



Competitive Math Assessment - Similarity Practice Quiz #1

Here are some suggestions for how to practice replicating testing conditions:

- Make sure you have a quiet place to practice on your own for an extended period of time. This will help model the actual experience of a competition. When you have finished the quiz, check your solutions using the online Brilliant quiz.
- Set a timer, or at least keep an eye on the clock to learn your own pace. If you want to set a specific time goal, math competitions provide an average of about 2 minutes per problem, so you should give yourself 30-40 minutes to complete these problems. Keep in mind that the general difficulty of problems increases as you move forward.
- Some competitions allow students to use calculators while others do not. We encourage you to use a calculator only for the most in-depth calculations on this practice quiz.

1. _____ A square has vertices of $(-7,3)$, $(1,3)$, $(-7,-5)$, and $(1,-5)$. What is the slope of the line that runs through the origin that divides the square into two congruent quadrilaterals?

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

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. 1

2. _____ The side lengths of a square are increased by 1%. By what percent does the area of the square increase?

A. 1%

B. 1.01%

C. 2.01%

D. 3.01%

3. _____ In two similar triangles, A and B, the length of the median to the longest side of A is 6 while the length of the median to the longest side of B is 9. What is the ratio of the area of B to the area of A? (The **median** is a line segment that joins a vertex to the midpoint of the opposite side.)

A. 3 : 2

B. 3 : 4

C. 9 : 2

D. 9 : 4

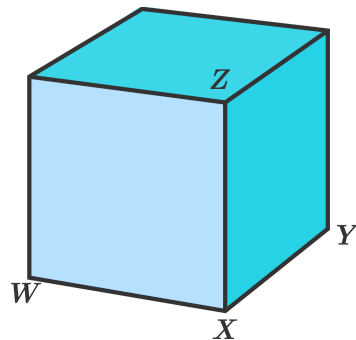
4. _____

If the diameter of a large pizza is 40% larger than the diameter of a small pizza, what is the percent increase in total amount of pizza, from a small to a large?

- A. 40%
- B. 64%
- C. 96%
- D. 160%

5. _____

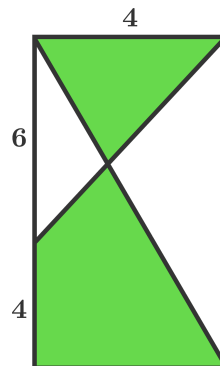
The cube shown below has a volume of 64. What is the volume of pyramid $WXYZ$?



- A. $10\frac{2}{3}$
- B. 12
- C. 16
- D. $21\frac{1}{3}$

6. _____

In the rectangle below, what is the total area of the regions shaded green?

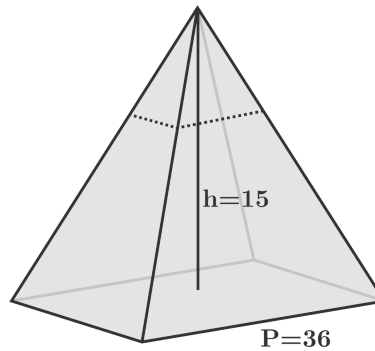


7. _____

The ratio of the surface areas of two similar cylinders is 4 : 25. If the volume of the smaller cylinder is 32 cubic centimeters, what is the volume of the larger cylinder, in cubic centimeters?

8. _____

The right square pyramid below has a height of 15 and a base perimeter of 36. If the pyramid is sliced parallel to the base to create a new pyramid with a height that is $\frac{1}{3}$ of the height of the original pyramid, what is the volume of the new smaller pyramid?



9. _____

Two circles, each with radius 4, have centers at (2,2) and (6,6). What is the y -intercept of the line that contains their common chord?

A. 6

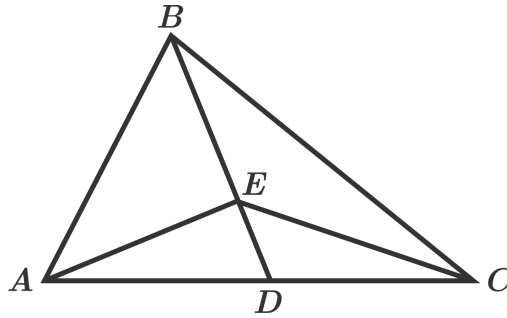
B. 7

C. 8

D. 9

10. _____

The ratio of the length of AD to the length of DC is $3 : 2$. If the area of triangle ABE is 13, what is the area of triangle BEC ?



A. $\frac{23}{3}$

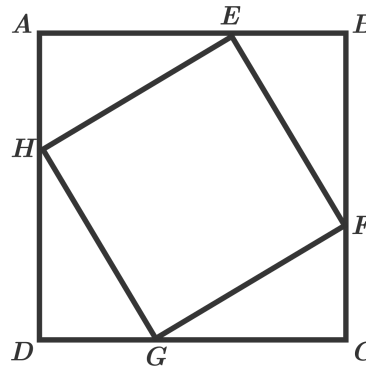
B. $\frac{26}{3}$

C. $\frac{29}{3}$

D. $\frac{32}{3}$

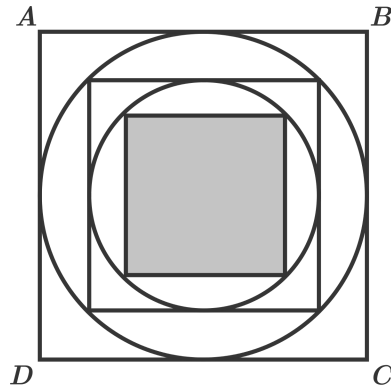
11. _____

The area of square $ABCD$ is 720. Square $EFGH$ trisects the sides of square $ABCD$ so that the segments have a $2 : 1$ ratio. What is the area of $EFGH$?



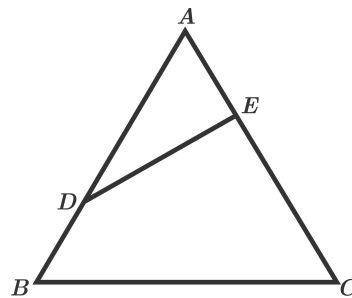
12. _____

In this figure that shows squares and circles inscribed in one another, the area of the shaded square is 25. What is the area of square $ABCD$?



13. _____

Point D divides AB in the ratio $2 : 1$ and point E divides AC in the ratio $1 : 2$. If the area of triangle ABC is 23, what is the area of triangle ADE ?



A. $\frac{46}{9}$

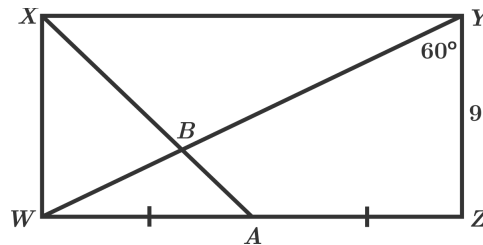
B. $\frac{23}{4}$

C. $\frac{92}{9}$

D. $\frac{46}{3}$

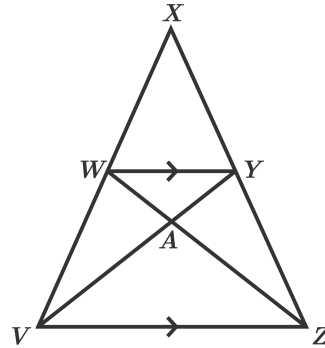
14. _____

In rectangle $WXYZ$, $WA = AZ$ and $YZ = 9$. What is WB ?



15. _____

The area of trapezoid $VWYZ$ is 3 times greater than the area of triangle WXY . The area of triangle VAZ is 16. What is the area of triangle WAY ?



A. 4

B. $\frac{16}{3}$

C. 8

D. 12