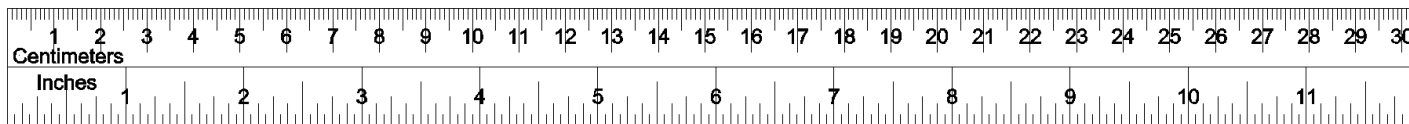


**NUMERACY —
CONVERSION:
DIFFERING UNITS**



By Mark Gillan



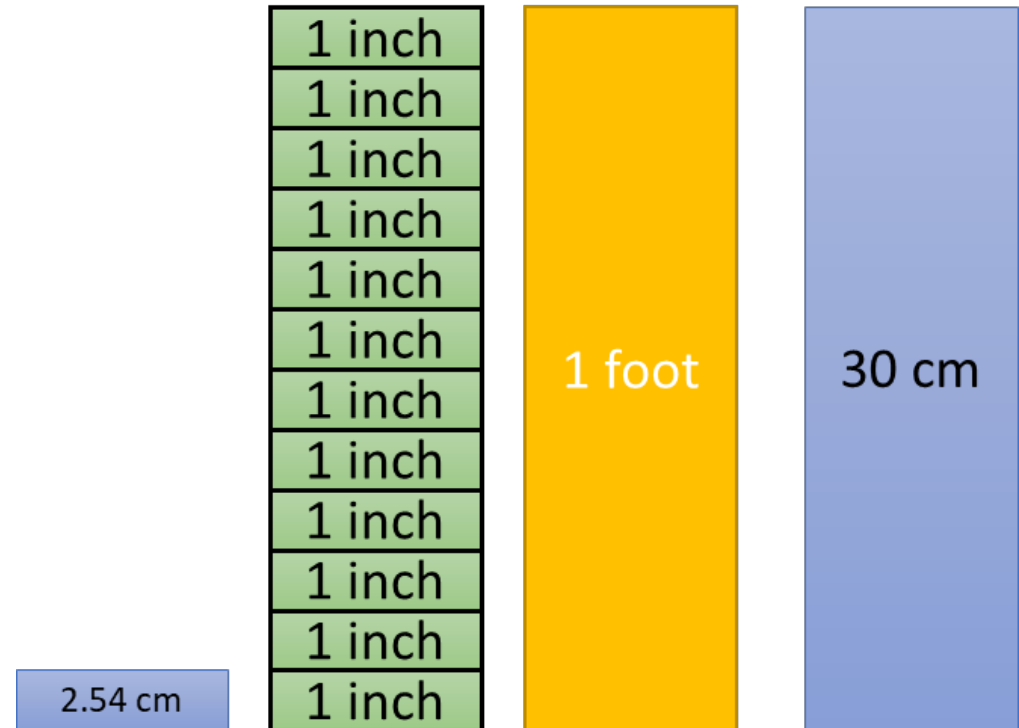
GRAPHICAL LOOK AT A RULE GUIDE

- Look how the comparison of one unit of measurement compares to another on a daily basis
- The markings show how a visual comparison can be done
- If you have the opportunity to pick up a rule guide such as the example shown and really look at it to notice the comparison, this might help understanding conversion rates for all other differing units



CONVERSION RATES

- If you look at a ruler guide, it is about 12 inches which is 1 foot.
- It is also about 30 centimetres.
- This acts as a good starting point and a guide.
- Conversions are as follows:
1 foot = 12 inches
1 inch = 2.54 cm
1 metre = 100 cm



1 inch = 2.54 cm



1 foot = 12 inches



1 metre = 100 cm

SIMPLIFIED WORKINGS

Simplified, conversions as follows:

Inches to centimetres

Inches x 2.54 = centimetres

Feet to inches

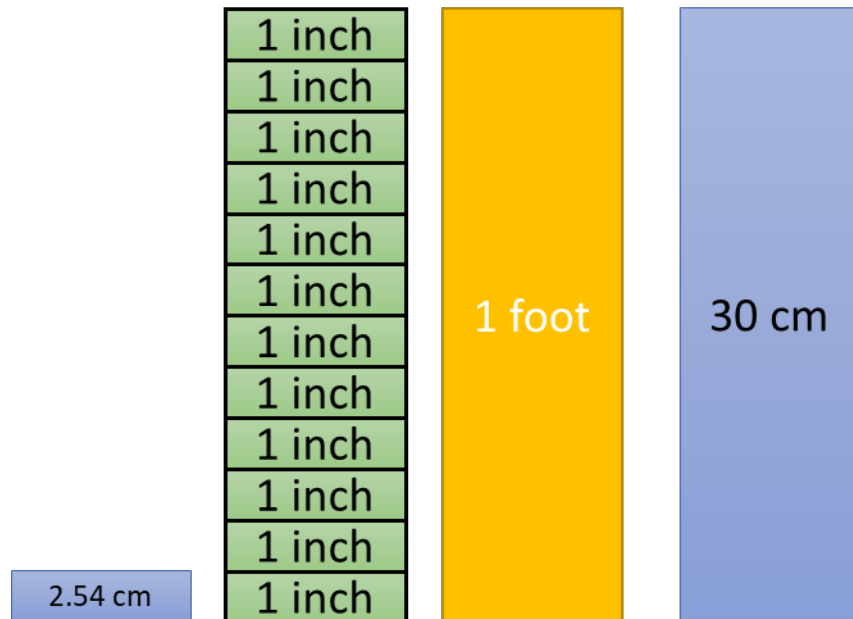
Feet x 12 = inches

Metres to centimetres

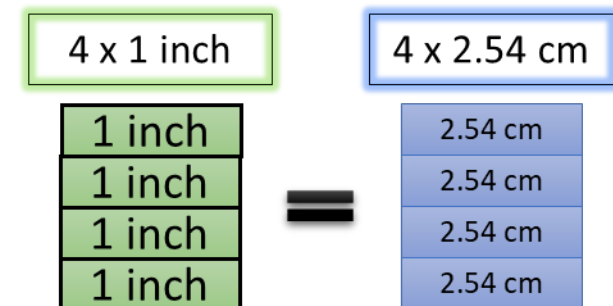
Metres x 100 = centimetres



ILLUSTRATION OF CALCULATIONS FOR 4 INCHES CONVERTED TO CENTIMETRES



Equivalent / conversion
1 inch = 2.54 cm
 $4 \times 1 \text{ inch} = 4 \times 2.54 \text{ cm}$
4 inches = 10.16 cm



INCHES TO CENTIMETRES

The conversion is:

$$1 \text{ inch} = 2.54 \text{ cm}$$

What we do on one side,
we do on the other.

So, with

$$1 \text{ inch} = 2.54 \text{ cm}$$

What is 55 inches in centimetres?

From 1 inch to 55 inches is 1 inch x55

Therefore, the other side must be x55
as well, because we know there are
more centimetres for every inch.

$$55 \text{ inches} = 2.54 \text{ cm} \times 55$$

Making this:

$$55 \text{ inches} = 140 \text{ cm (139.7 rounded off)}$$



THE OTHER WAY ROUND: CENTIMETRES TO INCHES

The conversion is still the same:
1 inch = 2.54 cm

So, with

1 inch = 2.54 cm

When converting inches to centimetres we multiplied the number of centimetres by the number of inches

We multiplied because the conversion showed us there are more cm to 1 inch, so there must be more cm in the end.

When working the other way round ... we divide. It is the opposite way round to multiplication.

So, what is 18 centimetres to inches?

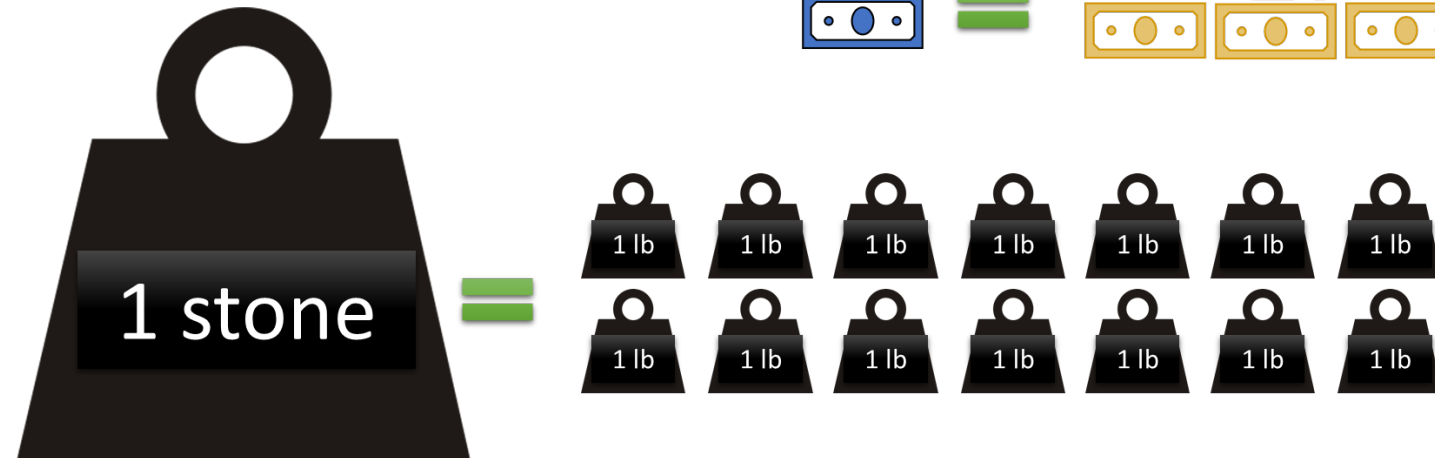
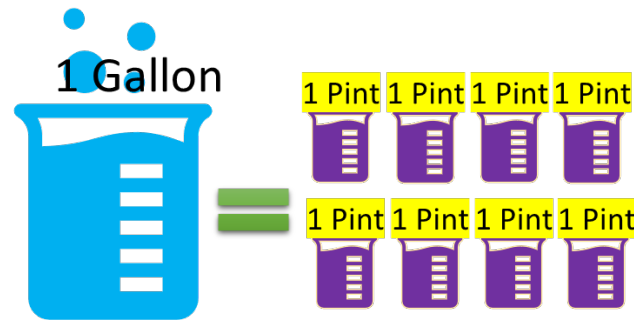
18 cm divided by 2.54 cm for every inch

$$18 \div 2.54 = 7.08 \text{ inches}$$

Rounded off to nearest whole inch would be 7 inches



COMPARISONS ILLUSTRATED



PART OF A UNIT – FRACTION/DECIMAL

- Part of a unit might require conversion
- For example, a person could have a height of 5 ft 6 in
- A foot has 12 inches, as we know
- The whole unit of a foot has 12 portions and the 6 inches is 6 portions out of the 12, as a fraction is $\frac{6}{12}$
- To convert the fraction into decimal, we divide the top number by the bottom number. This case would be 6 divided by 12 to provide 0.5
- The 5 ft plus the part of a foot is 5.5 feet in total
- Feet could then be converted from the noted 5.5 feet into other units of measurement

- Had the person been 5ft 3 in
- A foot still has 12 inches, as we know
- This time, the 3 inches is 3 portions of the 12 inch unit of a foot that we are working with, meaning it can be written as: $\frac{3}{12}$
- To convert a fraction into decimal that will allow us to calculate a conversion using a full decimal number, we divide the top number of a fraction by the lower part of the fraction
- That means, 3 divided by 12 = 0.25
- We can write the height as 5.25 feet for conversion directly into another unit of measurement



PART MEASUREMENTS CONVERTED

- If you look at a ruler guide, it is about 12 inches which is 1 foot. It is also about 30 centimetres. This acts as a good starting point and a guide.
- Conversions are as follows:
12 inches = 1 foot
1 inch = 2.54 cm
100 cm = 1 metre
- So, if we want to convert part of a measurement then we need to use the correct conversion rate. Remember a fraction is a part of something and for a decimal with figures after the decimal place is a part of something.
- For example, if we have 7 inches then that is 0.58 of a foot. Noting 7 inches when converting to feet is a part of the whole foot amount of 12 inches. 7 parts of 12 inches.
- We reach this by dividing the part (top of fraction) by the total whole amount. We could view it as a fraction (a part of), such as:
 $\frac{7}{12}$ which is 7 parts of a whole 12 units, if divided out, equals a decimal of 0.58
- Remember, converting a fraction to a decimal is top number divided by the bottom.
- Look at the conversions on the next page ...



THE CALCULATIONS BETWEEN INCHES, CENTIMETRES AND METRES

The first measurement of 4.8 inches into feet:

$4.8 \text{ divided by } 12 = 0.4 \text{ feet}$

Or we could have 4.8 inches into centimetres.

$4.8 \text{ inches multiplied by } 2.54 = 12 \text{ cm}$

Working the other way with into inches with a measurement in metric of 1.7 metres:

$1.7 \text{ multiplied by } 100 = 170 \text{ cm}$

$170 \text{ cm divided by } 2.54 = 67 \text{ inches}$

Working back the way with the same 67 in.

$67 \text{ multiplied by } 2.54 = 170 \text{ cm}$

Note: We can check answers to a guide. For example, we would know from a ruler guide that 60 cm is approximately 2 feet and is double the 12 inches to a foot meaning it is approximately 24 inches. This will help when we convert to a more accurate outcome.

ANOTHER LOOK AT LENGTH CONVERSIONS

If we take the height of someone at 5 ft 8 in.

5 foot 8 inches can be converted as follows:

5 foot multiplied by 12 inches per foot = 60 inches

The 60 inches of 5 foot plus the additional part of a foot being 8 inches = 68 inches

So, 5 foot 8 inches is a total of 68 inches

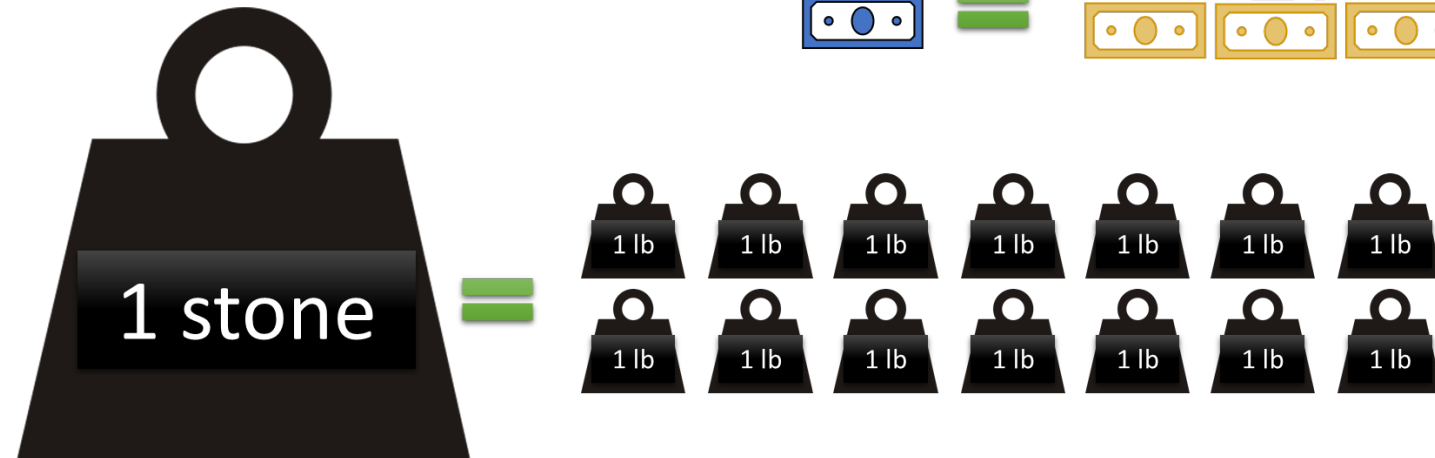
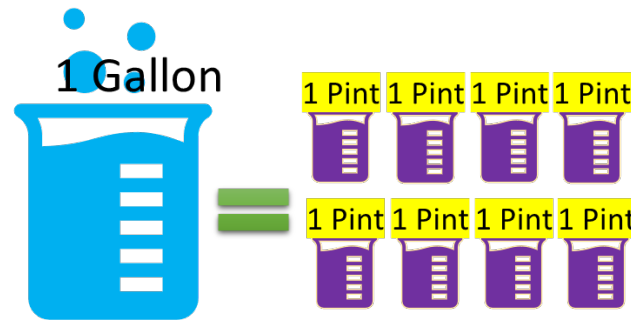
68 inches multiplied by 2.54 inches per centimetre = 173 cm (172.72 rounded off)

173 cm divided by 100 cm in a metre = 1.73 m

So, the person at 5 ft 8 in tall in metric is 1.73 m in height



REMINDER: COMPARISONS ILLUSTRATED



MORE CONVERSIONS

■ Length / distance:

1 foot = 12 inches

1 inch = 2.54 centimetres (cm)

1 metre = 100 centimetres (cm)

1 kilometre = 1000 metres (m)

1 mile = 1.609 kilometres (Km)

1 yard = 3 feet (ft)

1 metre = 1.09 yards

■ Weight:

1 Tonne = 1000 Kilograms (Kg)

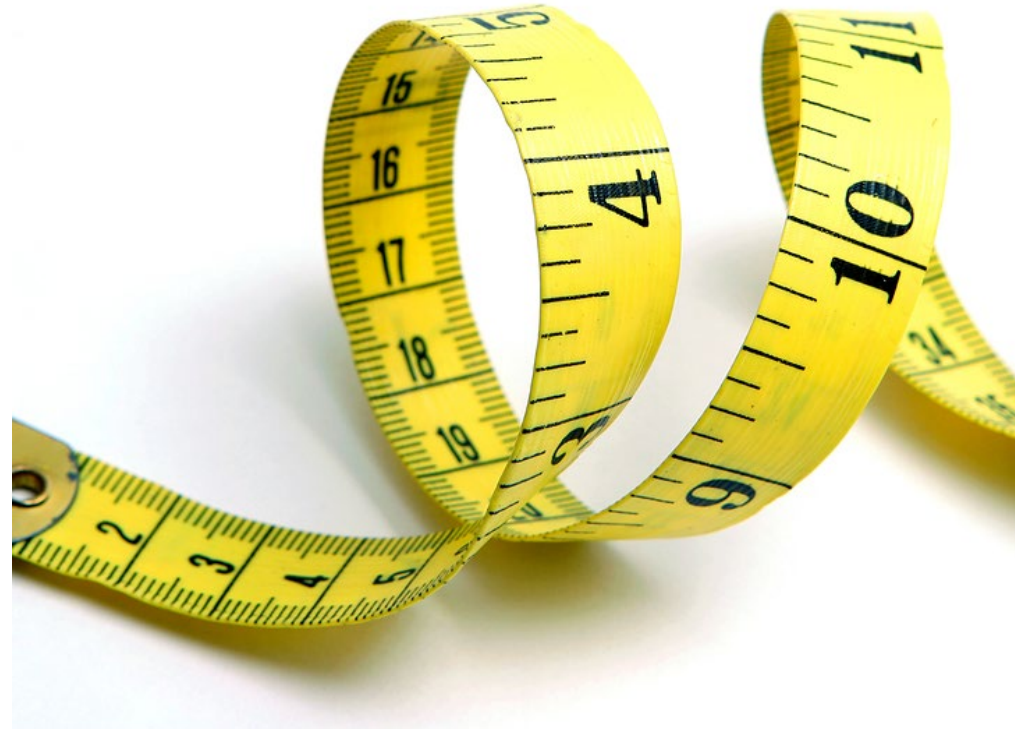
1 Kilogram = 1000 grams (g)

1 stone = 224 ounces (oz)

1 stone = 14 pounds (lbs)

1 Kilogram = 2.205 pounds (lbs)

1 ounce (oz) = 28.35 grams (g)



TRY YOURSELF: LENGTH CONVERSIONS

Questions - convert

- 1) 3.5 m into centimetres ...
- 2) 104" into centimetres ...
- 3) 40 ft into inches ...
- 4) 352 cm into metres ...
- 5) 352 cm into inches ...
- 6) 4 ft 8 in into metres ...
- 7) 4.8 m into feet ...
- 8) 1.2 m into feet and inches ...
- 9) 470 miles into Kilometres ...
- 10) 90 Kilometres into miles ...

Record your answers



ANSWERS: LENGTH CONVERSIONS

Questions - convert

- 1) 3.5 m into centimetres ...
- 2) 104" into centimetres ...
- 3) 40 ft into inches ...
- 4) 352 cm into metres ...
- 5) 352 cm into inches ...
- 6) 4 ft 8 in into metres ...
- 7) 4.8 m into feet ...
- 8) 1.2 m into feet and inches ...
- 9) 470 miles into Kilometres ...
- 10) 90 Kilometres into miles ...

Answers - converted

1. 350 cm
2. 264 cm (264.16 rounded off)
3. 480"
4. 3.52 m
5. 139" (138.5826772 rounded off)
6. 4 ft is 48" plus 8" total 56" = 1.42 m
7. 4.8 m is 189" = 15 feet 9 inches (bal inches)
8. 3' 11" (3 feet plus 11 inches – $3 \times 12 = 36$... bal 11")
9. 756 Km (756.39168 rounded off)
10. 56 miles (55.9234073 rounded off)



TRY YOURSELF: WEIGHT CONVERSIONS

Questions - convert

- 1) 4 Tonne into Kilograms ...
- 2) 3 stone into ounces ...
- 3) 5 Kilograms into pounds (lbs) ...
- 4) 8 stone into pounds (lbs) ...
- 5) 18 stone into Kilograms (Kg) ...
- 6) 7 pounds (lbs) into stones ...
- 7) 15 st 7 lbs into Kilograms (Kg) ...
- 8) 9 st 3 lbs into Kilograms (Kg) ...
- 9) 150 ounces (oz) into grams ...
- 10) 280 ounces (oz) into Kilograms (Kg) ...

Record the answers



ANSWERS: WEIGHT CONVERSIONS

Questions - convert

- 1) 4 Tonne into Kilograms ...
- 2) 3 stone into ounces ...
- 3) 5 Kilograms into pounds (lbs) ...
- 4) 8 stone into pounds (lbs) ...
- 5) 18 stone into Kilograms (Kg) ...
- 6) 7 pounds (lbs) into stones ...
- 7) 15 st 7 lbs into Kilograms (Kg) ...
- 8) 9 st 3 lbs into Kilograms (Kg) ...
- 9) 150 ounces (oz) into grams ...
- 10) 280 ounces (oz) into Kilograms (Kg) ...

Answers - converted

1. 4,000 Kg
2. 672 oz
3. 11 lbs (11.02311311 rounded off)
4. 112 lbs
5. 114 Kg (114.3052772 rounded off)
6. 0.5 st (7 lbs is $\frac{1}{2}$ of a stone being 14 lbs)
7. 98.43 Kg (rounded off)
8. 58.5 Kg (rounded off)
9. 4,252 grams (4252.428469 rounded off)
10. 8 Kg (7.937866475 rounded off)



QUESTIONS IN CONTEXT

Questions - mixed

- Andrea MacFarlane has applied for a position as a security officer. The employer has requested applications from anyone over 1.5 metres in height. Andrea knows she is 5' 2" from being measured a few years ago. How tall is Andrea in metric and is she able to meet the criteria for height in her application?
- Anja Patel has a height of 4 ft 9 in and is 8 st 8 lbs in weight. What is her body Weight Mass Index?
Using the formula: $BMI = W \div H^2$
Noting W is weight in Kilograms and H is height in Metres
Provide the answer to the nearest whole number.

Record answers



ANSWERS TO QUESTIONS IN CONTEXT

Questions - mixed

- Andrea MacFarlane has applied for a position as a security officer. The employer has requested applications from anyone over 1.5 metres in height.
Andrea knows she is 5' 2" from being measured a few years ago.
How tall is Andrea in metric and is she able to meet the criteria for height in her application?
- Anja Patel has a height of 4 ft 9 in and is 8 st 8 lbs in weight. What is her body Weight Mass Index?
Using the formula: $BMI = W \div H^2$
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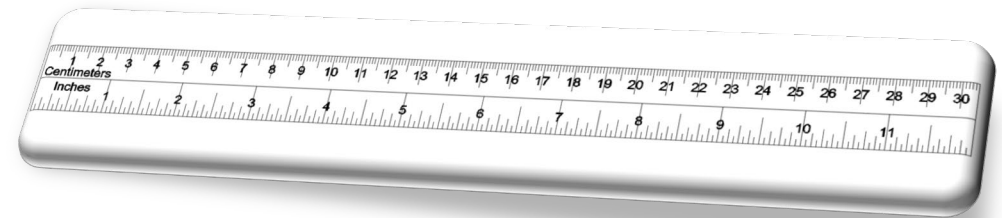
Answers

- Andrea has a height of 5 ft and 2 inches.
The 5 feet x 12 inches per foot = 60"
Plus the other 2 inches in height, makes 62"
Multiply the inches x 2.54 cm for every inch, makes 157.48 rounded off to 157 cm.
So, 100 cm per metre means height = 1.57 m
The criteria has been met and she can apply.
- Weight 8 st 8 lbs = 54.4 Kg
Height 4 ft is 48 inches plus the 9 gives a total of 57 inches = 1.4478 m
 H^2 will be $1.4478 \times 1.4478 = 2.096$
Weight 8 st is 50.8 Kg (rounded off) plus the 8 lbs that is 3.6 Kg (rounded off) gives a total 54.4 Kg or we could put everything into lbs first then into Kg.
So, BMI is $54.4 \div 2.096 = 25.954$
Rounded off to 26



SUMMARY

- Conversion rates exist to compare one unit to another, an exchange rate as such
- When the first unit is less than the other then it is usually multiplication. Knowing the units helps to decide because it is usually when converting from a larger unit to a smaller one then multiplication, smaller unit to larger then it would normally be division
- E.g. 1 inch is larger than 1 cm – **MULTIPLY:**
1 inch = 2.54 cm
Therefore, 4 inches = 2.54×4
Would give us an answer of 10 cm
- When the first unit is more than the other then it is usually division
- E.g. More cm's than 1 inch – **DIVIDE:**
 $2.54 \text{ cm} = 1 \text{ inch}$
Therefore, 8 cm = $8 \div 2.54$
Would give us an answer of 3.15 inches



HANDY CONVERSIONS TO NOTE

■ Volume

1 Litre = 1,000 millilitres

1 fluid ounce = 29.57 millilitres

1 gallon = 4,546 litres

■ Weight:

1 Tonne = 1000 Kilograms (Kg)

1 Kilogram = 1000 grams (g)

1 stone = 224 ounces (oz)

1 stone = 14 pounds (lbs)

1 Kilogram = 2.205 pounds (lbs)

1 ounce (oz) = 28.35 grams (g)

■ Length / distance:

1 foot = 12 inches

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