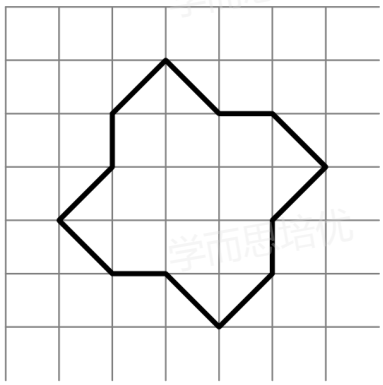
1-4 test

1 The twelve-sided figure shown has been drawn on $1\text{cm} \times 1\text{cm}$ graph paper. What is the area of the figure in cm^2? ( ) .

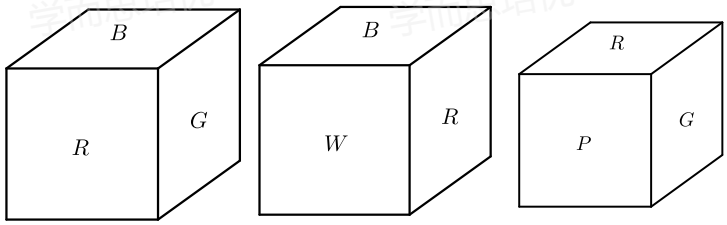


A. 12 B. 12.5 C. 13 D. 13.5 E. 14

2 Let N be the greatest five-digit number whose digits have a product of 120. What is the sum of the digits of N? ( ) .

A. 15 B. 16 C. 17 D. 18 E. 20

3 The faces of a cube are painted in six different colors: red (R), white (W), green (G), brown (B), aqua (A), and purple (P). Three views of the cube are shown below. What is the color of the face opposite the aqua face? ( )



A. red B. white C. green D. brown

E. purple

4 How many different real numbers x satisfy the equation

$$(x^2-5)^2=16\ ?$$

A. 0 B. 1 C. 2 D. 4 E. 8

5 (2020 AMC 8 Problem 15)

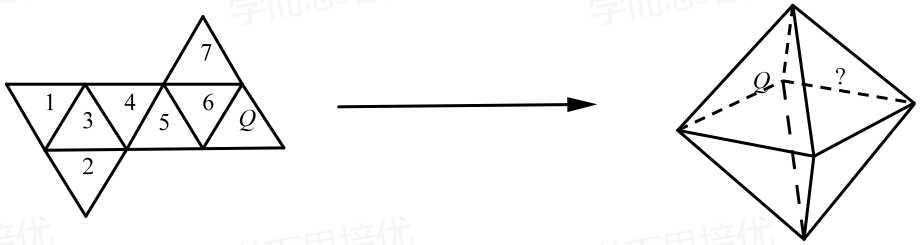
Suppose 15% of x equals 20% of y. What percentage of x is y ?

假设x的15%等于y的20% . y 是 x 的百分之多少 ?

A. 5 B. 35 C. 75 D. $133\frac{1}{3}$

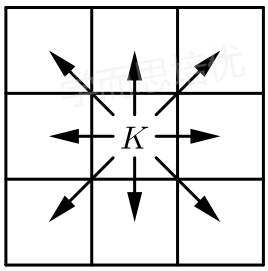
E. 300

6 A regular octahedron has eight equilateral triangle faces with four faces meeting at each vertex. Jun will make the regular octahedron shown on the right by folding the piece of paper shown on the left. Which numbered face will end up to the right of Q?



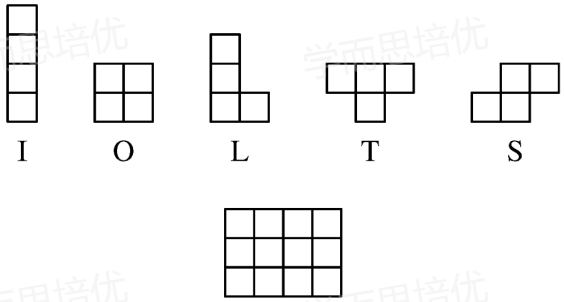
A. 1 B. 2 C. 3 D. 4 E. 5

7 A chess king is said to attack all the squares one step away from it, horizontally, vertically, or diagonally. For instance, a king on the center square of a 3×3 grid attacks all 8 other squares, as shown below. Suppose a white king and a black king are placed on different squares of a 3×3 grid so that they do not attack each other. In how many ways can this be done?



A. 20 B. 24 C. 27 D. 28 E. 32

8 A *tetromino* consists of four squares connected along their edges. There are five possible tetromino shapes, I, O, L, T, and S, shown below, which can be rotated or flipped over. Three tetrominoes are used to completely cover a 3×4 rectangle. At least one of the tiles is an S tile. What are the other two tiles?



A. I and L

B. I and T

C. L and L

D. L and S

E. O and T

9 A cube with 3-inch edges is made using 27 cubes with 1-inch edges. Nineteen of the smaller cubes are white and eight are black. If the eight black cubes are placed at the corners of the larger cube, what fraction of the surface area of the larger cube is white? ( ) .

A. $\frac{1}{9}$

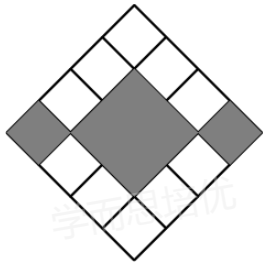
B. $\frac{1}{4}$

C. $\frac{4}{9}$

D. $\frac{5}{9}$

E. $\frac{19}{27}$

10 In the figure, what is the ratio of the area of the gray squares to the area of the white squares? ( ) .



A. 3 : 10

B. 3 : 8

C. 3 : 7

D. 3 : 5

E. 1 : 1