Sum of 4-digits no which are multiples of 6 or 8

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(a) How many multiples of 6 from 1000 to 9999?
(b) How many multiples of 8 with four digits?
(c) How many multiples of 6 or 8 with four digits?
(d) How many 4-digit numbers that are not multiples of 6 nor 8?
(e) What is the sum of multiples of 6 which are 4-digit numbers?
(f) What is the sum of multiples of 8 which are 4-digit numbers?
(g) What is the sum of multiples of 6 or 8 which are 4-digit numbers?
(h) What is the sum of 4-digit numbers that are neither multiples of 6 nor 8 ?

(a) $\frac{1000}{6}=166\frac{2}{3}$, $\frac{9999}{6}=1666\frac{1}{2}$

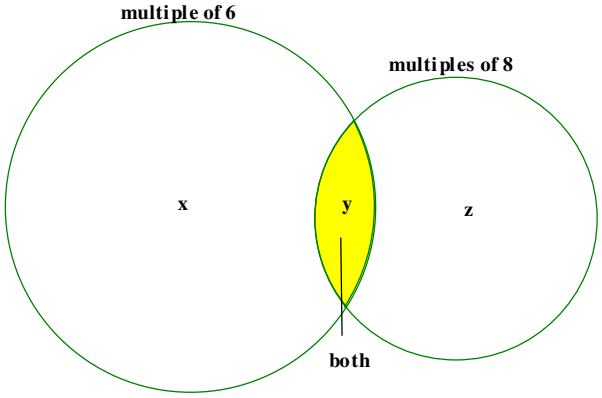
Count all integers from 167 to 1666.

Number of integers = 1666 – 167 + 1 = 1500

(b) 1000 = 8×125, 9992 = 8×1249

Number of multiples of 8 = 1249 – 125 + 1
= 1125

(c) $x + y = 1500$, $y + z = 1125$



y = number of multiples 6 and 8
= number of multiples of 24

$\frac{1000}{24}=41\frac{2}{3}$, $\frac{9999}{24}=416\frac{3}{4}$

$y = 416 – 42 + 1 = 375$

1500 + 1125 – 375 = 2250

There are 2250 4-digit numbers that are either multiples of 6 or multiples of 8.

(d) There are (9999 – 1000 + 1) 4-digit nos.
(i.e. 9000 4-digits numbers)

Required number = 9000 – 2250 = 6750

(e) $\text{sum}=\frac{1002+9996}{2}\times 1500$
$= 5499\times 1500$
$= (5500 – 1)\times 1500$
$= 5500000 + 2750000 – 1500$
$= 8250000 – 1500$
$= 8248500$

(f) $\text{sum}=\frac{1000+10000}{2}\times 1126-10000$
$= 11000\times 563 – 10000$
$= (5630 + 563)\times 1000 – 10000$
$= 6193000 – 10000$
$= 6183000$

(g) First we find the sum of multiples of 24 which are 4-digit numbers.

Smallest multiple of 24 = 24×42 = 1008

Largest multiple of 24 = 24×416 = 9984

$\text{Sum}=\frac{1008+9984}{2}\times 375$
$=\frac{10992}{2}\times 375$
$=5496\times\frac{3}{8}\times 1000$
$= 687\times 3000$
$= 2061000$

Sum of multiples of 6 or 8 which are 4-digit numbers = 8248500 + 6183000 – 2061000
= 12370500

(h) Sum of 4-digit numbers
$=\frac{1000+10000}{2}\times 9001-10000$
$= 5500\times 9001 – 10000$
$= 49500000 + 5500 – 10000$
$= 49505500 – 10000$
$= 49495500$

Required sum = 49495500 – 12370500
= 371 250 000