

STOP THE CLOCK!

If a diners ate between 6pm and 7 pm, and the increase each hour was d more diners, then the number of diners each hour was:

<i>Time</i>	<i>Cost (£)</i>	<i>Number of diners</i>
6 pm – 7 pm	6	a
7 pm – 8 pm	7	$a + d$
8 pm – 9 pm	8	$a + 2d$
9 pm – 10 pm	9	$a + 3d$
10 pm – 11 pm	10	$a + 4d$
11 pm – 12 am	11	$a + 5d$
12 am – 1 am	12	$a + 6d$

So the mean cost of a meal is $\frac{6a+7(a+d)+8(a+2d)+9(a+3d)+10(a+4d)+11(a+5d)+12(a+6d)}{a+(a+d)+(a+2d)+(a+3d)+(a+4d)+(a+5d)+(a+6d)} = \frac{63a+217d}{7a+21d}$,

and this must be equal to 9.96. A bit of algebra shows that this simplifies to $\frac{d}{a} = \frac{6}{7}$, or $a : d = 7 : 6$, giving solutions such as $a = 7, d = 6$ or $a = 14, d = 12$, etc.

Checking, with $a = 7$ and $d = 6$, we find a total spend of £1743 with 175 diners, giving a mean of £9.96.