

1. (2 points) The first seven terms  $a_1, a_2, a_3, a_4, a_5, a_6, a_7$  are shown for six different sequences. Precisely one of these sequences is a geometric sequence. Determine which sequence is geometric and find a formula for the  $n$ th term  $a_n$  in that sequence.

(a) 1, 3, 5, 7, 9, 11, 13, ...

(b) 1, 1, 2, 3, 5, 8, 13, ...

(c) 1, 3, 6, 10, 15, 21, 28, ...

(d) 2, 10, 50, 250, 1250, 6250, 31250, ...

(e) 1, 22, 333, 4444, 55555, 666666, 7777777, ...

(f) 2, 6, 10, 14, 18, 22, 26, ...

→ since we multiply  
by a constant (5)  
to get from one  
term to the next.

$$a_n = 2 \times 5^{n-1}$$

2. (2 points) Find the following sum of the first 200 multiples of 4 without resorting to doing each addition separately. You should also not use a calculator or computer.

$$4 + 8 + 12 + 16 + 20 + 24 + \dots + 792 + 796 + 800$$

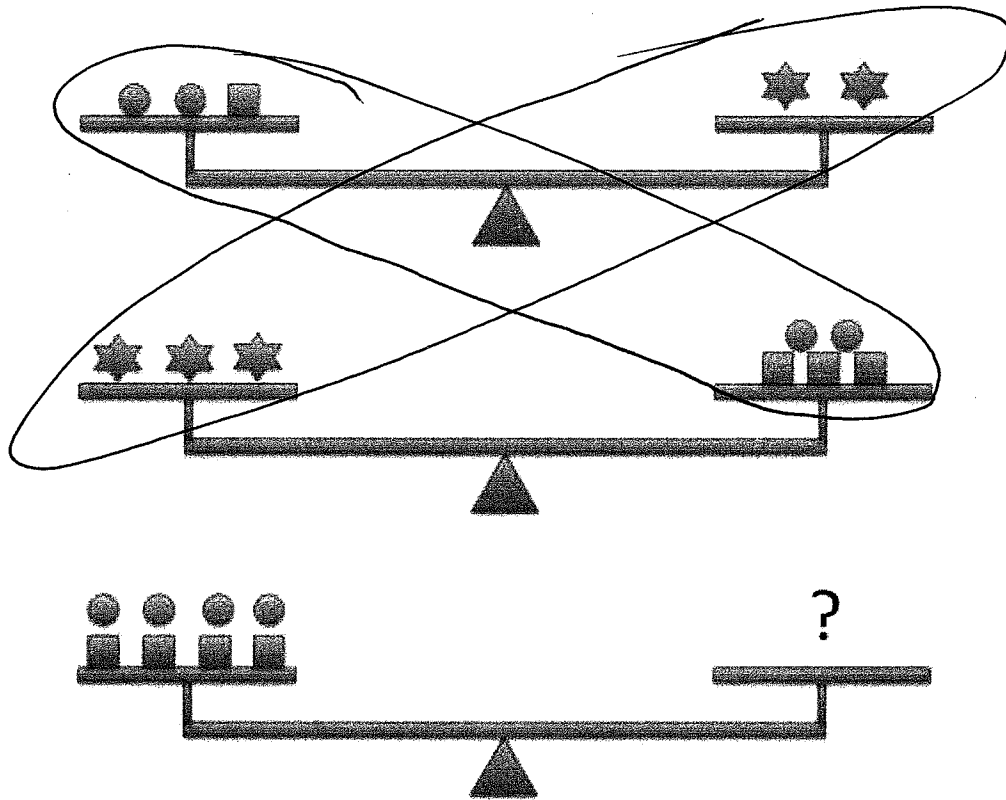
$$= 4(1 + 2 + 3 + \dots + 199 + 200)$$

$$= 4 \times \frac{200 \times (200 + 1)}{2}$$

$$= 4 \times 100 \times 201$$

$$= 80400$$

3. (2 points) The first two scales below are in perfect balance. How many stars will be needed on the right side of the bottom scale so that it will also be in perfect balance? You may assume that each square weighs the same as every other square, each circle weighs the same as every other circle, and each star weighs the same as every other star.

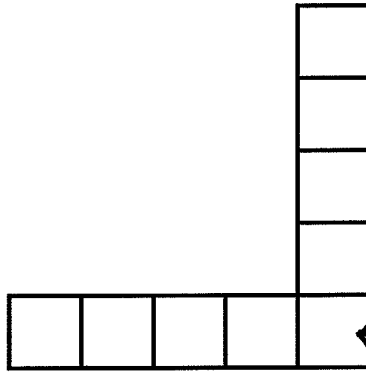


the combined weight of the objects on the left side of the top scale and the right side of the middle scale is equal to the combined weight of the object on the right side of the top scale and the left side of the middle scale.

$$\begin{array}{l}
 00\square \quad \& \quad \square\square\square \quad \longrightarrow \quad 0000 \\
 \star\star \quad \& \quad \star\star\star \quad \longrightarrow \quad \star\star\star\star\star
 \end{array}$$

Thus 5 stars are needed to balance the bottom scale.

4. (2 points) Each of the 9 squares shown is to contain one number chosen from 1, 2, 3, 4, 5, 6, 7, 8, and 9. No number is to be repeated. Suppose the sum of the 5 squares aligned vertically is 32 and that the sum of the 5 squares aligned horizontally is 20. What number goes in the shared corner square?



Let  $x$  be  
the number  
in this  
corner  
square

The sum of all nine numbers is equal to the sum of the five numbers aligned vertically plus the sum of the five numbers aligned horizontally minus the number in the corner square (since it was counted twice).

Thus,

$$1+2+3+4+5+6+7+8+9 = 32+20-x$$

$$45 = 52 - x$$

$$x = 7$$

5. (2 points) Create your own number trick according to the instructions discussed in lab.

① Choose a number; ② Add 2; ③ Double it; ④ subtract 3;  
⑤ Double it; ⑥ Add 6; ⑦ Divide by 4; The result is 2 more than original