

**Multiplying by 3367:**

A. When multiplying a number less than 100 by 3367, there are 3 different situations:

1. If the number you are multiplying by is divisible by 3 then:

a) Divide the number by 3 and multiply by 10101. If you have a 2-digit number, just write the answer 3 times.

Ex [1]  $45 \times 3367 =$  \_\_\_\_\_.

a.  $45 \div 3 = 15$ .

b.  $15 \times 10101 = 151515$ .

c. The answer is 151515.

2. If the number you are multiplying by has a remainder of 1, after dividing by 3 (i.e.  $(n \text{ MOD } 3) = 1$ ) then:

a) First, you must find the first numbers of the answer by finding out how many times 3 goes into n evenly (i.e.  $(n \text{ DIV } 3)$ ). These are the first digits of the answer.

b) To find the second set of digits, add the result in step a) to 33. Write this down.

c) To find the last set of digits, add the result in step a) to 67. Write this down.

Ex [1]  $34 \times 3367 =$  \_\_\_\_\_.

a. First, notice that  $34 \text{ MOD } 3$  does in fact equal 1.

b.  $34 \text{ DIV } 3 = 11$ . Write this down.

c.  $11 + 33 = 44$ . Write this down.

d.  $11 + 67 = 78$ . Write this down.

e. The answer is 114478.

Ex [2]  $85 \times 3367 =$  \_\_\_\_\_.

a. Notice that  $85 \text{ MOD } 3 = 1$ .

b.  $85 \text{ DIV } 3 = 28$ . Write this down.

c.  $28 + 33 = 61$ . Write this down.

d.  $28 + 67 = 95$ . Write this down.

e. The answer is 286195.

3. If the number you are multiplying by has a remainder of 2, after dividing by 3 (i.e.  $(n \text{ MOD } 3) = 2$ ) then:

- a) First, you must find the first numbers of the answer by finding out how many times 3 goes into  $n$  evenly (i.e.  $(n \text{ DIV } 3)$ ). These are the first digits of the answer.
- b) To find the next set of digits, add the result in step a) to 67. Write this down.
- c) To find the last set of digits, add the result in step a) to **34 (not 33)**. Write this down.

Ex [1]  $59 \times 3367 = \underline{\hspace{2cm}}$ .

- a. Notice that  $59 \text{ MOD } 3 = 2$ .
- b.  $59 \text{ DIV } 3 = 19$ . Write this down.
- c.  $19 + 67 = 86$ . Write this down.
- d.  $19 + 34 = 53$ . Write this down.
- e. The answer is 198653.

Ex [2]  $98 \times 3367 = \underline{\hspace{2cm}}$ .

- a. Notice that  $98 \text{ MOD } 3 = 2$ .
- b.  $98 \text{ DIV } 3 = 32$ . Write this down.
- c.  $32 + 67 = 99$ . Write this down.
- d.  $32 + 34 = 66$ . Write this down.
- e. The answer is 329966.

B. If the number you are multiplying by is greater than 100 and not divisible by 3, then the middle numbers or last numbers could be greater than 99, forcing you to carry 1 into the middle set of digits (if  $n \text{ MOD } 3 = 1$ ) or the first set of digits (if  $n \text{ MOD } 3 = 2$ ).

Ex [1]  $104 \times 3367 = \underline{\hspace{2cm}}$ .

- a. Notice that  $104 \text{ MOD } 3 = 2$ .
- b.  $104 \text{ DIV } 3 = 34$ . Don't write this down yet.
- c.  $34 + 67 = 101$ . In this case, 01 is the middle digits, and  $34 + 1$  would be the first digits.
- d.  $34 + 34 = 68$ . Write 68.
- e. The answer is 350168.