# Using Percentages. *% Stg 6/E7   props & rats* Name:_____

'Percent' is a word you hear all the time, especially from politicians trying to sell you an idea. E.g.
"51 percent of all dog owners in Levin East agree that **all cats should be banned**" or "You have a
3 percent chance of being struck by lightning if you dance around outside during a thunderstorm
whilst holding an aluminium ladder". But what does 'percent' mean? **'Percent'** literally means
'per –hundred' – like there are 100 *cents* in a dollar. It just shows us a fraction that has been
converted to **100ths.** So if I had 3 percent (**%** is the symbol BTW) it is the same as 3/100ths.
Or **51% = 51/100ths**. And so, like any other fraction **100/100ths, = 1** and **so 100% = 1**
Let's have a look at some very common percentages:

One Half is 50%   A quarter is 25%   A third is 33.3%   One tenth is 10%
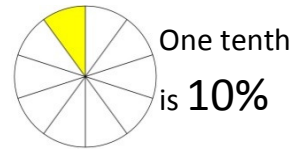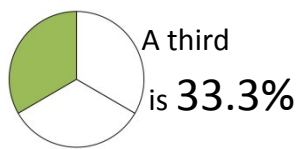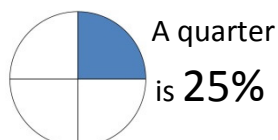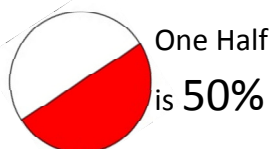
In fact, knowing that **1/10 = 10%** can help you out of a lot of tricky situations. Figuring out a tenth of any
number is easy – just use your old buddy place value to bump it down once. So we can get the percentage of
numbers by dividing by 10, then multiplying by however many we need to again…*What?* I'll show you:

E.G. what is **40% of 70?** Well, we know that 10% of 70 is **7**. So then we go **4** (4 lots of 10%) **x 7 = 28%   Try:**

a.   60% of 90 = ___   we know 10% of 90 = ____ x 6 = ____
b.   30% of 50 = ___   we know 10% of 50 = ____ x 3 = ____
c.   90% of 30 = ___   we know 10% of 30 = ____ x 9 = ____
d.   70% of 80 = ___   we know 10% of 80 = ____ x 7 = ____
e.   40% of 40 = ___   we know 10% of 40 = ____ x 4 = ____

> **%** - The modern symbol for percentage came from medieval Italy in the 15th century and evolved over the next two centuries. Earlier, percentages were used in ancient Egypt and India in the fourth century B.C.

By the same logic, it's super easy to figure out what 1% of any number is too, then we can easily figure other
small numbers too! E.G. what is **4% of 70?** 1% of 70 is **0.7** So then we go **4 x 0.7 = 2.8%**

f.   6% of 90 = ___   we know 1% of 90 = ____ x 6 = ____
g.   3% of 50 = ___   we know 1% of 50 = ____ x 3 = ____
h.   9% of 30 = ___   we know 1% of 30 = ____ x 9 = ____
i.   7% of 80 = ___   we know 1% of 80 = ____ x 7 = ____
j.   4% of 40 = ___   we know 1% of 40 = ____ x 4 = ____

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Then we can start to join up those parcels of information – we can add the 10s and 1s to solve some complex
ones!

k.   20% of 90 = _____   +   6% 0f 90 = _____   so   26% of 90 = (18 + 5.4) = ___
l.   40% of 50 = _____   +   5% 0f 50 = _____   so   45% of 50 = ___
m. 50% of 60 = _____   +   3% 0f 60 = _____   so   53% of 60 = ___
n.   30% of 70 = _____   +   5% 0f 70 = _____   so   35% of 70 = ___

Dave Moran 2015

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Percentages are just like 100ths, and so closely resemble decimal numbers to 2 places. Have a look at this number line that compares them:
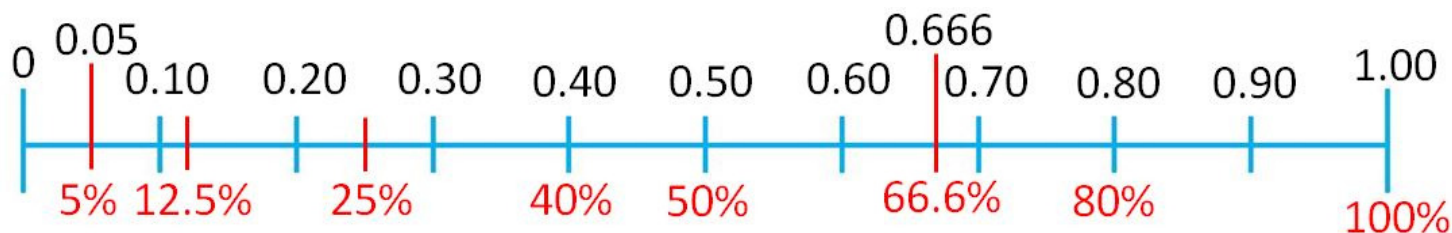
With the number line as a guide, have a go at turning these decimal numbers into percentages:

0.50 = ____%	0.25 = ____%	0.333 = ____%	0.99 = ____%	0.80 = ____%
0.666 = ____%	0.05 = ____%	0.125 = ____%	0.40 = ____%	0.90 = ____%
0.23 = ____%	0.08 = ____%	0.625 = ____%	0.03 = ____%	0.77 = ____%
0.52 = ____%	0.43 = ____%	0.785 = ____%	0.89 = ____%	0.60 = ____%
0.78 = ____%	0.62 = ____%	0.44 = ____%	0.30 = ____%	1.10 = ____%

Q. If 100% = 1 , how can you have **110%?** – A. You need another whole set! Just like you can have 1½ apples, but you need to start with **2** apples.

Here's the thing though, hardly anything in real life is divided up neatly into hundreds. When you do a PAT test at the start of the year, it's 'out of 35'. Your spelling test might be out of 16 or 20. So how do we figure out what percentage we got? Let's start with some more percentage basic facts:

1. ¼ of any number = 25%   because 1 ÷ 4 = **0.25**   so 25% of 20 = 5
    so now we know also that **5 out of 20 is 25%**

2. ½ of any number = 50%   because 1 ÷ 2 = **0.50**   so 50% of 60 = ____

3. ¾ of any number = 75%   because (1 ÷ 4) x 3 = **0.75**   so 75% of 20 = ____

4. 1/10 of any number = 10%   because 1 ÷ 10 = **0.10**   so 10% of 70 = ____

5. ⅓ of any number = 33.3%   because 1 ÷ 3 = **0.333r**   so 33.3% of 30 = ____
    so now we know also that ____ **out of 30 is 33.3%**

6. ⅕ of any number = 20%   because 1 ÷ 5 = **0.20**   so 20% of 20 = ____

7. ⅛ of any number = 12.5%   because 1 ÷ 8 = **0.125**   so 12.5% of 80 = ____

8. ⅔ of any number = 66.6%   because (1 ÷ 3) x 2 = **0.666**   so 66.6% of 60 = ____

9. ⅗ of any number = 60%   because (1 ÷ 5) x 3 = **0.60**   so 60% of 50 = ____

10. ⅘ of any number = 80%   because (1 ÷ 5) x 4 = **0.80**   so 80% of 100 = ____
    so now we know also that ____ **out of 100 is 80%**

"If there is a 50-50 chance that something can go wrong, then 9 times out of ten it will".

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We've learned some basic facts about percentages, but what if the numbers are a little trickier – say like figuring out what percentage 5 out of 12 is, or 7 out of 11. Let's have a look.

5 out of **12** as a percentage: First we'll need to use our fast long-division skills to chop **5** into **12** bits. (Yes, that's right) We want to end up a decimal version of our fraction – the test had 12 questions, or parts, and we are talking about 5 of those parts. **(5 ÷ 12) x 100 = ??? %**

Now all you have to do is multiply the quotient (division answer) by 100

$$12\overline{)5.0^50^20^80^8}$$ 0.4 1 6r

0.417 x **100** = 41.7 so: 5/12 = 41.7%   Try some (mmm tasty):

7/11 $11\overline{)7.0\,0\,0}$ x 100 = _____ %

5/8 $8\overline{)5.0\,0\,0}$ x 100 = _____ %

13/20 $20\overline{)13.0\,0\,0}$ x 100 = _____ %

7/9 $9\overline{)7.0\,0\,0}$ x 100 = _____ %

> How though, would I work percentages out on a calculator? (I know you want to) – easy! Say I need a percentage for 28 out of 90. Punch in '28'. Press '÷' then put in '90 =' you should get a decimal like 0.31111111 – you don't need all those 1s, just use the first 2 or 3 decimal places: 0.311, then press 'x 100 =' and you'll see your percentage: 31.1

Maths inquiry – Work with a buddy if you like – use your maths book to do the working out.
Some wordy word questions like you find in annoying maths tests full of words:

a. 10% of our class have blonde hair. One boy and two girls. How many kids are in our class? _____

b. 50% of everyone in Hamilton metropolis owns a pair of gumboots. 180 thousand people live there – how many people own gumboots? _____

c. In my bowl there are 12 pieces of fruit. 3 of them are apples – what percentage of apples is there? _____ %

d. A recent survey said that 75% of all people prefer doughnuts over Brussel sprouts. They asked 120 people – how many of them prefer doughnuts? _____

e. If I have 30 blue marbles, 20 green, 40 red ones and 10 yellow ones, what percentage of my marbles are green? _____ %

f. I did a maths test on proportions and ratios and got 18 out of 24 correct. What was my percentage? _____ %

g. A factory making pooper-scoopers had a product failure rate of 1%. Last year they made 100 000 scoopers – how many failed? _____

h. Every 3rd person you meet in a group of 366 people is wearing clown shoes. What percentage of them are NOT wearing clown shoes? _____%

i. 12% of boys ride skateboards, 30% of boys ride bikes, 25% get dropped off. The rest just walk. What percentage of boys have to walk? _____%

j. In a large family with 11 kids (poor mum) 8 are girls. What percentage of the kids are boys? _____%

k. It's easy to work out what 10% of 428 is right? So, using that knowledge, figure these out:

15% of 428 = _____   40% of 428 = _____   25% of 428 = _____