

# Multiple-Choice Questions

Over one-half of the questions on the SAT-I: Mathematics Reasoning Test are multiple-choice questions. There are a total of 35 multiple-choice questions covering the subjects of arithmetic, algebra, and geometry. The mathematics portion of the ACT is entirely multiple choice, with 60 questions covering the subjects of pre-algebra, algebra, plane geometry, intermediate algebra, coordinate geometry, and trigonometry. Each test offers 5 possible choices for each answer.

## Test-Taking Strategies

1. Read each question carefully. Make sure you know what the question is asking. Read the answer choices to see what form the answer should take (fraction, decimal, percent) or the approximate size of the answer (between 10 and 40, less than 1, and so on).
2. Know when to guess. On the ACT, you are not penalized for incorrect answers, so it is to your advantage to answer each question, even if you have to guess.

On the SAT-I, incorrect answers count against you. On the multiple-choice section of the test,  $\frac{1}{4}$  point will be deducted for each incorrect

answer. This does not mean, however, that you should never guess on a question. If you can definitely eliminate 1 or 2 of the possible answer choices, it is to your advantage to guess.

3. Sometimes the SAT-I introduces nonstandard symbols such as \* or @ to define an expression. Do not be confused by such symbols. Simply substitute the given values into the expression and solve. (See Sample Question 3 on the next page.)
4. Most of the formulas that you will need to answer the questions on the SAT-I are given to you in the test booklet. The ACT, however, does not provide these formulas, so it is important to review and memorize key formulas ahead of time.

Here are some sample multiple-choice questions and their solutions.

## Sample Question 1

**The student council has 30 members, 18 of whom are girls. If two-thirds of the girls are either freshmen or sophomores, what percent of the council are girls in their junior or senior year?**

- (A)  $23\frac{1}{3}\%$   
 (B) 20%  
 (C)  $33\frac{1}{3}\%$   
 (D) 40%  
 (E) 50%

You can solve this problem by using a series of simple computations.

First find the number of freshman or sophomore girls on student council.

$$\frac{2}{3} \cdot 18 = 12$$

Now find the number of junior or senior girls on student council.

$$18 - 12 = 6$$

Divide this number by the number of people on the council to get the percent.

$$\frac{6}{30} = 20\%$$

The correct answer is B.

## Sample Question 2

If  $x > 1$ , which of the following increases as  $x$  increases?

I.  $x - \frac{1}{x}$

II.  $\frac{1}{x^2 - x}$

III.  $4x^3 - 2x^2$

- (A) None  
(B) I only  
(C) II only  
(D) I and III only  
(E) I, II, and III

This type of question, which gives you several combinations of choices, appears on the SAT-I but not on the ACT. To solve this problem, you need to examine each choice (I, II, and III) to determine which one(s) are true.

As  $x$  increases:  $x - \frac{1}{x}$  increases,

$\frac{1}{x^2 - x}$  approaches 0, and

$4x^3 - 2x^2$  increases.

Since both I and III are true, the correct answer is D.

## Sample Question 3

$q * t$  is defined as  $q^2 + t^2 + qt$ . What is the value of  $4 * (-2)$ ?

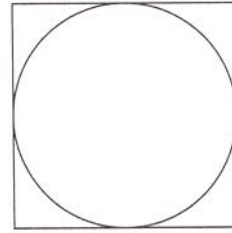
- (A) 4  
(B) 12  
(C) 20  
(D) 26  
(E) 28

Here you are given a nonstandard symbol (\*) and its definition. Substitute the given values into the expression and solve.

$$\begin{aligned} 4 * (-2) &= 4^2 + (-2)^2 + (4)(-2) \\ &= 16 + 4 - 8 \\ &= 12 \end{aligned}$$

The correct answer is B.

## Sample Question 4



The area of the circle enclosed in the square is  $8\pi$ . What is the area of the square?

- (A) 64 square units  
(B) 48 square units  
(C) 32 square units  
(D) 16 square units  
(E) 8 square units

To find the area of the square, you need to know the length of a side. You can find this length by first finding the radius of the circle. Use the formula  $A = \pi r^2$  and solve for  $r$ . (This formula will probably be given to you in the SAT-I, but not in the ACT.)

$$\begin{aligned} A &= \pi r^2 \\ 8\pi &= \pi r^2 \\ 8 &= r^2 \\ 2\sqrt{2} &= r \end{aligned}$$

The radius of the circle is  $2\sqrt{2}$ , so the diameter is  $2r$  or  $4\sqrt{2}$ . The length of a side of the square is the same as the diameter,  $4\sqrt{2}$ , so the area of the square is  $(4\sqrt{2})^2$  or 32 square units. The correct answer is C.

## Sample Question 5

Which of the following *cannot* be the average of 10, 7, 13, 2, and  $x$  if  $x > 4$ ?

- (A) 7  
(B) 9  
(C) 10  
(D) 13  
(E) 36

Let  $x = 4$ . The average of 10, 7, 13, 2, and 4 is  $\frac{10 + 7 + 13 + 2 + 4}{5}$  or 7.2.

Since  $x$  must be greater than 4, the average must be greater than 7.2. So 7 *cannot* be the average. The correct answer is A.

### Sample Question 6

If  $x = -6$  and  $\frac{1}{2y} = -12$ , what is the value of  $y$  in terms of  $x$ ?

- (A)  $x - 6$
- (B)  $2x - 6$
- (C)  $2x$
- (D)  $\frac{1}{2x}$
- (E)  $\frac{1}{4x}$

Notice that if you multiply each side of  $x = -6$  by 2, you get  $2x = -12$ . Since  $2x = -12$  and  $\frac{1}{2y} = -12$ , you know  $2x = \frac{1}{2y}$ .

Solve for  $y$ .

$$2x = \frac{1}{2y}$$
$$4xy = 1$$
$$y = \frac{1}{4x}$$

The correct answer is E.

Now go on to the next page and practice solving some typical questions on an SAT-I: Mathematics Reasoning Test. The answers are on page 23.

