Fraction, Decimal and Percentage 100 Square

$\frac{1}{100}$	$\frac{2}{100}$	$\frac{3}{100}$	$\frac{4}{100}$	$\frac{5}{100}$	$\frac{6}{100}$	$\frac{7}{100}$	$\frac{8}{100}$	$\frac{9}{100}$	$\frac{10}{100}$
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
$\frac{11}{100}$	$\frac{12}{100}$	$\frac{13}{100}$	$\frac{14}{100}$	$\frac{15}{100}$	$\frac{16}{100}$	$\frac{17}{100}$	$\frac{18}{100}$	$\frac{19}{100}$	$\frac{20}{100}$
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
$\frac{21}{100}$	$\frac{22}{100}$	$\frac{23}{100}$	$\frac{24}{100}$	$\frac{25}{100}$	$\frac{26}{100}$	$\frac{27}{100}$	$\frac{28}{100}$	$\frac{29}{100}$	$\frac{30}{100}$
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30
21%	22%	23%	24%	25%	26%	27%	28%	29%	30%
$\frac{31}{100}$	$\frac{32}{100}$	$\frac{33}{100}$	$\frac{34}{100}$	$\frac{35}{100}$	$\frac{36}{100}$	$\frac{37}{100}$	$\frac{38}{100}$	$\frac{39}{100}$	$\frac{40}{100}$
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40
31%	32%	33%	34%	35%	36%	37%	38%	39%	40%
$\frac{41}{100}$	$\frac{42}{100}$	$\frac{43}{100}$	$\frac{44}{100}$	$\frac{45}{100}$	$\frac{46}{100}$	$\frac{47}{100}$	$\frac{48}{100}$	$\frac{49}{100}$	$\frac{50}{100}$
0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50
41%	42%	43%	44%	45%	46%	47%	48%	49%	50%
$\frac{51}{100}$	$\frac{52}{100}$	$\frac{53}{100}$	$\frac{54}{100}$	$\frac{55}{100}$	$\frac{56}{100}$	$\frac{57}{100}$	$\frac{58}{100}$	$\frac{59}{100}$	$\frac{60}{100}$
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60
51%	52%	53%	54%	55%	56%	57%	58%	59%	60%
$\frac{61}{100}$	$\frac{62}{100}$	$\frac{63}{100}$	$\frac{64}{100}$	$\frac{65}{100}$	$\frac{66}{100}$	$\frac{67}{100}$	$\frac{68}{100}$	$\frac{69}{100}$	$\frac{70}{100}$
0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70
61%	62%	63%	64%	65%	66%	67%	68%	69%	70%
$\frac{71}{100}$	$\frac{72}{100}$	$\frac{73}{100}$	$\frac{74}{100}$	$\frac{75}{100}$	$\frac{76}{100}$	$\frac{77}{100}$	$\frac{78}{100}$	$\frac{79}{100}$	$\frac{80}{100}$
0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80
71%	72%	73%	74%	75%	76%	77%	78%	79%	80%
$\frac{81}{100}$	$\frac{82}{100}$	$\frac{83}{100}$	$\frac{84}{100}$	$\frac{85}{100}$	$\frac{86}{100}$	$\frac{87}{100}$	$\frac{88}{100}$	$\frac{89}{100}$	$\frac{90}{100}$
0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90
81%	82%	83%	84%	85%	86%	87%	88%	89%	90%
$\frac{91}{100}$	$\frac{92}{100}$	$\frac{93}{100}$	$\frac{94}{100}$	$\frac{95}{100}$	$\frac{96}{100}$	$\frac{97}{100}$	$\frac{98}{100}$	$\frac{99}{100}$	$\frac{100}{100}$
0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
91%	92%	93%	94%	95%	96%	97%	98%	99%	100%

Fraction, Decimal and Percentage 100 Square

Fill in the missing spaces to complete the 100 square and show the fraction, decimal and percentage equivalents.

$\frac{1}{100}$			$\frac{4}{100}$	$\frac{5}{100}$	$\frac{6}{100}$		$\frac{8}{100}$		$\frac{10}{100}$
0.01	0.02	0.03			0.06	0.07	0.08	0.09	0.10
1%			4%		6%			9%	
$\frac{11}{100}$		$\frac{13}{100}$		$\frac{15}{100}$		$\frac{17}{100}$		$\frac{19}{100}$	
0.11	0.12				0.16		0.18	0.19	
		13%	14%	15%		17%			20%
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0.21	0.22		0.24	0.25		0.27		0.29	
	22%	23%		25%		27%			
	$\frac{32}{100}$		$\frac{34}{100}$		$\frac{36}{100}$	$\frac{37}{100}$	$\frac{38}{100}$	$\frac{39}{100}$	
0.31			0.34	0.35		0.37			0.40
	32%	33%			36%		38%	39%	
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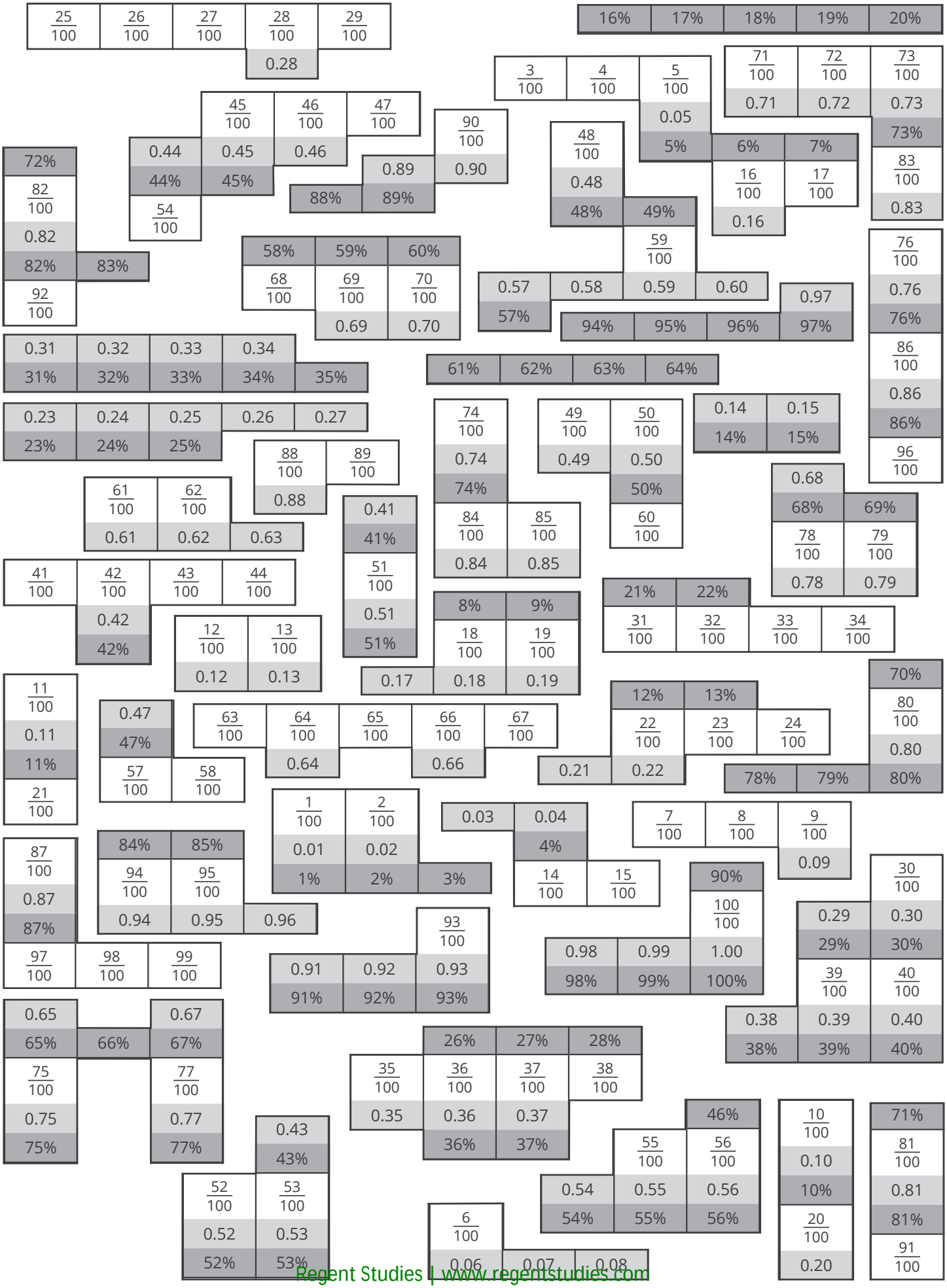
41%			44%					49%	50%
	$\frac{52}{100}$		$\frac{54}{100}$		$\frac{56}{100}$			$\frac{59}{100}$	
0.51	0.52			0.55	0.56	0.57	0.58	0.59	0.60
			54%	55%				59%	
$\frac{61}{100}$		$\frac{63}{100}$		$\frac{65}{100}$	$\frac{66}{100}$				$\frac{70}{100}$
		0.63					0.68		
61%		63%	64%		66%	67%	68%	69%	
	$\frac{72}{100}$		$\frac{74}{100}$		$\frac{76}{100}$			$\frac{79}{100}$	
0.71		0.73		0.75		0.77			0.80
			74%	75%			78%		
$\frac{81}{100}$		$\frac{83}{100}$	$\frac{84}{100}$		$\frac{86}{100}$	$\frac{87}{100}$			
0.81	0.82			0.85			0.88	0.89	0.90
				85%				89%	
		$\frac{93}{100}$	$\frac{94}{100}$		$\frac{96}{100}$				
0.91	0.92	0.93	0.94	0.95	0.96	0.97			
91%		93%	94%	95%	96%		98%	99%	

Fraction, Decimal and Percentage 100 Square

Cut out and rearrange the pieces to make a 100 square to show the fraction, decimal and percentage equivalents.



Fraction, Decimal and Percentage 100 Square

$\frac{1}{100}$	$\frac{2}{100}$	$\frac{3}{100}$	$\frac{4}{100}$	$\frac{5}{100}$	$\frac{6}{100}$	$\frac{7}{100}$	$\frac{8}{100}$	$\frac{9}{100}$	$\frac{10}{100}$
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0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
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0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30
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0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60
51%	52%	53%	54%	55%	56%	57%	58%	59%	60%
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		13%	14%	15%		17%			20%
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	22%	23%		25%		27%			
	$\frac{32}{100}$		$\frac{34}{100}$		$\frac{36}{100}$	$\frac{37}{100}$	$\frac{38}{100}$	$\frac{39}{100}$	
0.31			0.34	0.35		0.37			0.40
	32%	33%			36%		38%	39%	
$\frac{41}{100}$		$\frac{43}{100}$	$\frac{44}{100}$	$\frac{45}{100}$		$\frac{47}{100}$	$\frac{48}{100}$		
	0.42	0.43			0.46	0.47	0.48		
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	$\frac{52}{100}$		$\frac{54}{100}$		$\frac{56}{100}$			$\frac{59}{100}$	
0.51	0.52			0.55	0.56	0.57	0.58	0.59	0.60
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$\frac{61}{100}$		$\frac{63}{100}$		$\frac{65}{100}$	$\frac{66}{100}$				$\frac{70}{100}$
		0.63					0.68		
61%		63%	64%		66%	67%	68%	69%	
	$\frac{72}{100}$		$\frac{74}{100}$		$\frac{76}{100}$			$\frac{79}{100}$	
0.71		0.73		0.75		0.77			0.80
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$\frac{81}{100}$		$\frac{83}{100}$	$\frac{84}{100}$		$\frac{86}{100}$	$\frac{87}{100}$			
0.81	0.82			0.85			0.88	0.89	0.90
				85%				89%	
		$\frac{93}{100}$	$\frac{94}{100}$		$\frac{96}{100}$				
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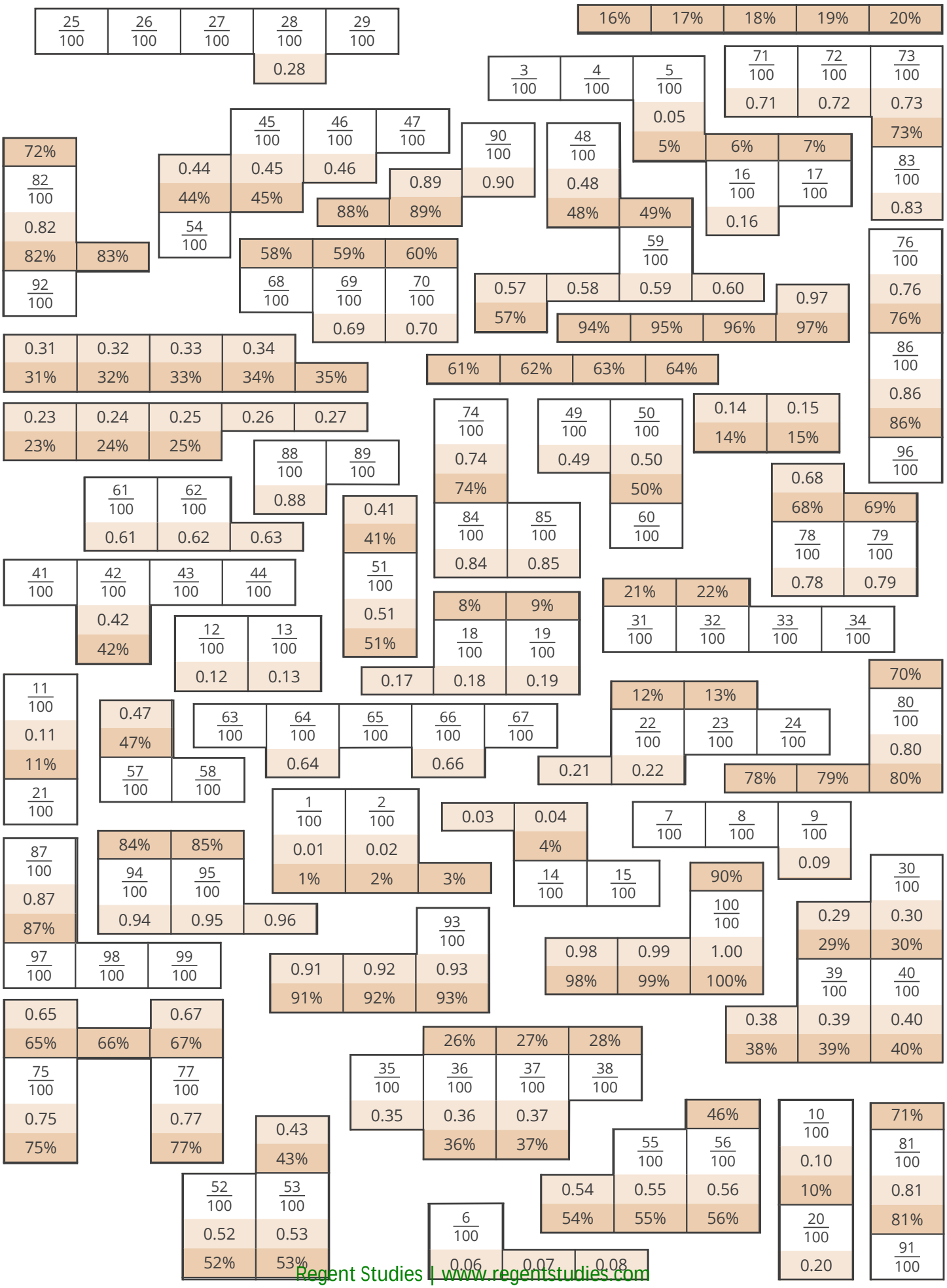
Fraction, Decimal and Percentage 100 Square

Cut out and rearrange the pieces to make a 100 square to show the fraction, decimal and percentage equivalents.

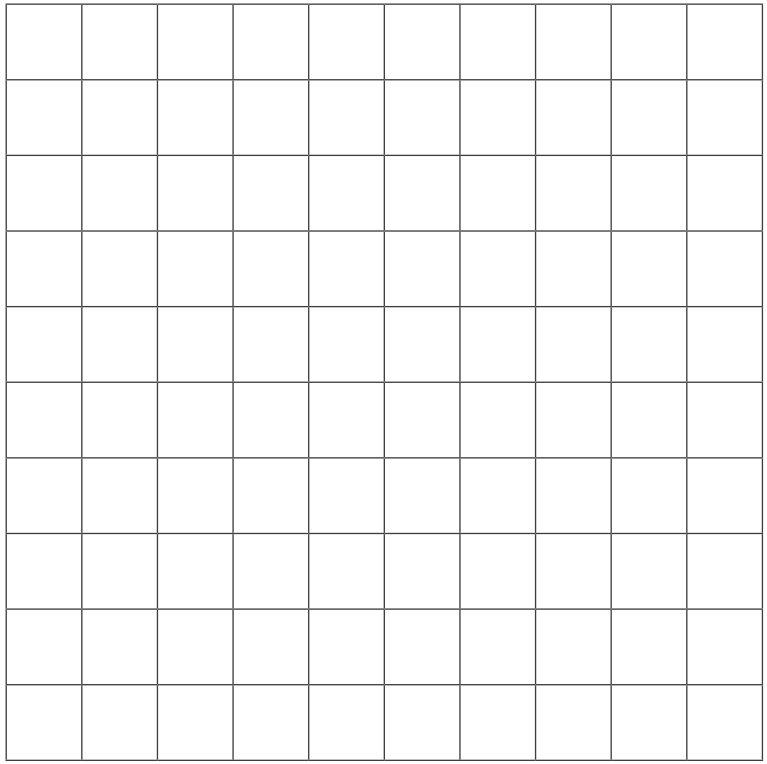


Design a Park

Task

Your task is to design a park.

You can colour in the squares to represent what you have included. For example, you could colour the squares in green to represent trees or blue to represent water, or even colour in the squares grey to indicate a skate-park; the design is completely up to you! All you need to do is include a key and complete the fractions, decimal and percentages equivalence table to indicate the proportion of each item.



Key

Item	Fraction	Decimal	Percentage

Design a Park

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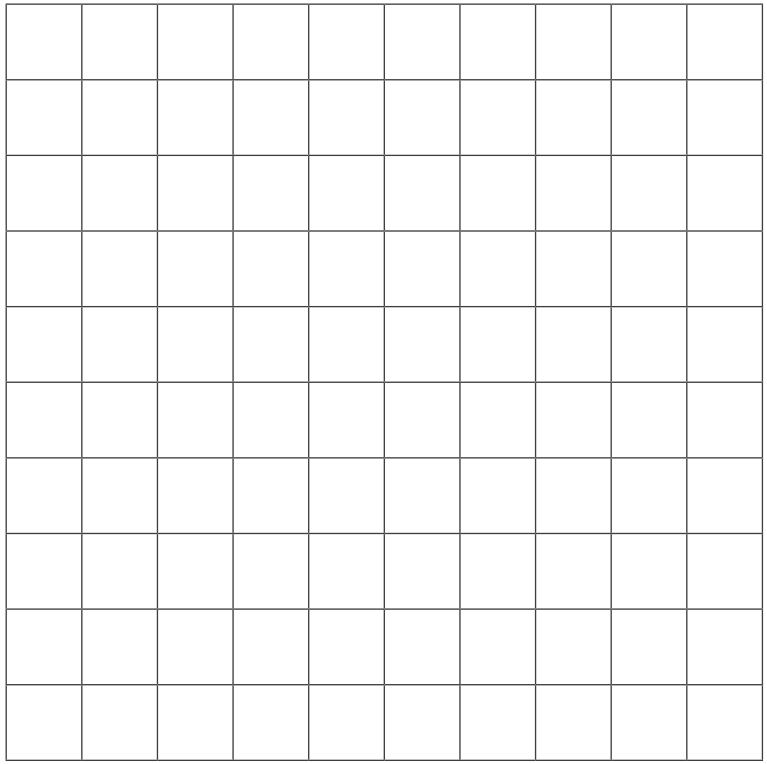
Your task is to design a park.

You can colour in the squares to represent what you have included. For example, you could colour the squares in green to represent trees. However, there are 3 rules you must follow: there must be 23% trees, 0.1 of an item of your choice and $\frac{1}{5}$ of another item of your choice.

You must include a key and complete the fractions, decimal and percentages equivalence table to indicate the proportion of each item.



Key

Item	Fraction	Decimal	Percentage
Trees			23%
		0.1	
	$\frac{1}{5}$		

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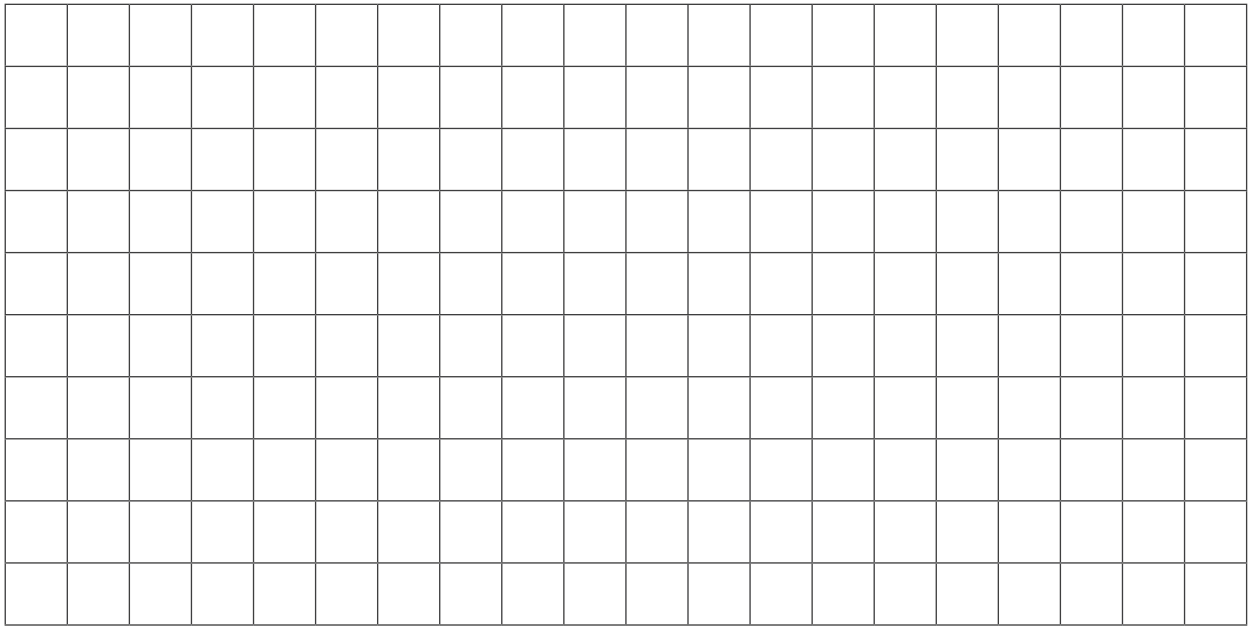
Key



Item	Fraction	Decimal	Percentage
	$\frac{1}{5}$		
		0.1	
	$\frac{8}{25}$		

Design a Park

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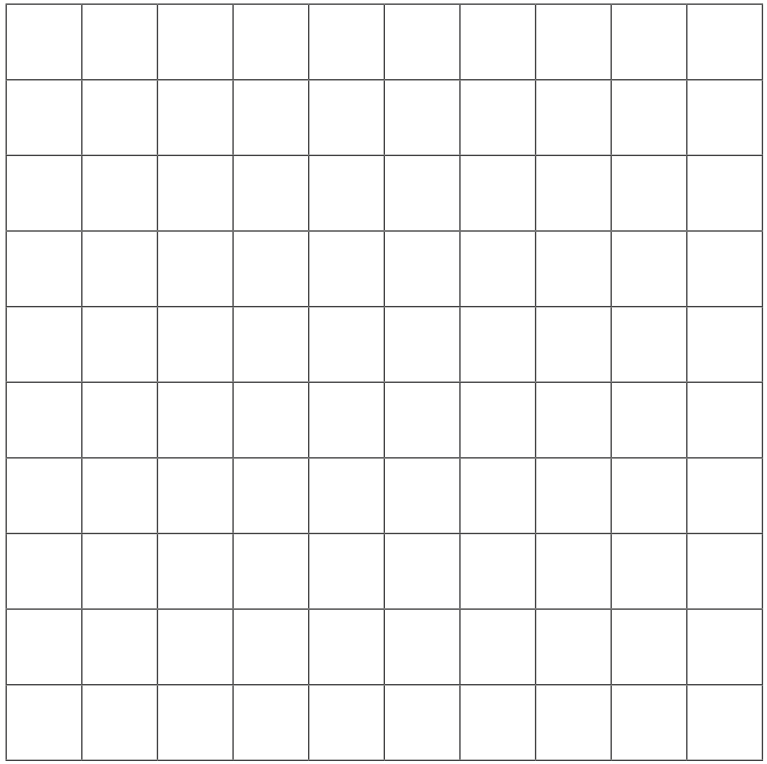

Key

Item	Fraction	Decimal	Percentage

Design a Park

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Your task is to design a park.

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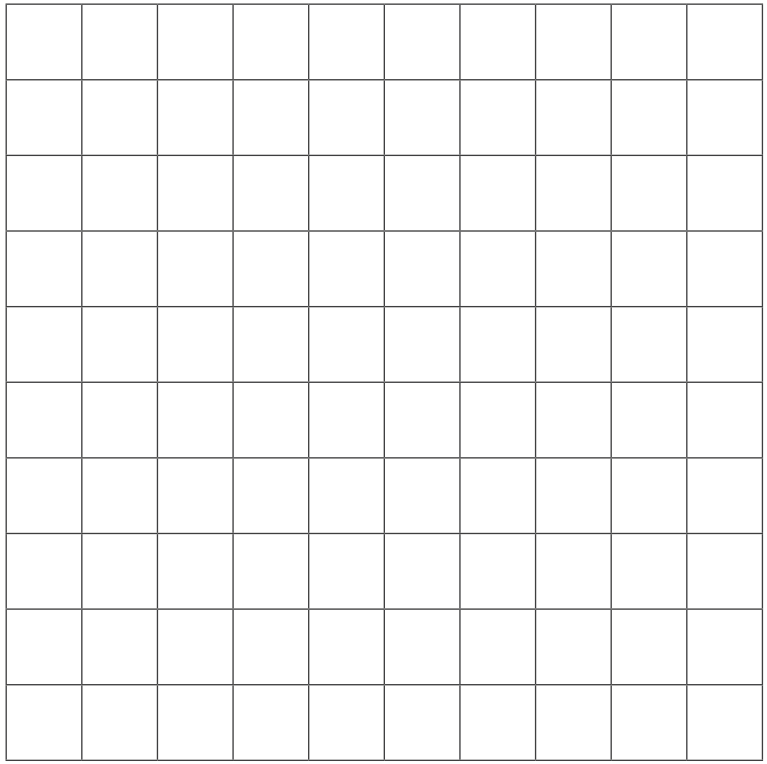

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Trees			23%
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Design a Park

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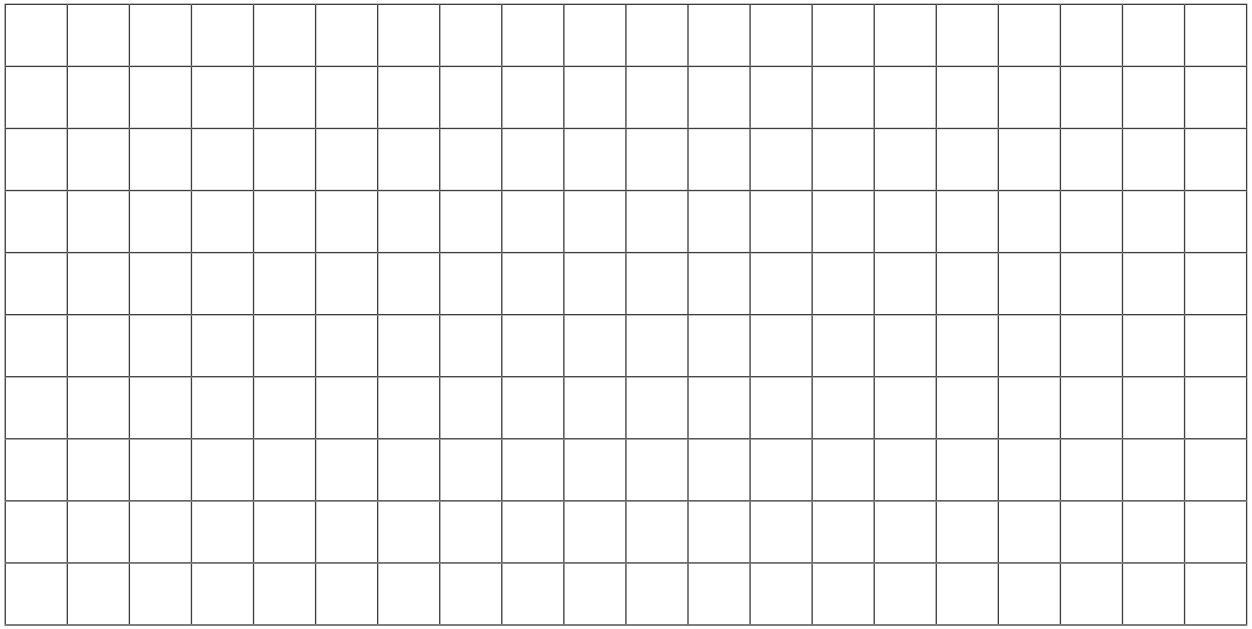


Item	Fraction	Decimal	Percentage
	$\frac{1}{5}$		
		0.1	
	$\frac{8}{25}$		

Converting between Fractions, Decimals and Percentages

Lesson 1: An Introduction

Learning Objective

To identify and develop an understanding of simple equivalent fractions, decimals and percentages.

Targeting Assessment Objectives A01

Success Criteria

- To recap core skills needed to convert fractions, decimals and percentages.
- To use a 100 square to identify simple equivalents.
- To design a park which shows simple fraction, decimal and percentage equivalents.

Unscramble

Can you unscramble the letters to spell out some of the keywords for today's lesson?

L D I M C E A	**DECIMAL**
E C A N G R P T E E	**PERCENTAGE**
A C O N I R F T	**FRACTION**
V E U Q I L A N C E E	**EQUIVALENCE**
V I E D D I	**DIVIDE**
U I P M Y T L L	**MULTIPLY**

Extension: Try writing an example or definition for each word.

Did Someone Say 'Pizza'?

Two friends decide to buy a pizza and they see these offers:

Buy one pizza

and get

35% extra free **!**

Buy one pizza

and get

$\frac{7}{20}$ extra free **!**

Assuming each pizza is the same base price, which offer is the best and why?

Discuss with a partner.

Did Someone Say 'Pizza'?

Buy one pizza

and get

35% extra free !

Buy one pizza

and get

$\frac{7}{20}$ extra free !

Pause for Thought

What do we mean by 'convert'?

Which is the best offer?

In fact, neither offer is the best: they are equivalent!

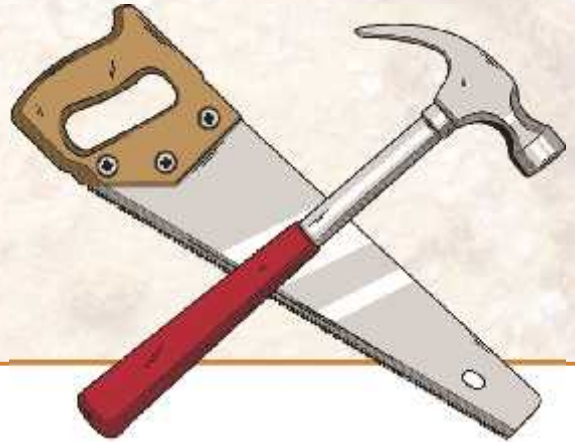
It is useful to know how to convert between fractions, decimals and percentages so we can compare them.

To 'convert' a value, we change it from one system of units to another whilst remaining equivalent. For example, 50% is equivalent to 0.50 or $\frac{1}{2}$.

This is similar to when you exchange currency. For example, you will be given the equivalent value of British pounds in US dollars.

Maths Skills Toolbox

These is a set of skills which we need to recap on to help us convert **confidently** between fractions, decimals and percentages.



You need to be able to:

- Use the bus stop method for dividing.
- Multiply integers and decimals by 100 without a calculator.
- Divide integers by 100 without a calculator.
- Simplify fractions.
- Use a 100 square to convert fractions, decimals and percentages.

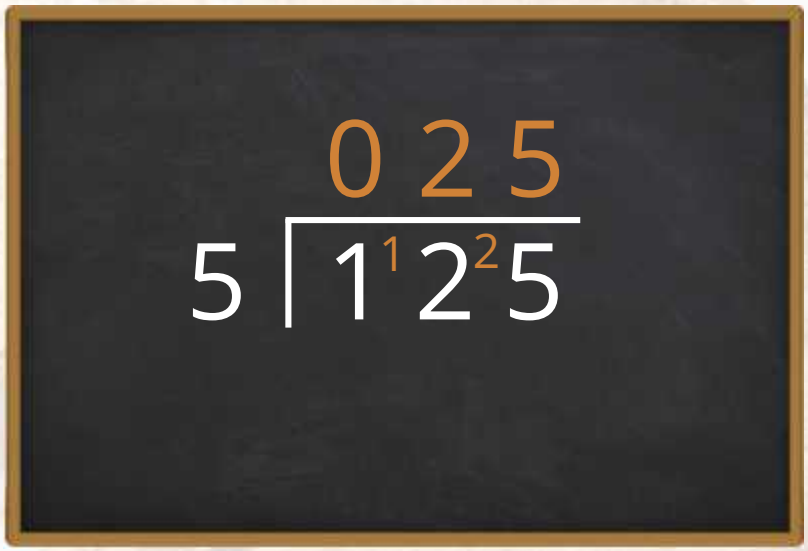
Bus Stop Method

125 ÷ 5 = **25**

Step 2

Remember: the first number goes inside the box, the second and the last one goes on the **outside**.

So write 2 above the line and carry the remainder over to the 5.



Bus Stop Method

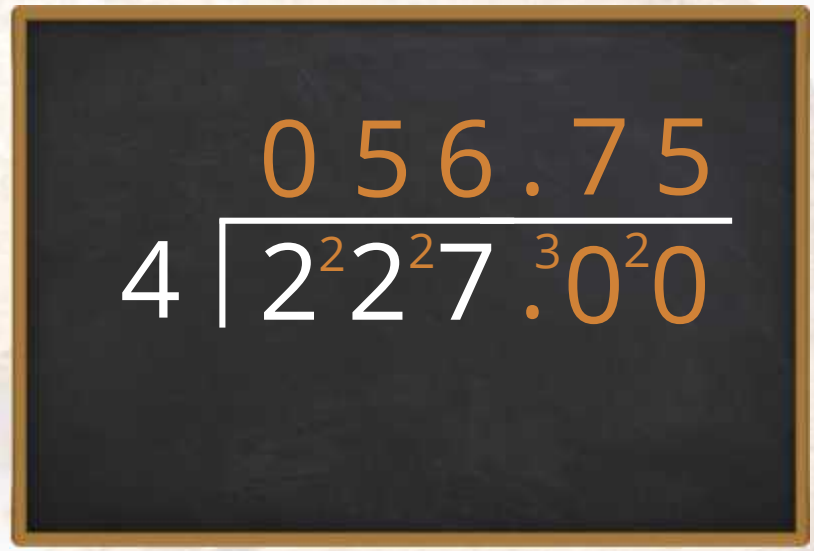
227 ÷ 4 = **56.75**

Step 2

227 ÷ 4 or in the words, how many 4s go into 227? The answer is 06 with a remainder of 3.

Remember: the first number goes **inside** the bus stop and what you're dividing by goes on the **outside**.

So write 5 above the line and carry the remainder over to the 7.



Pause for Thought
What do we do now?

Dividing Using the Bus Stop Method

Now have a go at the following questions:

1. 455 ÷ 5 **= 91**
2. 204 ÷ 4 **= 51**
3. 329 ÷ 5 **= 65.8**
4. 191 ÷ 2 **= 95.5**
5. 794 ÷ 8 **= 99.25**

Multiplying Numbers by 100

When we multiply a number by 100, we move the digits of the number two places to the left.

42.9 × 100 **= 4290**

Thousands	Hundreds	Tens	Units	Tenths	Hundredths	Thousandths
		4	0	. 9		

We must make sure we add in the zero to the units column as a placeholder.

Dividing Numbers by 100

When we divide a number by 100, we move the digits of the number two places to the right.

73.2 ÷ 100 **= 0.732**

Thousands	Hundreds	Tens	Units	Tenths	Hundredths	Thousandths
		7	3 0	. 2		

We must make sure we add in the zero to the units column as a placeholder.

Your Turn

Now have a go at the following questions:

1. 0.45×100 **= 45**

2. $792 \div 100$ **= 7.92**

3. $101.3 \div 100$ **= 1.013**

4. 0.057×100 **= 5.7**

5. $1.24 \div 100$ **= 0.0124**

Simplifying Fractions

To simplify a fraction, we must find the highest common factor between its numerator and its denominator.

Remember: 'common' means that the same integer must divide into the top and the bottom.

For example:

Write $\frac{55}{100}$ in its simplest terms.

5 would be the highest common factor of 55 and 100.

$$\frac{55}{100} \quad \begin{matrix} \div 5 \\ \div 5 \end{matrix} \longrightarrow \frac{11}{20}$$

Your Turn

Now have a go at the following questions:

1. $\frac{16}{24} = \frac{2}{3}$

2. $\frac{25}{30} = \frac{5}{6}$

3. $\frac{8}{40} = \frac{1}{5}$

4. $\frac{49}{63} = \frac{7}{9}$

5. $\frac{25}{175} = \frac{1}{7}$

Using a Hundred Square

We can use a 100 square to help us convert between fractions, decimals and percentages. Using your squares, fill in the following table.

Fraction	Decimal	Percentage
$\frac{45}{100}$	0.45	**45%**
$\frac{56}{100}$	**0.56**	**56%**
$\frac{73}{100}$	**0.73**	73%
$\frac{20}{100}$	0.20	**20%**
$\frac{1}{100}$	**0.01**	1%

Design a Park

Your task is to design a park.

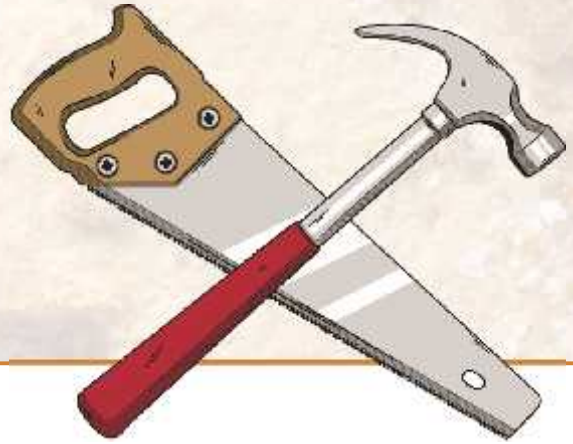
You can colour in the squares to represent what you have included. For example, you could colour the squares in green to represent trees or blue to represent water, or even colour in the squares grey to indicate a skate-park.

All you need to do is include a key and complete the fractions, decimal and percentages equivalence table to indicate the proportion of each item.

Reflection

Go back to the Maths Skills Toolbox.

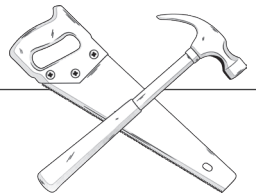
1. Which skills have you mastered today? Convince me you have mastered them.
2. Which skills do you still need to practise?
3. What is your target for next lesson?



You need to be able to:

- Use the bus stop method for dividing.
- Multiply integers and decimals by 100 without a calculator.
- Divide integers by 100 without a calculator.
- Simplify fractions.
- Use a 100 square to convert fractions, decimals and percentages.

Maths Skills Toolbox



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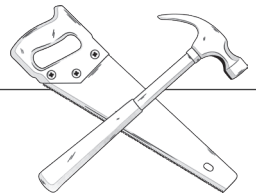

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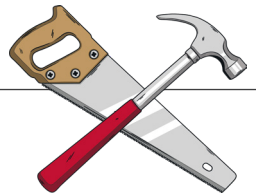

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Fraction, Decimal and Percentage **Question Table**

Fraction	Decimal	Percentage
	0.45	
		73%
	0.20	
		1%

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Converting between Fractions, Decimals and Percentages

Teaching Ideas

Learning Objective:
To identify and develop an understanding of simple equivalent fractions, decimals and percentages.

Success Criteria:

- To recap core skills needed to convert fractions, decimals and percentages.
- To use a 100 square to identify simple equivalents.
- To design a park which shows simple fraction, decimal and percentage equivalents.

Context
This lesson introduces converting fractions, decimals and percentages by recapping the core skills needed to be able to do this: dividing using the bus stop method; multiplying and dividing numbers by 100; simplifying fractions. The lesson then moves to converting between fractions, decimals and percentages using a 100 square. Students will need to have a good understanding of their times tables as well as of place value. You may find that the contents of this lesson can stretch over several sessions.

Resources
Design a Park Worksheet, 100 Square Worksheet, Question Table Worksheet, Skills Toolbox.

Starter

Unscramble

A great opportunity for students to become familiar with some of the keywords needed during the lesson. Display the starter for approximately 3 minutes; you may wish for students to complete the activity in their books or on whiteboards. Students should unscramble each word and as an extension can write an example or definition for each word. When the activity has run its course, draw the class together and go through the answers.

Main Activities

Did Someone Say 'Pizza'?

Display the two pizza offers and allow students up to 1 minute to discuss which offer is the best with a partner.

Ask students for their responses and encourage them to give a reason for this. The following slide reveals that they are actually equivalent offers.

Display the pause for thought question. You may wish for students to talk to a partner about what they think 'converting' means or you may wish to ask for suggestions from the class. An example of currency conversion is provided in addition to the pizza problem – perhaps students can offer some more real-life scenarios.

Maths Skills Toolbox

This slide presents students with the skill set which they need to be able to convert between fractions, decimals and percentages effectively. Simply share these with the class; they will be referred to again during the plenary.

Bus Stop Method

This sequence of slides indicates how to effectively use the bus stop method; you may use all three examples (each provides a unique challenge) or just one of them if you feel your class has quickly grasped the concept.

Use the 'pause for thought' question on the second example to encourage students to think about what happens with their remainder. Address any answers which may involve simple placing an 'r' followed by the remainder value.

Use the third example to show students how to use the decimal point and subsequent zeros to help them complete the division.

The final slide offers opportunity for pupils to practise this skill. Use this time to walk around the class and check in on students' work.

Multiplying Numbers by 100

This slide provides an example of how to multiply by 100. You may wish to ask the class what happens when they multiply by 10, 100 or a 1000 to draw out any misconceptions that you simply 'add zeros' onto the end of the number. The example deliberately uses a decimal to highlight the correct process. Emphasise the importance of putting the 0 in the units column as a place holder. Also ensure students understand that the decimal point never moves, rather the digits move around the decimal point.

Dividing Numbers by 100

Use this opportunity in the same way as the previous slide. Address any misconceptions that you simply 'remove zeros' when dividing by 100. Again, the example uses a decimal to highlight the correct process. Emphasise the importance of putting the 0 in the units column as a place holder. Again, ensure students understand that the decimal point never moves, rather the digits move around the decimal point.

Your Turn

This pit-stop practice will allow students to implement the key skills you have just gone through. Like before, use this opportunity to walk around the class and check in on students' work.

Simplifying Fractions

This slide will allow you to revisit how to write a fraction in its simplest terms. It is also followed by a slide with some practice questions on it. It is important to emphasise that writing a fraction in its simplest form involves finding the highest common factor rather than just halving the numerator and denominator. The example has been chosen to highlight the correct process.

Using a 100 Square to Convert

Students could use the **100 Square Worksheet** to help them with this activity. Using this, they should complete the table showing equivalent fractions, decimals and percentages. You may want students to quickly draw this table in their books, or you could use the **Question Table Worksheet** to save time. Students may well notice patterns such as 56% is 0.56. You may wish to discuss this with students although this would be visited in detail in subsequent lessons on converting fractions, decimals and percentages.

Design a Park

Use the **Design a Park Worksheet** to allow students to apply their understanding of what you have shown them on the PowerPoint. These sheets are differentiated by scaffold, so students should be able to work independently. The higher ability sheet uses a 200 square to challenge them in their thinking. You may wish to share students' designs when they have completed the activity.

Plenary

A Perfect Triple

The plenary draws the lesson together by revisiting the **Maths Skills Toolbox** and provides a good opportunity for a self-assessment. Students could record their responses in their books or they could use the Maths Skills Toolbox Sheet to record their answers. Students are encouraged to 'convince' you that they have mastered a skill by using mathematical reasoning. For example, 'I have mastered the multiplying by 100 skills because I know that you move the digits to the left twice adding in a place holder to the unit's column if necessary.' This will allow you a good insight into the depth of students' understanding.

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