1

What is the thousandths digit of the decimal p ?

(1) p is equivalent to the fraction 4/7. We are given the exact value of p, thus we can find its thousandths digit. Sufficient.

(2) The units digit of 100p is 2. Say p=a.bcd, the thousandths digit would be d. Given that the units digit of 100p=abc.d is 2, thus we have that c=2, but we need d. Not sufficient.

Answer: A.

2

1234.567

1 - THOUSANDS
2 - HUNDREDS
3 - TENS
4 - UNITS
. - decimal point
5 - TENTHS
6 - HUNDREDTHS
7 - THOUSANDTHS

Given: x is a fraction in the range $0<x<1$ --> $x=0,abcd...$ Question: is $a=0$?

(1) 16x is an integer --> $x=\frac{integer}{16}$, where $0<integer<16$ (as $0<x<1$). Now, the least value of x is $x=\frac{1}{16}=0.0625$ and the tenth digit is zero BUT the highest value of x is $x=\frac{15}{16}=0.9375$ and the tenth digit is nonzero (9). Not sufficient.

(2) 8x is an integer --> $x=\frac{integer}{8}$, where $0<integer<8$ (as $0<x<1$). Now, the least value of x is $x=\frac{1}{8}=0.125$ and the tenth digit is already nonzero thus all other values of x will be more than 0.125 and therefore will have nonzero tenth digit. Sufficient.

Answer: B.

3

If n is an integer, what is the units digit of x?

(1) x = (25^2)/(10^n). If $n=0$ then $x=\frac{25^2}{10^0}=625$ and the units digit of x is 5 but if $n=-1$ then $x=\frac{25^2}{10^{-1}}=6250$ and the units digit of x is 0. Not sufficient.

(2) n^2 = 1 --> $n=1$ or $n=-1$. Not sufficient as no info about x.

(1)+(2) If $n=1$ then $x=\frac{25^2}{10^1}=62.5$ and the units digit of x is 2 but if $n=-1$ then $x=\frac{25^2}{10^{-1}}=6250$ and the units digit of x is 0. Not sufficient.

Answer: E.

4

If A=0.abc, where a, b, and c are digits of A, is A greater than 2/3?

Is $A>\frac{2}{3}$? --> Is $A>0.666...$?

(1) a+b>14 --> since a and b are single digits, then the least value of a is 6 and in this case b must be 9 (a+b=6+9=15>14), thus the least value of A is 0.69, so more than 0.666... Sufficient.

(2) b+c>15. Clearly insufficient, since we know nothing about a.

Answer: A.

5

We are nowhere told that the capacities of pools X and Y are equal.

(1) If all the water currently in Pool Y were transferred to Pool X, Pool X would be filled to 6/7 of its capacity --> together pools X and Y contain 6/7 of the capacity **of pool X**. Now, in order pools X and Y to contain **equal amount** of water each pool should contain 3/7 of the capacity **of pool X**, thus from pool Y, which contains 4/7 (6/7-2/7=4/7) of the capacity **of pool X** we must transfer 1/7 of the capacity of pool X, which is 25% of the water currently in pool Y (1/7)/(4/7)=1/4. Sufficient.

Or consider the following:
Let the capacity of pool X be 7 gallons. It's 2/7 full, thus there are 2 gallons of water. If all the water currently in Pool Y were transferred to Pool X, Pool X would be filled to 6/7 of its capacity and thus will contain 6 gallons of water, which means that there are now 6-2=4 liters of water in pool Y (it doesn't matter what capacity it has). In order both pools to contain **equal amount** of water each pool should contain 3 gallons of water, thus we should transfer 1 gallon from pool Y to pool X. 1 gallon is 1/4 of the water currently in pool Y.

(2) Pool X has a capacity of 14,000 gallons. No info about pool Y. Not sufficient.

Answer: A.

6

If n is one of the numbers in $\frac{1}{3}$, $\frac{3}{16}$, $\frac{4}{7}$, $\frac{3}{5}$ then what is the value of n?

The method of cross multiplication:

Suppose we want to know which **positive** fraction is greater $\frac{4}{7}$ or $\frac{7}{12}$. Cross-multiply --> $4*12=48$ and $7*7=49$ --> $48<49$. Now, ask yourself, which fraction contributed nominator for the larger value? $\frac{7}{12}$! Thus $\frac{4}{7}<\frac{7}{12}$.

(1) $\frac{5}{16}<n<\frac{7}{12}$ --> $\frac{5}{16}<(\frac{1}{3}=\frac{5}{15})<\frac{7}{12}$, hence $\frac{1}{3}$ is obviously in the given range (notice also that $\frac{1}{2}<\frac{7}{12}$). Next, from our example above we know that $\frac{4}{7}<\frac{7}{12}$ so $\frac{4}{7}$ is also in the given range. Not sufficient.

(2) $\frac{7}{13}<n<\frac{19}{33}$ --> only two values might be in this range: $\frac{4}{7}\approx 5.7$ and $\frac{3}{5}=0.6$ (other possible values of n are less than 1/2 and are clearly out of the range). As the second one is larger, then let's compare it with $\frac{19}{33}$ (the upper limit of the range). So we are comparing $\frac{19}{33}$ and $\frac{3}{5}$: cross-multiply --> $3*33=99$ and $19*5=95$ --> $99>95$. Which fraction contributed nominator for the larger value? $\frac{3}{5}$! Thus $\frac{3}{5}>\frac{19}{33}$, which means that $\frac{3}{5}$ is out of the range. n can only be $\frac{4}{7}$. Sufficient.

Answer: B.

7

At the end of 2004, a certain farm had 24 hens, 12 cows, 30 sheep, and 14 pigs. By the end of 2005, 22 new animals — each either a hen, cow, sheep or pig — were brought to the farm. No animals left the farm. How many pigs were there on the farm at the end of 2005?

(1) The ratio of cows to pigs and the ratio of hens to sheep were the same at the end of 2004 and 2005.

At the end of 2004 the ratio of cows to pigs was 12/14=6/7, in order the ratio to remain the same at the end of 2005, cows and pigs should be added in the same ratio (or not added at all). So, possible numbers of new cows and pigs are: (0, 0) or (6, 7). *Notice that (12, 14) is not possible since 12+14=26, which is more than total number of new animals brought, 22.*

The same for the ratio of hens to sheep: at the end of 2004 the ratio was 24/30=4/5. So, possible numbers of new hens and sheep are: (0, 0), (4, 5) or (8, 10).

Only one combination makes total of 22 animals: (6, 7) and (4, 5) --> 6+7+4+5=22. Hence, 7 new pigs were brought to the farm, so there were 14+7=21 pigs on the farm at the end of 2005. Sufficient.

(2) The number of sheep increased by 1/6 from the end of 2004 to the end of 2005. 5 sheep were brought to the farm, but we know nothing about the rest of 17 animals. Not sufficient.

Answer: A.