm)	10^{-9} gigametres (Gm)
10^{12} picometres (pm)	10^{-12} terametres (T)
10^{15} femtometres (fm)	10^{-15} petametres (Pm)
10^{18} attometres (am)	10^{-18} exametres (Em)
10^{21} zeptometres (zm)	10^{-21} zettametres (Zm)
10^{24} yoctometres (ym)	10^{-24} yottametres (Ym)

Review: Area of rectangle =
square =
circle =
triangle =

Perimeter =
=
=

Volume of rectangular prism =
cube =
cylinder =

Area =
=
=

Converting SI Units -

eg) Change 7.5 km to cm.

Mental Check:

Note going to a smaller measurement will make the number larger and going to a larger measurement will make the number smaller.

eg) Change 350 mm to km.

eg) Change 24 m to μm

eg) Change 37 dm to dam

Scaling and Ratios - always keep the same object in the numerator and denominator.



Each grid is 7 mm. The scale reduction is 1:1122. Determine the length of this 747-200 B.



Each grid is 7mm. The scale reduction is 1:176. Determine the length of this Entegra Aspire Motorhome in (m)

Assigned Work: pp. 15 - 21: 1, 4, 7, 9, 10, 12.

Referents - are used to estimate. Choose an appropriate referent for the size of the object. You should also choose appropriate units for ANY measurement! The units imply a certain amount of accuracy - important in science.

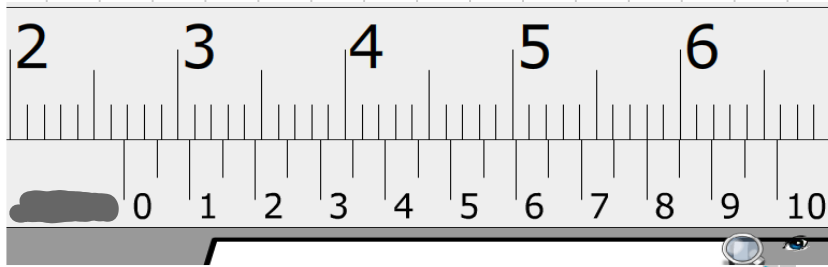
- eg) What are the appropriate units?
- i) distance to another city
 - ii) room sizes in a house
 - iii) size of bugs
 - iv) heights of students
 - v) lengths of salmon

The problem with referents is that they vary with each person. The measure can be quite different between a child's hand vs an adult's hand. Even amongst adults, the measure can be different. Before standardization in 1959, each country used their own definition for measures. You can see this would make it difficult to collaborate in science or do trade in business.

eg) What are appropriate referents?

- i) width and height of a book
 - ii) dimensions of a couch
 - iii) dimensions of a cell phone
 - iv) dimensions of a house
 - v) dimensions of a dime.
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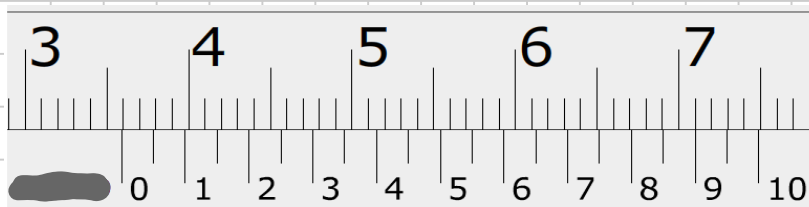
Metric Calipers. - offers more precision over a ruler.
You may never use a caliper again in your life, but you want to learn how to use tools because there are thousands of tools and you may need a few in your life.



Read the Main Scale to the left of '0' on the Vernier Scale. These are the leading digits:

Where the Main and Vernier line up, the Vernier are the trailing digits: So we have

Note the bottom scale is only accurate where there are lines; you can't read between the lines!



To the left of '0' on the Main is
The lines line up on the Vernier at

So we have

Be aware that calipers will have different measures!

Assigned work: pp. 15-21: 2, 3, 5, 6, 8, 11

Challenge: 15-17

Extra caliper practice: (link on website)

<http://www.stefanelli.eng.br/en/en-vernier-caliper-pachymeter-calliper-simulator-millimeter-05-mm.html>

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Note Title

2016-07-20

Imperial Measurement - based on British units. The U.S. uses Customary System that has names identical to the Imperial System, but differ in quantity for gallons and fluid ounces.

But again, in this chapter, we are only concerned about length. So there are no differences. Converting units in the Imperial System is more complicated because we are not multiplying by powers of 10.

Imperial Conversion	
12000	thous (th)
12	inches (in)
1	foot (ft)
1/3	yards (yd)
1/66	chains (ch)
1/660	furlongs (fur)
1/5280	miles (mi)
1/15840	leagues (lea)

eg) Convert 67 in to (ft) & (ft & in)

eg) Convert 3000 ft to (mi).

eg) Convert 437 ft to (yd) & (yd & ft)

Scaling - requires you to make a measurement then convert to an appropriate unit. Maps require 2 measurements!

Calculate the size of this Orca.

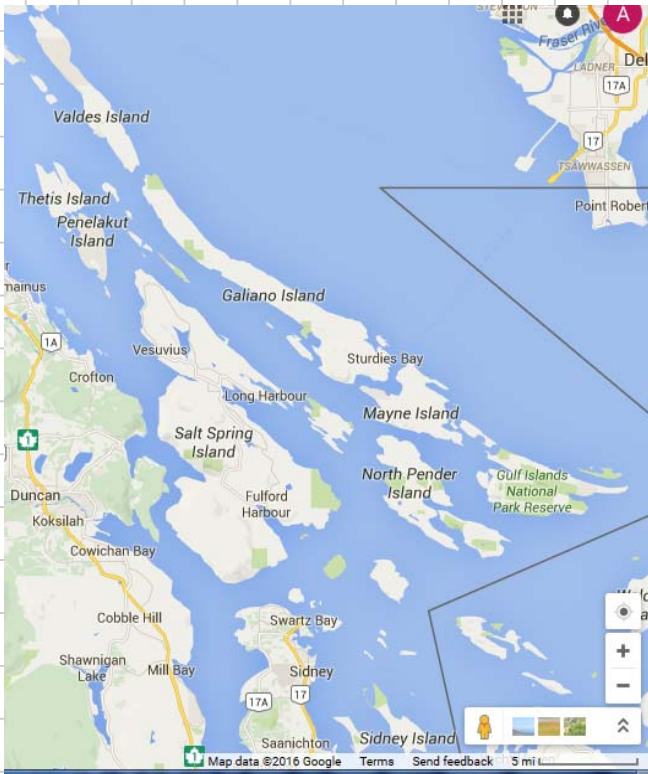


Assume that each grid is .27 in. The reduction ratio is 1:30.

Calculate the length of this Sockeye.



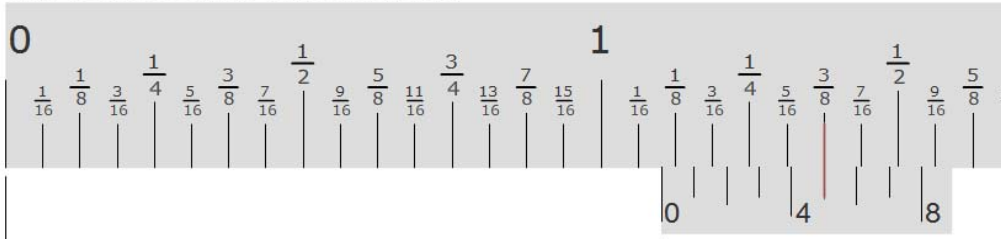
Assume that each grid is .27 in. The reduction ratio is 2:15.



Find the straight line distance from the Tsawwassen Terminal to Swartz Bay Terminal.

Calipers - be aware there are different scales.

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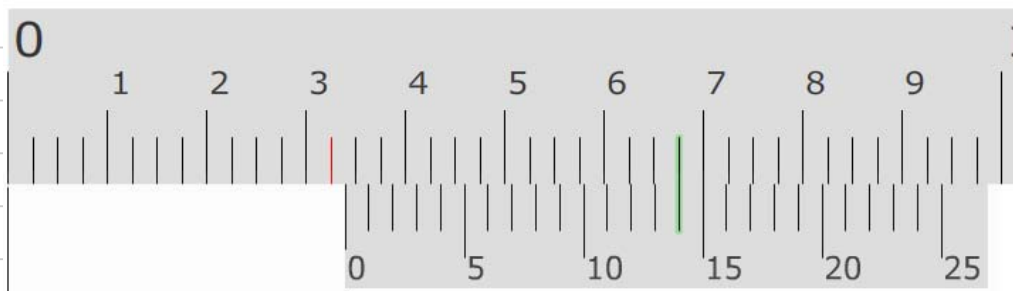


Main Scale

Vernier Scale

The Main Scale has divisions of $\frac{1}{16}$ inch.
The Vernier Scale has $\frac{1}{32}$ inch divisions, so

We read the measure to the left of '0' on the Vernier, so
We see where the Main & Vernier line up, so



Main

Vernier

This is the type of caliper in the textbook.
The Main has tenths of an inch. In between the tenths, are $\frac{1}{100}$ inch divisions, so
The Vernier scale has $\frac{1}{1000}$ inch divisions, so
The Vernier reads 13
The Main reads 0.7
So the final measure is 0.713 inches

Assigned work: pp. 29-35: 2, 3, 5, 6, 9, 11

Challenge: 13, 14, 15

Extra Caliper practice (links on my website):

<http://www.stefanelli.eng.br/en/vernier-scale-nonius-thousandth-inch.html>

<http://www.stefanelli.eng.br/en/vernier-scale-nonius-millimeter-fractional-inch.html>

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Note Title

2016-07-20

Converting Between SI and Imperial Units - really important to write units. If you have already been using units, you should have no problems.

SI-Imperial Conversion	
1 in	2.54 cm
1 ft	.3048 m
1 yd	.9144 m
1 mi	1.6093 km
1 mm	.0394 in
1 cm	.3937 in
1 m	1.0936 yd
1 km	.6214 mi

the left and right quantities are equal, therefore when we write it as a fraction and multiply; we are multiplying by 1.

eg) 2 by 4 (2x4) lumber is used to build houses. A common length is 8 ft. 2x4 starts out as 2 in by 4 in. but ends up being 1.5 in by 3.5 in. Convert 2x4 to (cm).

Nobody wants to call a 2x4, 1 1/2 by 3 1/2. They certainly won't want to call it a 5.08 by 10.16.

eg) When you cross the border to drive down I-5 to Seattle, you see the distance to Seattle is 110 mi. Convert this to km.

Why is it not important to have decimals in your answer?

Speed or velocity is calculated by dividing distance by time.

eg) Migrating salmon must travel along the Strait of Georgia (150 mi) to reach the Fraser River. Assume that it takes an average of 13 hours for this journey. Determine the speed in km/h.

Sometimes you need to use multiple conversions to get an answer. Write the units and cancel them out to verify your conversion.

eg) Convert 10,000,000 cm to (mi).

eg) Convert 60 mi/h to m/s.

Assigned Work: pp. 42-47: 1, 3, 4, 6, 10, 11, 12

Challenge: 13, 15, 16 This uses Simpson's Rule (Calculus)