

Self-assessment Test before Taking AMC 8, MATHCOUNTS *

PROFESSOR CHEN EDUCATION PALACE

- Please simplify the following expressions. Your solution to each question is either an integer or a fraction.
 - $(-3) \times (-5) \times (-7)$.
 - $\frac{2}{5} - \frac{9}{7}$.
 - $\frac{1}{3} \times \frac{4}{11}$.
 - $\frac{1}{3} \div \frac{4}{11}$.
 - $1 - 2 + 3 - 4 + 5 - 6 + \cdots + 99 - 100 + 101$.
- Please compute
 - $102^2 - 98^2$.
 - $107 \cdot 93$.
- Please solve the following equations. Your solution to each question is either an integer or a fraction.
 - $3x - 10 = -31$.
 - $\frac{6}{x-3} + 2 = 9$.
 - $|2x - 3| = 5$.
- Please solve the following inequalities. Your solution to each question is either an integer or a fraction.
 - $-3x + 10 \geq -31$.
 - $\frac{6}{x} + 2 = 9$.
 - $|2x - 3| > 5$.
 - $|2x - 3| \leq 5$.
- Please simplify the following expressions. Your solution to each question is either an integer or a fraction.
 - 4^4 .

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- (b) 4^{-4} .
- (c) $4^{1/2}$.
- (d) $4^{-1/2}$.
- (e) 4^0 .

6. The expression

$$\frac{3^5 \cdot (9^2)^3}{\sqrt{3^3} \cdot 27^{-2}}$$

can be simplified as 3^a . What is a ? Please express a as a fraction.

- 7. How many integers are between $\sqrt{79}$ and $\sqrt{780}$?
- 8. How many numbers from 100 to 1000 have remainder 2 while being divided by 3?
- 9. We define the following new operation: $a \diamond b = \frac{a+b}{a-2b}$. Please compute the following:
 - (a) $3 \diamond 4$.
 - (b) $3 \diamond (4 \diamond 4)$.
- 10. In $\triangle ABC$, $\angle A = 20^\circ$, $\angle B = 2\angle A - 5^\circ$. What is the degree measure of $\angle C$?
- 11. In $\triangle ABC$, $\angle A = 90^\circ$, $\angle B = 30^\circ$, $AB = 1$. What are BC and CA ?
- 12. In $\triangle ABC$, $\angle A = 90^\circ$, $AB = AC$, $BC = 1$. What is the area of this triangle?
- 13. In an equilateral triangle, the length of each side is 1. What is the area of this triangle?
- 14. In Figure 1, $\angle ACB = \angle ADC = 90^\circ$, $AD = 3$, $DB = 7$. What is AC ?

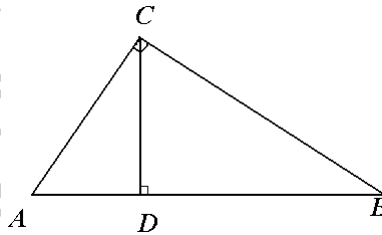


Figure 1

- 15. What is the degree measure of each exterior angle of a regular hexagon?
- 16. Six pepperoni circles will exactly fit across the diameter of a 12-inch pizza when placed. If a total of 24 circles of pepperoni are placed on this pizza without overlap, what fraction of the pizza is covered by pepperoni?