Equivalences

Course Content: Choose your topic …

MATHS L1 to L2

Whole Number and Functions

place value

negative numbers

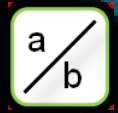

add and subtract


multiply divide

round numbers

ratio scale

Parts of a whole



fraction

decimal numbers


percent

percent decimal fraction

Measure and Shape

metric measure

imperial measure

perimeter

area

volume

formulae bodmas

Handling Data


charts data

averages


prob-ability

Topic Introduction : Equivalents

Percent/Decimal Fraction Equivalents

When you have studied the topics of Percentage, Decimal and Fractions it is important to realise that all three of these topics are connected and really just show the same value in different ways.

If you get good at changing between the three number systems for parts of a whole you will be able to select the quickest and easiest methods for solving lots of problems and calculations.

This topic is especially useful in the topic of pie charts where different slices of a chart can be shown using different values so check this topic out too after this one!

Choose an icon to select where to start

Warm up Exercise 1

1 x 7 =	
2 x 7 =	
3 x 7 =	
4 x 7 =	
5 x 7 =	
6 x 7 =	
7 x 7 =	
8 x 7 =	
9 x 7 =	
10 x 7 =	

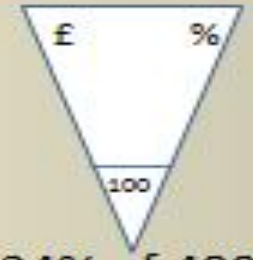
1	4	3	7	10	6	5	9	2	8
5									
2									
6									
10									
8									
7									
3									
9									
4									

Warm up Exercise 2

Do-talk-record

A

L2/L1



N=480
%= 24

L2. 24% of 480 is?

a) N x 100 ÷ 24 because.....
b) N x 0.24 because.....
c) N x 6/25 because.....
a) N x % ÷ 100 because.....

L1. 24% of 480 is?

A) is 1/24 because.....
B) is approximately 1/4 because.....
C) is approximately 120 because....
D) is 0.24 x 480 because.....

Warm up Exercise 3

Fractions

Do-talk-record

C

L2/L1

L2. 14% is ....1/7?

a) > because.....

b) < because.....

c) ≈ because.....

d) = because.....

L1. 8% is ... 1/12?

A) > because.....

B) < because.....

C) =0.8 because.....

D) =0.08 because.....

Warm up Exercise 4

Fractions

Do-talk-record

B

L2/L1

L2. 36% of 500 is the same as?

a) 180% of 100 because.....
b) 1.8% of 1000 because.....
c) 18% of 1000 because.....
d) 72% of 250 because.....

L1. 10% of 750 is the same as?

A) 100% of 75 because.....
B) 20% of 1500 because.....
C) 20% of 375 because.....
D) 50% of 150 because.....

Progress Checker 1

What do you already know about Equivalences between % / Decimals / Fractions ?

How would you rate your skills in changing between the three systems ?

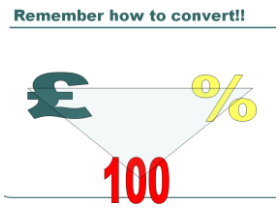
1) Excellent ability
2) Good ability, but working to improve
3) Ok, making a start but I know I have lots to still learn

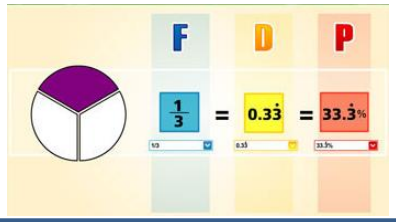
My aims for today _____ **are...**

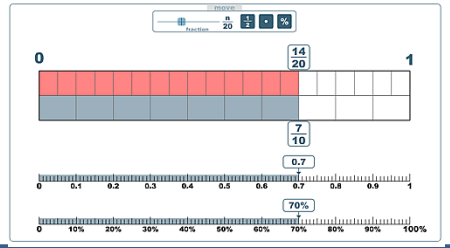
A Recognise that the three systems for parts of a whole are the same thing written differently

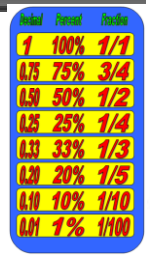
B Change one system to another, eg.. change fractions to decimals

C Use appropriate systems to solve and simplify problems









Introductory Video and Discussion

Is it better to stick with one method or change between systems during a calculation ?

Can all fractions be changed exactly to decimals ?

How are decimals and percentages different ?

When might we want to change between decimals / % / fractions ?

Which is the best system from counting values between 0 and 1 ?

Which is the newest system of counting parts of a whole ?

Watch the introductory video and then discuss the above

Your thoughts..

Vocabulary and Jobs

Equivalent
Decimal
Fraction
Percentage
Change
Convert
Conversion Triangle
Decimal places dps
Simplify
Ratio
Alter
Reduce

These are the words you will be using in this topic

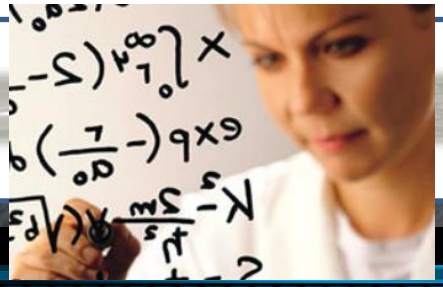
Hotel Management
Government Statistics
Scientist
Mathematician
Engineer
Health Care
Media
Cooking
Manufacturing

Statist…. Can you think of more?

……

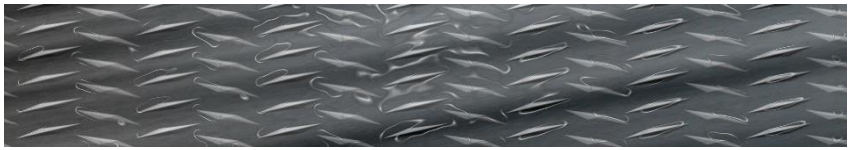
……

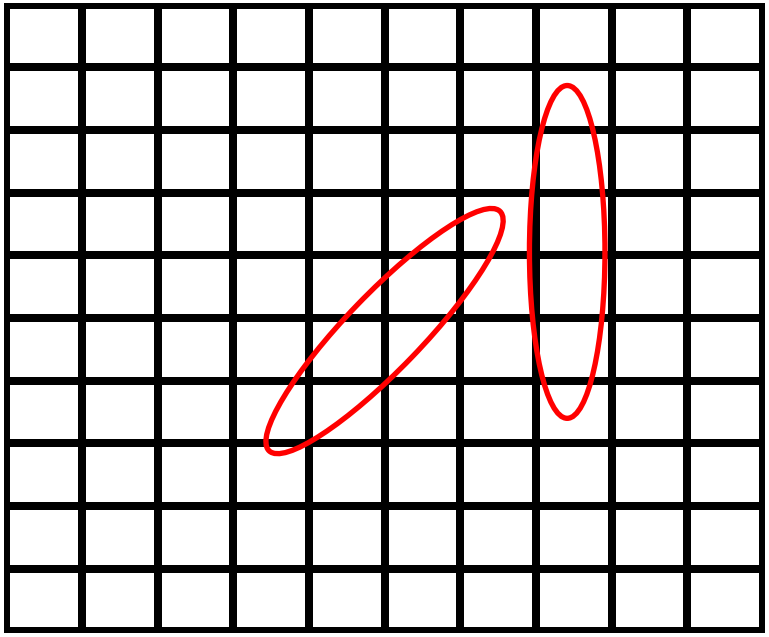




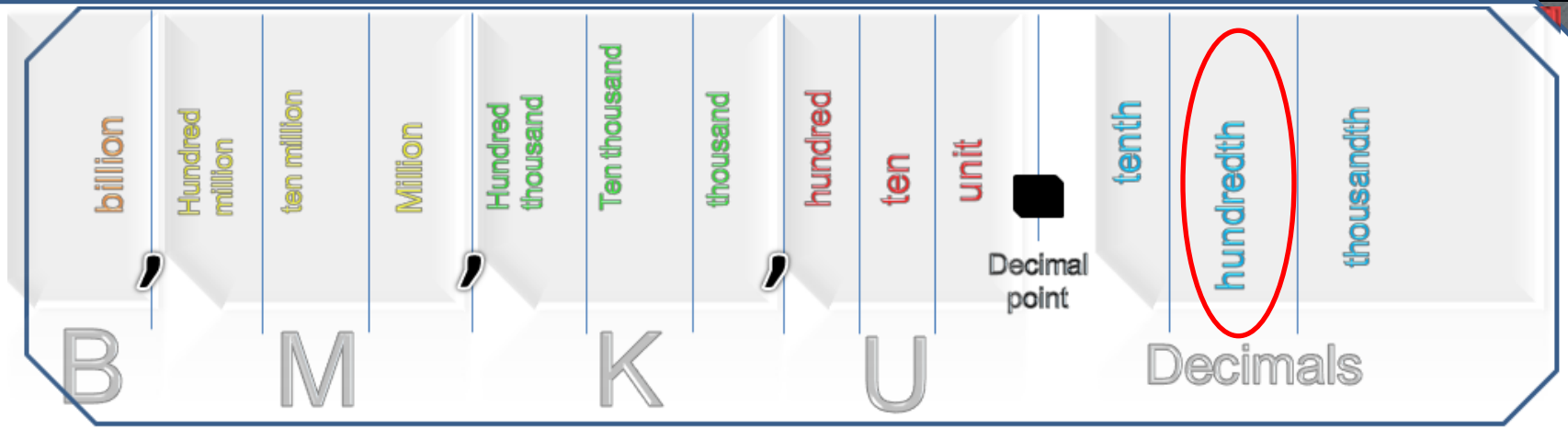

Four in a row equivalences grid

- Pair up
- Choose a square to start
- Write in it the % of the grid it is
- Next player chooses another square
- Write the fraction out of 100 that square is
- First player now chooses a second square and writes the decimal that square is
- Alternate between players choosing squares and writing the % -- fract – decimal values until one player has 4 squares in a line in any direction





Lesson: Main Teach 1



To be able to convert between the three systems of counting parts of a whole that have been invented over many centuries, first 'FRACTIONS' (5000 years old) , then 'DECIMALS' (200 years old) and finally 'PERCENTAGES' (60 years old), you need to know your place values, especially the H U N D R E D T H S.

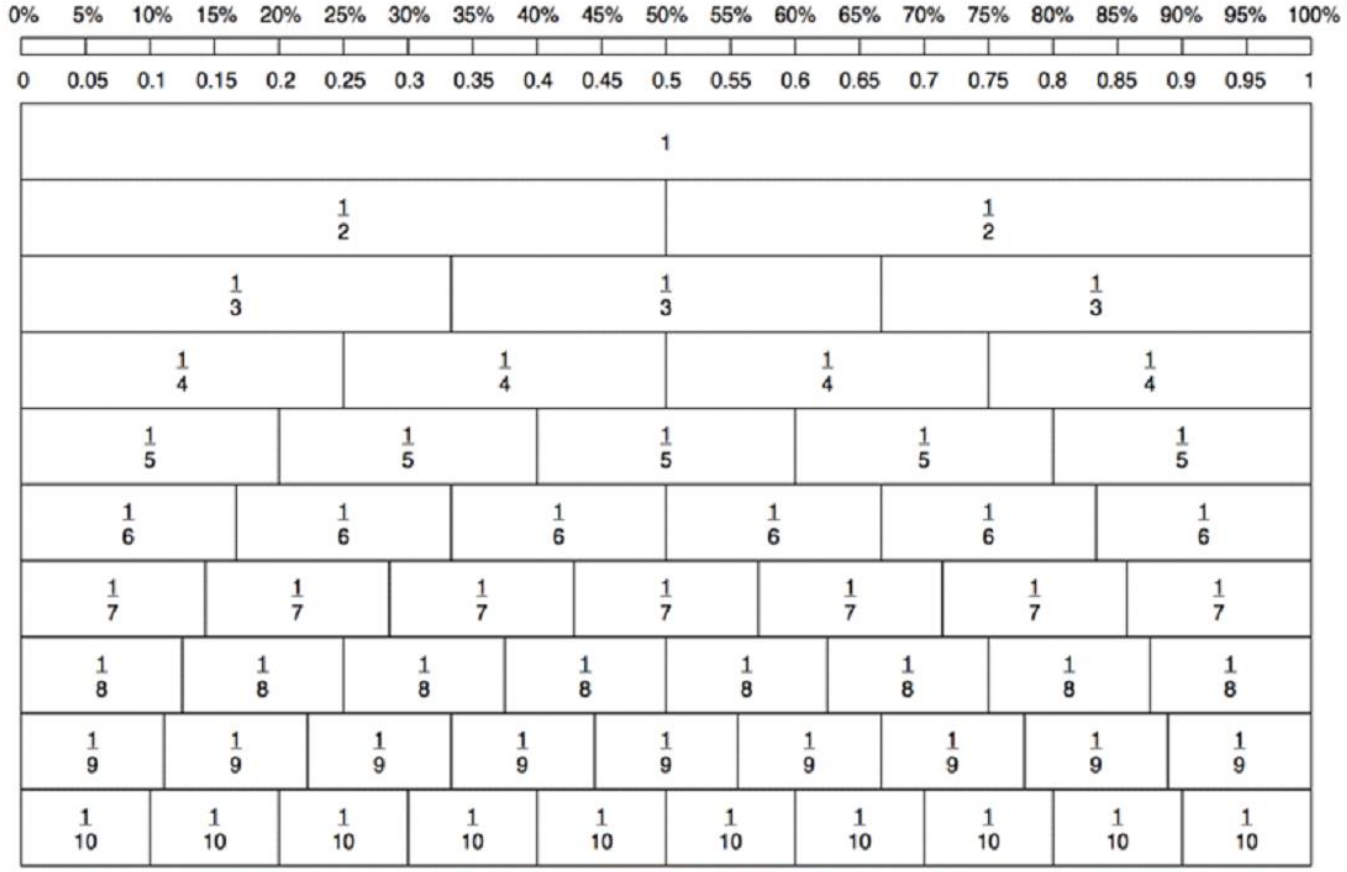
One cut into a hundred is also ..... 1 / 100..... one hundredth.....one percent..... 0.01

So ....if we put a 7 in the hundredths column to show we have seven parts out of the whole amount (such as 7p out of a £1) how could we show this value???

Well.... 7 out of a hundred is ..... 7/100 .....seven hundredths.....seven percent..... 0.07

Fraction, Decimal, Percentage Converter

Place your ruler vertically on this page and read off the scales to convert between fractions, decimals and percentages.



1.

To change a decimal to a percent we multiply by 100 or move the decimal point two places to the right.

0.30=30%

2.

To change a percent to a decimal we divide by 100 or move the decimal point two places to the left.

45%=0.45

3.

To change a percent to a fraction we place it on top of 100.

We then simplify it if we can.

56%=56/100

4

To change a decimal to a fraction we turn it to a percent and place it on top of 100.

0.95=95%=95/100

5.

To change a fraction to a percent we divide the denominator into 100 and multiply by the numerator

3/5=60/100=60%

6.

To change a fraction to a decimal we divide the numerator of the fraction by the demoninator

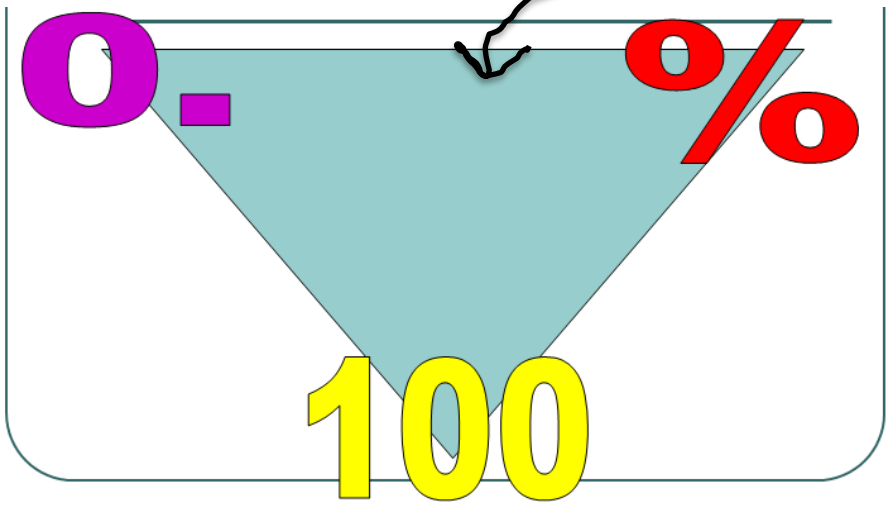
6/7=0.857..

Lesson: Main Teach 4

There are some basic equivalents that you can learn off by heart that are really useful in simplifying and speeding up your calculations.

Try to learn the basic equivalents in the grid opposite →

There is also a neat upside down triangle that can help you to convert any %/frac/dec number. Just write the value out of 100 in the space at the top of the triangle .... Cover up the two systems you don't want to see to leave the one you want ..... Here, try 73 ... put it here..... what did you get?? ..... Hopefully 73% or 73/100 or 0.73 ..great !!



Decimal	Percent	Fraction
1	100%	1/1
0.75	75%	3/4
0.50	50%	1/2
0.25	25%	1/4
0.33	33%	1/3
0.20	20%	1/5
0.10	10%	1/10
0.01	1%	1/100

Lesson: Try out

Block 1 : Watch tutor led demo (in class or on video)

Try these,
1) Which is larger ½ or 0.75
2) Which is smaller ¾ or 0.25
3) Which is larger 2/10 or 0.7
4) Which is smaller 40% or 0.35
5) Which is larger 25% or 0.6
6) Convert ½ into decimals and percentages

Block 2 : Watch tutor led demo (in class or on video)

Try these,
7) Convert 0.23 into fractions
8) Change 15/100 into percentage
9) Make 79/1000 into a decimal
10) Convert 0.05 into the simplest fraction
11) Alter 63% to be a decimal
12) Add together 3/10 + 0.27 writing your answer as a %

Block 3 : Watch tutor led demo (in class or on video)

Level Two

Try these,
13) Change 0.047 into a fraction
14) Convert 116/1000 into a decimal
15) Write 16.9% as a fraction
16) Write 0.437800..... as a fraction
17) 241/10000 is ..... as a %
18) Make 0.2% into a decimal

Lesson: Websites and links

Website on converting between %, decimals and fractions	http://www.mathsisfun.com/decimal-fraction-percentage.html
Conversion tool on website for you to check your answers	http://www.purplemath.com/modules/percents.htm
3 number lines to match %/frac/decimals to	http://www.ictgames.com/equivalence.html
Card matching game	http://www.mathplayground.com/matching_fraction_percent.html
Another card matching game	http://nrich.maths.org/1249
An online converter between fractions and decimals (with hundredths also)	http://www.amblesideprimary.com/ambleweb/mentalmaths/fracto.html

Lesson: Activity E

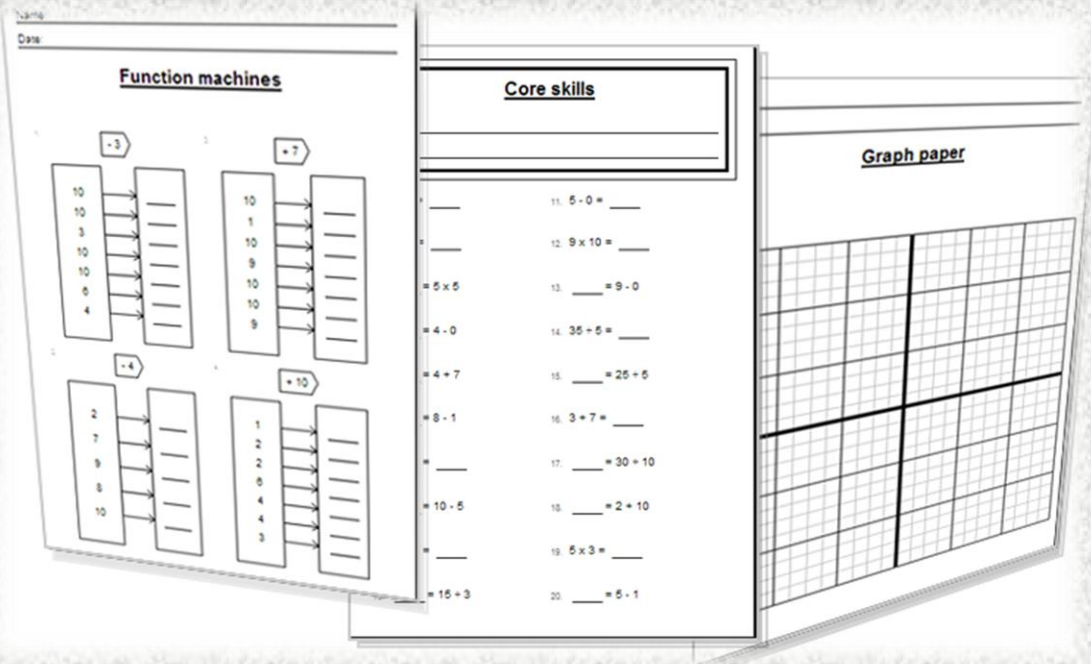
Try a variety of written practice

Worksheets

Workbooks

Practice Exam Papers

Maths Problems



Lesson: Practice – just the numbers

Convert Decimals to Percent

1) 0.40 = ...%
2) 0.75 =
3) 0.16 =
4) 0.62 =
5) 0.04 =
6) 0.005 =
7) 0.806 =
8) 0.999 =
9) 0.47231 =

Level Two

Convert Percent to Decimals

10) 15% = 0. ..... ?
11) 48% =
12) 82% =
13) 6% =
14) 0.5% =
15) 1.2% =
16) 16.9% =
17) 22.5% =

Convert Decimals to Fractions

18) 0.23
19) 0.18
20) 0.98
21) 0.33
22) 0.08
23) 0.005
24) 0.612
25) 0.8954
26) 0.4032

Convert Fractions to Decimals

27) 1/5
28) 3/10
29) 92/100
30) 25/75
31) 16/25
32) 1/3
33) 18/26
34) 2040/3928

Convert Fractions to Percent

35) 4/5
36) 9/10
37) 83/100
38) 1/6
39) 8/9
40) 900/1000
41) 23/49
42) 6/80
43) 2M / 18M

Convert Percent to Fractions

44) 1%
45) 20%
46) 85%
47) 72%
48) 16%
49) 9%
50) 0.7%
51) 11.8%

Lesson: Practice – word problems

1) I scored 15 out of 20 question correct. What was my percentage score?

2) A train journey is 45% of the way through. How many of the 50km has the train journey completed so far?

3) A charity has collected £0.381 M. Its target is a million pounds. What percentage of the money has still to be collected?

Level Two

4) A bus fare goes up £0.15 and was originally £1.20. What was the percentage increase? (hint, write as a fraction first then convert)

5) Mike spends 45% of his day sleeping. What fraction of 24 hours is this?

Level Two

6) A computer readout shows a dial setting to be at 0.35852..... . The dial should be set on setting 3 out of 5. Is the computer readout correct to the dial setting?

TOPIC ANSWERS 1

Just the numbers

1) 40%
2) 75%
3) 16%
4) 62%
5) 4%
6) 0.5%
7) 80.6%
8) 99.9%
9) 47.231%

10) 0.15
11) 0.48
12) 0.82
13) 0.06
14) 0.005
15) 0.012
16) 0.169
17) 0.225

Just the numbers

18) 23/100
19) 18/100 or 9/50
20) 98/100 or 49/50
21) 33/100 (about 1/3)
22) 8/100 or 2/25
23) 5/1000 or 1/200
24) 612/1000
25) 8954/10,000
26) 4032/10,000

27) 0.2
28) 0.3
29) 0.92
30) 0.333...
31) 0.64
32) 0.333...
33) 0.69...
34) 0.519...

Just the numbers

35) 80%
36) 90%
37) 83%
38) 16%
39) 89%
40) 90%
41) 47%
42) 7.5%
43) 11%

44) 1/100
45) 20/100 or 1/5
46) 85/100
47) 72/100
48) 16/100
49) 9/100
50) 7/1000
51) 118/1000

Word Problem ANSWERS

1) 75%

2) 22.5 km

3) 61.9%

4) 12.5%

5) 10.8 hours

6) No, the readout should say 0.8

TOPIC ANSWERS 2 Fuctional Skills Activity

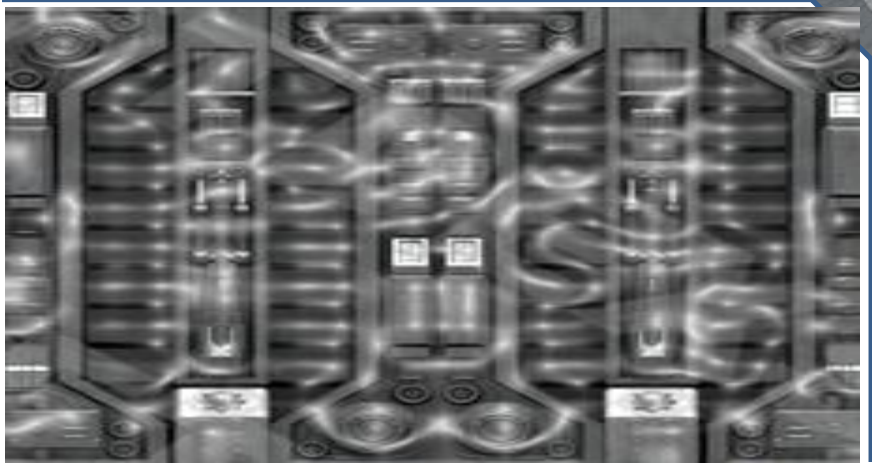
Answers

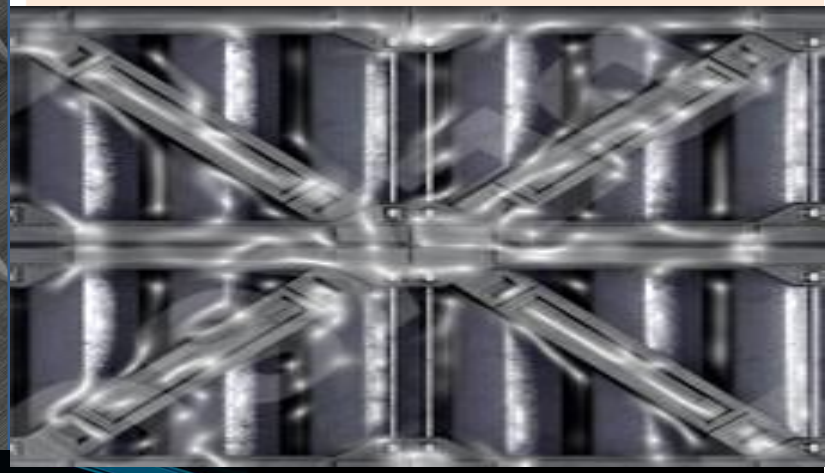
- 1a) 0.2 = 20% 0.166 = 16.6% 0.05 = 5%
- 0.15 = 15% 0.25 = 25% 0.6 = 60%

- b) 2/5 = 40% 1/8 = 12.5% 6/30 = 20%
- 11/44 = 25% 6/20 = 30% 8/20 = 40%
- 3/20 = 15%

- c) 5%, 12.5%, 15%, 16.6%, 20%, 25%, 33.3%, 30%, 40%, 60%, 66.7%

- d) 15%, 20%, 25%, 40%





Answers

- 2 a) 16.6% = 1/6 12.5% = 1/8 33.3% = 1/3 66.7% = 2/3

- b) Choose 4 discount totals listed in fractions and percentages from 5%, 15%, 20%, 25%, 30%, 40%, 60%, 1/3, 2/3, 1/6 and 1/8.

- c) Explain the 4 choices. Have you considered the easiest for customers to understand, or the range of discounts you think should be available?

Progress Checker 2

What do you now know about Equivalences between % / Decimals / Fractions ?

How would you now rate your skills in changing between the three systems ?

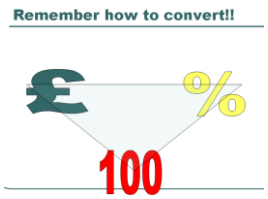
1) Excellent ability
2) Good ability, but still working to improve
3) Ok, made a start but I know I have lots to still learn

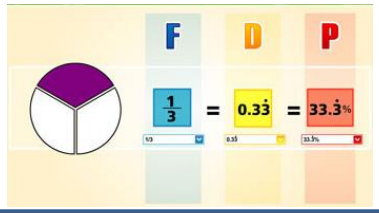
My aims for today were...

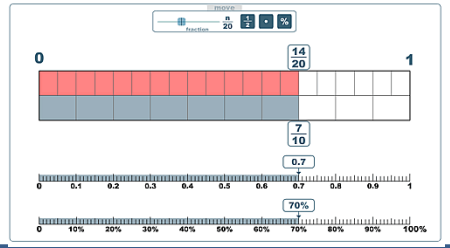
A Recognise that the three systems for parts of a whole are the same thing written differently

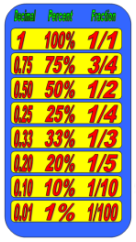
B Change one system to another, eg.. change fractions to decimals

C Use appropriate systems to solve and simplify problems









Continuing to Study and Learn

What else can you do to help yourself to learn and practice? Here are ten suggestions, record which you do each week and also record your progress.

Internet websites
Repeat the lesson, make notes, organise a folder, revise

Own maths workbook
Study together with a friend or family member

Finish activities in this book
Complete class handouts or tasks

Practice exams / past papers
Use maths skills learnt at home or at work in real situations

Play games
Experiment yourself, try new things ask yourself questions

Try making a graph of number of practice methods you use against your progress score in each topic. Are you showing more practice gives better results?