

BA Are you ready for Beast Academy 2D?



Before beginning Beast Academy 2D, students should know how to measure and compute with common units of length.

Students should understand place value and be able to use a variety of addition and subtraction strategies for mental computation.

A student ready for Beast Academy 2D should be able to answer at least 10 of the 13 problems below correctly.

Step 1. The student should try to answer every question without a calculator and without help.

Step 2. Check the student's answers using the solutions at the end of this document.

Step 3. The student should be given a second chance on problems answered incorrectly.

Solve each problem below using a ruler.

1. Draw **two** dots on the line below that are each 4 centimeters from dot D.

D

2. Draw a line below that is 4 inches long. Then, find the length of the line you drew to the **nearest centimeter**. 2. _____ cm

Solve each problem below.

3. Write 273 centimeters in meters and centimeters. 3. _____ m _____ cm
4. Snorff is 7 ft 3 in tall. Glorff is 3 ft 7 in tall. How much taller is Snorff than Glorff? 4. _____ ft _____ in



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Fill the boxes to make each equation true.

5. $554 - 86 + \boxed{} = 555$

6. $221 + \boxed{} - 220 = 444$

Fill the blanks in the skip-counting patterns below.

7. $\underline{\hspace{1cm}}, \underline{\hspace{1cm}}, 33, 44, 55, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}$.

8. $\underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, 180, 210, 240, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}$.

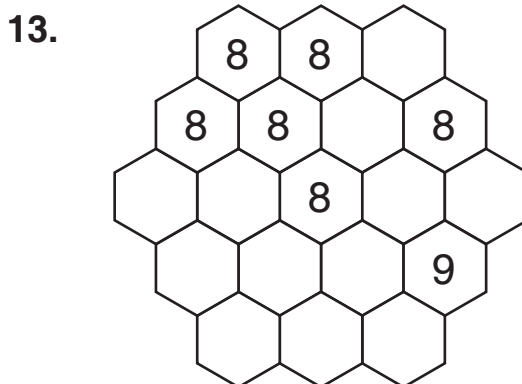
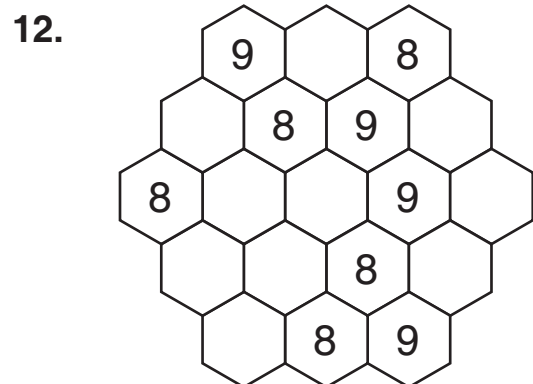
Solve each problem below.

9. Compute $41 + 44 - 14 + 41 - 44 + 41 + 14$. 9. $\underline{\hspace{2cm}}$

10. Compute $(71 + 73 + 75 + 77) - (61 + 63 + 65 + 67)$. 10. $\underline{\hspace{2cm}}$

11. Winnie's number is half of 220. What is half of Winnie's number? 11. $\underline{\hspace{2cm}}$

Fill every empty hexagon with an 8 or a 9 so the sum of the numbers in every horizontal (\leftrightarrow) and diagonal (\nearrow or \searrow) row of hexagons is odd.

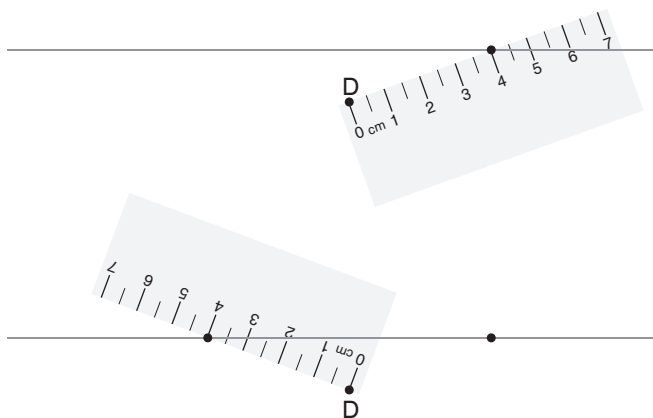




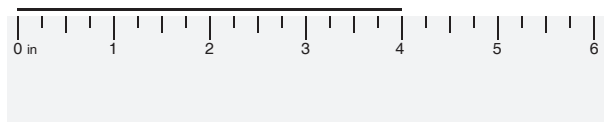
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Solutions

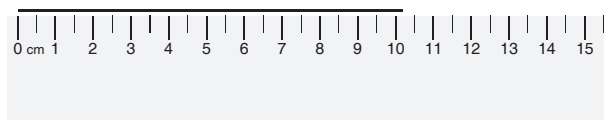
1. We place the 0 cm mark of the ruler at the dot marked D and turn our ruler until the 4 cm mark lands on the line. We can do this on the right and on the left. We draw dots on the line at the 4 cm mark on both sides of the D.



2. First, we draw a line that is 4 inches long.



Then, we measure the line in centimeters. The line is about **10** centimeters long.



3. 273 centimeters is more than 200 centimeters (2 meters) but less than 300 centimeters (3 meters). Since $273 - 200 = 73$, we know 273 centimeters is 73 centimeters more than 2 meters.

So, 273 centimeters is **2 m 73 cm**.

4. Snorff is 7 ft 3 in – 3 ft 7 in taller than Glorff.

Since we can't take 7 inches from 3 inches, we rewrite 7 ft 3 in as 6 ft 15 in. Then, we subtract.

$$\begin{array}{r} 6 \text{ ft } 15 \text{ in} \\ \cancel{7 \text{ ft } 3 \text{ in}} \\ - 3 \text{ ft } 7 \text{ in} \\ \hline 3 \text{ ft } 8 \text{ in} \end{array}$$

So, Snorff is **3 ft 8 in** taller.

— *or* —

To find the difference between 7 ft 3 in and 3 ft 7 in, we can count up.

We count up by 5 in to get from 3 ft 7 in to 4 ft.
We count up by 3 ft 3 in to get from 4 ft to 7 ft 3 in.

All together, we count up by 5 in + 3 ft 3 in = 3 ft 8 in.
So, Snorff is **3 ft 8 in** taller.

5. 555 is 1 more than 554. So, we add 1 more than we subtract. Since we subtract 86, the number in the box is 87.

$$554 - 86 + \boxed{87} = 555.$$

6. Adding then taking away 220 gives the same result as taking away 220 then adding .

Subtracting 220 from 221 gives 1. So, we must add 443 to get 444.

So, the number in the box is 443.

$$221 + \boxed{443} - 220 = 444.$$

7. We skip-count by 11's to complete the pattern to the right of 55.

$$\underline{\quad}, \underline{\quad}, \underline{33}, \underline{44}, \underline{55}, \underline{66}, \underline{77}, \underline{88}, \underline{99}, \underline{110}.$$

Since the number to the right of 33 is 11 *more* than 33, the number to the left of 33 is 11 *less* than 33. We continue this pattern to the left.

$$\underline{11}, \underline{22}, \underline{33}, \underline{44}, \underline{55}, \underline{66}, \underline{77}, \underline{88}, \underline{99}, \underline{110}.$$

8. Since 240 is 30 more than 210, we are skip-counting by 30's.

We skip-count by 30's to complete the pattern to the right.

$$\underline{\quad}, \underline{\quad}, \underline{\quad}, \underline{\quad}, \underline{\quad}, \underline{180}, \underline{210}, \underline{240}, \underline{270}, \underline{300}.$$

Since the number to the right of 180 is 30 *more* than 180, the number to the left of 180 is 30 *less* than 180. We continue this pattern to the left.

$$\underline{30}, \underline{60}, \underline{90}, \underline{120}, \underline{150}, \underline{180}, \underline{210}, \underline{240}, \underline{270}, \underline{300}.$$

9. We cross out addition and subtraction that cancel, and compute the expression as shown.

$$\begin{aligned} & 41 + 44 - 14 + 41 - 44 + 41 + 14 \\ & = 41 + \cancel{44} - 14 + 41 - \cancel{44} + 41 + 14 \\ & = 41 - \cancel{14} + 41 + 41 + \cancel{14} \\ & = 41 + 41 + 41 \\ & = 123. \end{aligned}$$

10. 71 is 10 more than 61.
73 is 10 more than 63.
75 is 10 more than 65.
77 is 10 more than 67.

So, $(71 + 73 + 75 + 77)$ is $10 + 10 + 10 + 10 = 40$ more than $(61 + 63 + 65 + 67)$.

So $(71 + 73 + 75 + 77) - (61 + 63 + 65 + 67) = 40$.

11. Since $110 + 110 = 220$, half of 220 is 110. So, Winnie's number is 110.

110 is $100 + 10$. Half of 100 is 50, and half of 10 is 5.
So, half of Winnie's number 110 is $50 + 5 = 55$.

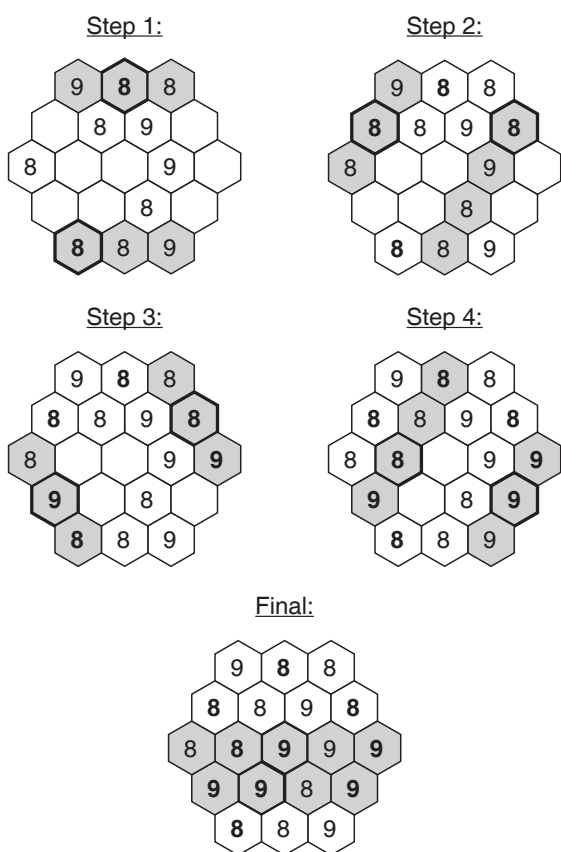


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12. We can tell whether a sum is even or odd by how many odd numbers are in the sum. If there is an even number of odds, the sum will be even. If there is an odd number of odds, the sum will be odd.

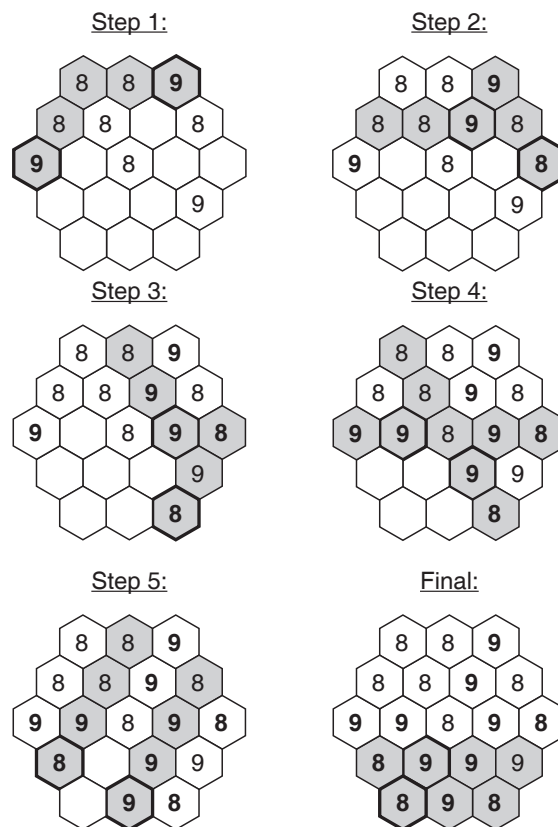
Since 9 is odd and 8 is even, there must be an odd number of 9's in each row to get an odd sum. It does not matter how many 8's are in each row.

We fill the blanks so that each row has an odd number of 9's as shown below.



You may have used a different set of steps to arrive at the same answer.

13. Each row must have an odd number of 9's. We complete the puzzle as shown below.



You may have used a different set of steps to arrive at the same answer.