



First Round 2021-2022

Solution:

Problem 1:

How many ducks weigh the same as a crocodile?

To figure this out, let's look at the two scales that are balanced.

Step 1: Look at the first scale. On the first scale, one crocodile weighs the same as two lions. So, we can say: 1 crocodile = 2 lions.

Step 2: Look at the second scale. On the second scale, one lion weighs the same as two ducks. So, we can say: 1 lion = 2 ducks.

Step 3: Put it all together! We know that 1 crocodile is equal to 2 lions. And we know that each lion is equal to 2 ducks. So, if we have 2 lions, that's like having 2 groups of 2 ducks. 2 groups of 2 ducks is $2 \times 2 = 4$ ducks.

Therefore, one crocodile weighs the same as **4 ducks**.

Looking at the options, the image with 4 ducks is B).

Answer: B)

Problem 2:

The ball is inside how many circles?

Let's look at the picture and count how many black circles the yellow ball is sitting inside.

Step 1: Find the yellow ball. There's a yellow ball right in the middle of some circles.

Step 2: Count the circles around the ball.

The ball is inside the smallest circle. (That's 1 circle)

The ball is also inside the circle that is on the top-right. (That's 2 circles)

And the ball is inside the circle that is on the bottom-right. (That's 3 circles)

The ball is *not* inside the biggest circle on the left.

So, the ball is inside 3 circles.

Looking at the options, C) is 3.

Answer: C)

Problem 3:

Which animal does the ant get to when he walks from home along the following arrows: $\rightarrow 2$, $\downarrow 2$, $\rightarrow 3$, $\uparrow 3$, $\rightarrow 2$, $\uparrow 2$?

Let's imagine the ant is at his home. We will follow the arrows step by step to see where he ends up.

Step 1: Start at home. The ant begins at the house.

Step 2: Follow the first arrow: $\rightarrow 2$ This means the ant moves 2 squares to the right.

Step 3: Follow the second arrow: $\downarrow 2$ From there, the ant moves 2 squares down. He is now next to the caterpillar.

Step 4: Follow the third arrow: $\rightarrow 3$ Next, the ant moves 3 squares to the right. He is now next to the frog.

Step 5: Follow the fourth arrow: $\uparrow 3$ Then, the ant moves 3 squares up. He is now next to the snail.

Step 6: Follow the fifth arrow: $\rightarrow 2$ After that, the ant moves 2 squares to the right. He is now next to the butterfly.

Step 7: Follow the sixth arrow: $\uparrow 2$ Finally, the ant moves 2 squares up. He lands on the square with the bee.

So, the ant gets to the **bee**.

Looking at the options, B) is the bee.

Answer: B)

Problem 4:

The other piece looks like option E.

When a rectangle is cut into two pieces, the cut edges of both pieces must fit together perfectly, like a puzzle.

The piece Max has looks like a mountain range with three peaks. The other piece must have a "valley" shape that is the exact inverse or negative of the "mountain" shape.

If you place piece E on top of the piece Max has, the jagged edges will lock together to form a straight line, recreating the original rectangle.

Problem 5:

The stick exactly in the middle is **stick 7**.

To find the middle stick, we need to determine the complete stacking order from bottom to top by looking at which stick lies on top of another.

The problem gives us the start and end points:

- **Bottom (1st):** Stick 2
- **Top (7th):** Stick 6

By tracing the overlaps in the image, we can find the full order:

- Stick 3 is on top of stick 2.
- Stick 1 is on top of stick 3.
- Stick 7 is on top of stick 1.
- Stick 4 is on top of stick 7.
- Stick 5 is on top of stick 4.
- Stick 6 is on top of stick 5.

This gives us the complete order from bottom to top:

1. Stick 2
2. Stick 3
3. Stick 1
4. **Stick 7**
5. Stick 4
6. Stick 5
7. Stick 6

In a stack of seven items, the fourth one is exactly in the middle.

The correct answer is **7**.

Problem 6:

There are 7 such numbers.

The easiest way to solve this is to list all the numbers that fit the criteria. The numbers must be between 10 and 32 and can only use the digits 1, 2, or 3.

- **Numbers in the 10s:** 11, 12, 13
- **Numbers in the 20s:** 21, 22, 23
- **Numbers in the 30s:** 31

The number 32 is not included because the numbers must be *smaller* than 32. Counting the numbers on the list gives us a total of 7.

The correct answer is 7.

Problem 7:

The rabbit family ate 40 carrots last week.

A week has 7 days. The problem states that the family ate a total of 6 cabbages, and on the days they eat cabbages, they eat 2 of them.

- **Days eating cabbages:** 6 cabbages / 2 cabbages per day = 3 days.
- **Days eating carrots:** 7 days in a week - 3 cabbage days = 4 days.

On the days they eat carrots, they eat 10 of them.

- **Total carrots eaten:** 4 days \times 10 carrots per day = 40 carrots.

The correct answer is 40.

Problem 8:

The four pieces are cut from a square that is 2 units by 2 units, as shown by the grid. The total area of these four pieces is therefore $2 \times 2 = 4$ square units.

Any shape that is made by rearranging these four pieces must also have a total area of 4 square units. We can find the shape that cannot be made by calculating the area of each option. The one whose area is not 4 is the correct answer.

Shape B: A triangle with a base of 4 units and a height of 2 units. Area = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 4 \times 2 = 4$ square units.

Shape C: This shape can be seen as a 2x1 rectangle at the bottom with a triangle on top. The triangle has a base of 2 and a height of 2. Area = $(2 \times 1) + (\frac{1}{2} \times 2 \times 2) = 2 + 2 = 4$ square units.

Shape E: This shape is made of two triangles side-by-side. Each triangle has a base of 2 and a height of 2. Area = $2 \times (\frac{1}{2} \times 2 \times 2) = 4$ square units.

Shape A: This hexagon can be broken into a central 2x2 rectangle and two triangles on the sides. Each side triangle has a base of 2 and a height of 1. Area = $(2 \times 2) + 2 \times (\frac{1}{2} \times 2 \times 1) = 4 + 2 = 6$ square units.

Since the area of shape A is 6 square units, it cannot be made from the pieces that have a total area of 4 square units.

The correct answer is **A**.

Problem 9:

The biggest number they could make is **95**.

To get the largest possible sum, the digits with the highest value (5 and 4) must be placed in the position with the highest place value, which is the tens place.

This creates the two numbers 5_ and 4_.

The remaining digits (3 and 2) are placed in the ones places. It doesn't matter which way you arrange them:

- $53 + 42 = 95$
- $52 + 43 = 95$

In both cases, the sum is the same.

The correct answer is **95**.

Problem 10:

Analyze the Structure: The cube with the question mark is in a central position. By looking at the pyramid, you can see it touches 6 other cubes: two below it, one on each side, and two above it.

Identify Non-Touching Cubes: Since the question mark cube touches 6 other cubes, and there are 10 cubes in total, there are only 3 cubes that it does **not** touch. These are:

- The cube at the bottom-left corner.

- The cube at the bottom-right corner.
- The single cube at the very top.

Place the Red Cubes: There are **4 red cubes**, and none of them can touch each other. This is the biggest constraint.

- Let's assume the question mark cube is **Red**.
- If it's Red, then none of its 6 neighbors can be Red.
- This means the other 3 Red cubes *must* be placed in the only 3 available spots that don't touch the question mark cube.

Confirm the Placement: This places the 4 Red cubes at:

- The question mark spot.
- The bottom-left corner.
- The bottom-right corner.
- The top cube.

If you check the diagram, none of these four positions touch each other, so this is a valid arrangement for all 4 Red cubes. The remaining 6 cubes can then be filled in with the blue, green, and yellow cubes without breaking the rules. Since this is a valid and logically forced arrangement for the most numerous color, it is the correct solution.

The correct answer is **Red**.

Problem 11:

There are **4** children in the family.

This is a classic riddle. The key is that all three sisters share the same brother.

- There are **3 sisters**.
- There is **1 brother**.

Each sister looks at her family and sees her two sisters and her one brother.

The condition is met for all three sisters.

Total children = 3 sisters + 1 brother = 4.

The correct answer is **4**.

Problem 12:

According to the order of operations, multiplication and division are done before subtraction.

First, calculate the multiplication: $876 \times 5 = 4380$.

Next, calculate the division: $1467 \div 3 = 489$.

Now, perform the subtraction:

$$4380 - 489 = 3891.$$

The correct answer is **3891**.