

February 8th

How many two-digit numbers are 5 more or 5 less than three times the sum of the digits?

Start with 2 digit number "ab" :

"5 more than 3 times the sum of its digits"

$$10a + b - 5 = 3a + 3b$$

$$7a - 2b = 5$$

Solution set:

(ignore even values of a, as they require 2b to be odd)

$$a=1 \ b=1 \quad 11 \quad (3 \text{ times the sum of its digits} =6)$$

$$a=3 \ b=8 \quad 38 \quad (3 \text{ times the sum of its digits} =33)$$

$$a=5 \ b=15 \quad \text{No further solutions as } b < 10 \text{ for } b \text{ to be a single digit}$$

"5 less than 3 times the sum of its digits"

$$10a + b + 5 = 3a + 3b$$

$$2b - 7a = 5$$

Solution set:

(ignore even values of a, as they require 2b to be odd)

$$a=1 \ b=6 \quad 16 \quad (3 \text{ times the sum of its digits} =21)$$

$$a=3 \ b=13 \quad \text{No further solutions as } b < 10 \text{ for } b \text{ to be a single digit}$$

So the 3 numbers are **11, 16 and 38.**