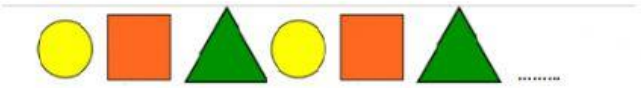
TOPIC 9: SHAPE PATTERN

I. LEVEL 1



Problem 1: In the shape sequence below, if the pattern continues, which shape would be the 10^{th} shape?

Answer: ☺_____☺

Problem 2: In the animal sequence below, if the pattern continues, which animal would be the 10th animal?

Answer: ☺_____☺

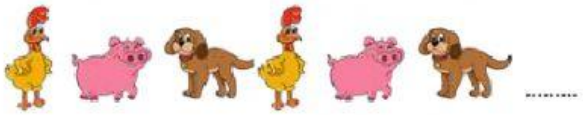
Problem 3: In the character sequence below, if the pattern continues, which character would be the 15th character?

Answer: ☺_____☺

Problem 4: In the shape sequence below, if the pattern continues, which shape would be the 10th shape?

Answer: ☺_____☺

Problem 5: In the animal sequence below, if the pattern continues, which animal would be the 10th animal?



Answer: ☺_____☺

Problem 6: In the character sequence below, if the pattern continues, which character would be the 15th character?

Answer: ☺_____☺

Problem 7: In the fruit sequence below, if the pattern continues, which fruit would be the 15th fruit?

Answer: ☺_____☺

Problem 8: In the animal sequence below, if the pattern continues, which animal would be the 15th animal?

Answer: ☺_____☺

Problem 9: In the character sequence below, if the pattern continues, which character would be the 15th character?

Answer: ☺_____☺

Problem 10: In the shape sequence below, if the pattern continues, which shape would be the 15th shape?

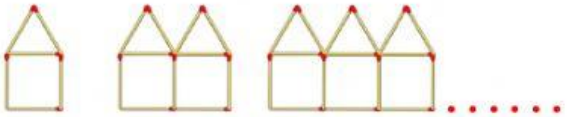
Answer: ☺_____☺

II. LEVEL 2

Problem 1: We use matchsticks to build the figures below. How many matchsticks are there in the 5th set?

Answer: ☺_____☺

Problem 2: We use matchsticks to build the figures below. How many matchsticks are there in the 6th set?

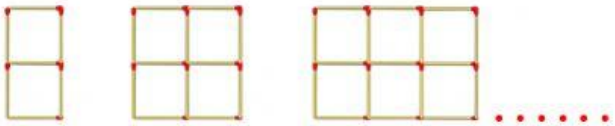


Answer: ☺_____☺

Problem 3: We use matchsticks to build the figures below. How many matchsticks are there in the 7th set?

Answer: ☺_____☺

Problem 4: We use matchsticks to build the figures below. How many matchsticks are there in the 8th set?

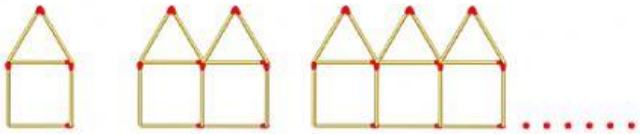


Answer: ☺_____☺

Problem 5: We use matchsticks to build the figures below. How many matchsticks are there in the 9th set?

Answer: ☺_____☺

Problem 6: We use matchsticks to build the figures below. How many matchsticks are there in the 10th set?



Answer: ☺_____☺

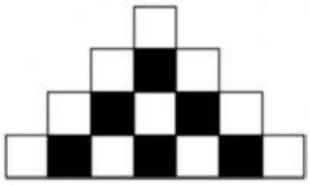
III. LEVEL 3

Problem 1: A pattern that repeats every six symbols stars as shown below:

Which are the 20th and the 21st symbols in the pattern?

A. ♦♥ B. ♥♦ C. ♥♣ D. ♣♥

Problem 2: If the pattern continues, how many black squares would the 10th row have?



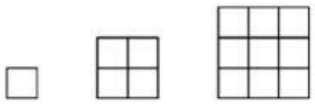
. . . . . .

Answer: ☺_____☺

Problem 3: If the pattern in the diagram continues, how many shaded triangles are there in the 10th triangle?

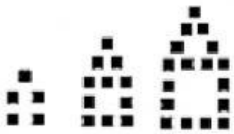
Answer: ☺_____☺

Problem 4: The first figure has 1 square, the second figure has 4 squares and the third figure has 9 squares. How many squares will the 10th figure have?



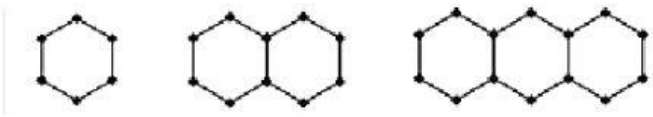
Answer: ☺_____☺

Problem 5: How many dots are needed to build the 5th house?



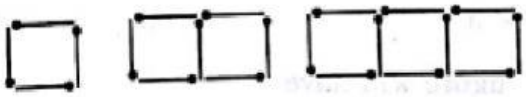
Answer: ☺_____☺

Problem 6: How many matchsticks will the 10th figure have?



Answer: ☺_____☺

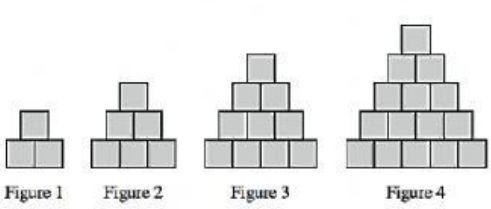
Problem 7: How many matchsticks will the 10th figure have?



Answer: ☺_____☺

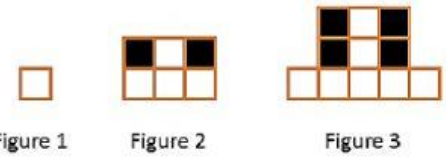
IV. LEVEL 4

Problem 1: How many squares are there in the 15th figure?



Answer: ☺_____☺

Problem 2: How many black squares are there in the 20th figure?

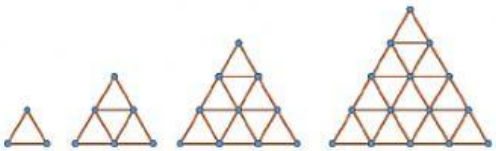


Answer: ☺_____☺

Problem 3: The figure consists of alternating light and dark squares. By how many squares does the number of dark squares exceed the number of white squares?

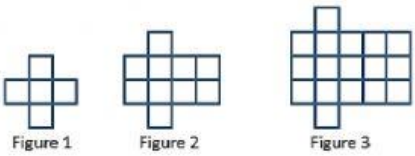
Answer: ☺_____☺

Problem 4: How many matchsticks are needed to build the 25th figure?



Answer: ☺_____☺

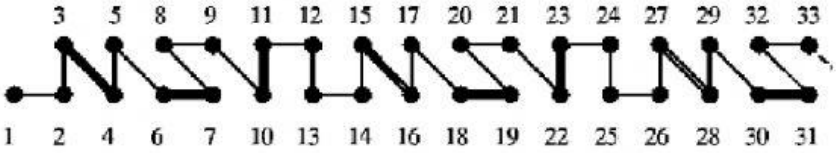
Problem 5: How many squares are there in the 30th figure?

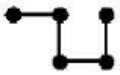
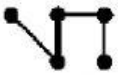


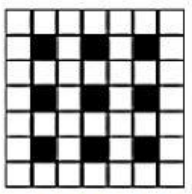
Answer: ☺_____☺

V. LEVEL 5

Problem 1: The diagram below shows a pattern which repeats every 12 dots. Which of the following does the piece between 2007 and 2011 look like?



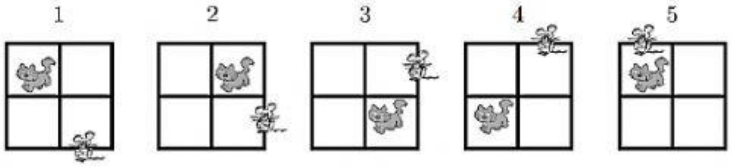
A  B  C  D  E 



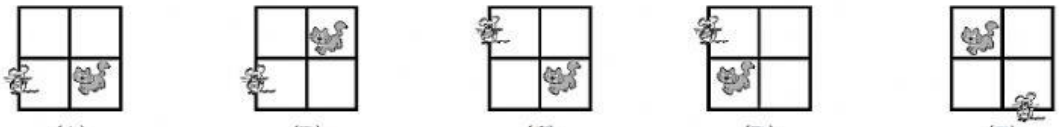
Problem 2: The diagram shows a square board that has 9 black squares. A larger board, constructed in the same way, has 49 black squares. How many white squares are there on the larger board?

Answer: ☺_____☺

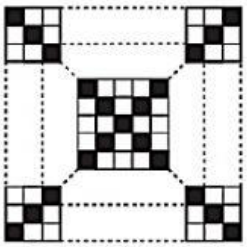
Problem 3: In the pattern below, the cat moves clockwise through the four squares and the mouse moves counterclockwise through the eight exterior segments of the four squares.



If the pattern is continued, where would the cat and mouse be after the 247^{th} move?



Problem 4: A square floor is tiled with congruent square tiles. The tiles on the two diagonals of the floor are black. The rest of the tiles are white. If there are 101 black tiles, what is the total number of white tiles?



Answer: ☺_____☺

Problem 6: A gym owner has some white weights and some yellow weights. The white weights are 4 kilograms each, and the yellow weights are 3 kilograms each. The owner has 6 weights, and they weigh 22 kilograms in all. How many of each color weight does he have?

Answer: ☺ _____ ☺