

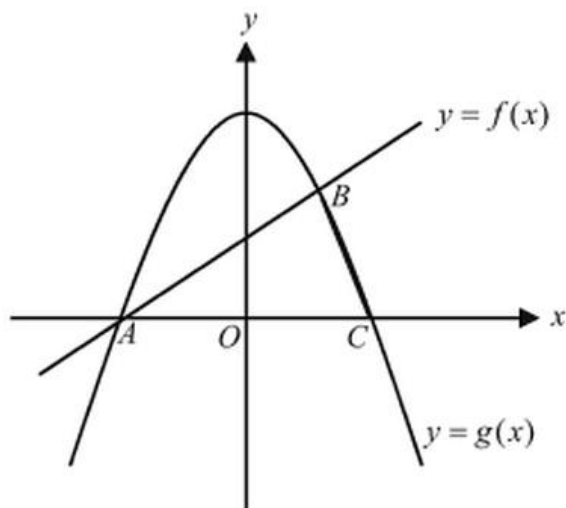
## WS 11—Skills 46-50

**Directions:** For this section, solve each problem and decide which is the best of the choices given. Circle the corresponding capital letter. You may use any available space for scratchwork.

**Notes:**

1. The use of a calculator is permitted.
2. All numbers used are real numbers.
3. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.
4. Unless otherwise specified, the domain of any function  $f$  is assumed to be the set of all real numbers  $x$  for which  $f(x)$  is a real number.

1. Buford travels from city  $A$  to city  $B$  in 3 hours. For the first hour, he drove at the constant speed of 40 miles per hour. Then he instantaneously increased his speed and, for the next 2 hours, kept it at 50 miles per hour. Find the average speed (in mph) of Buford's motion.  
(A) 45  
(B)  $46\frac{2}{3}$   
(C)  $46\frac{3}{4}$   
(D) 47  
(E)  $48\frac{1}{3}$
2. The same Buford travels from city  $A$  to city  $B$ . The first half of the way, he drove at the constant speed of 20 miles per hour. Then he increased his speed and traveled the remaining distance at 30 miles per hour. Find the average speed (in mph) of his motion.  
(A) 24  
(B) 25  
(C) 26  
(D) 28  
(E) 30
3. Suppose we're driving a car from New Braunfels to Old Munich at a constant speed of 60 miles per hour. On the way back from Old Munich to New Braunfels, we drive a constant speed of 30 miles per hour. What is the average speed (in mph) for the round trip?  
(A) 40  
(B) 43  
(C) 44  
(D) 45  
(E) 50
5. If  $(x-3)(x+3) = a$ , then  $(2x-6)(x+3) =$   
(A)  $2a$   
(B)  $3a$   
(C)  $4a$   
(D)  $5a$   
(E)  $6a$
6. Which of the following is equivalent to  $\left(n - \frac{1}{n}\right)^2 + 4$ ?  
(A) 4  
(B) 8  
(C)  $\left(n + \frac{1}{n}\right)^2$   
(D)  $n^2 + \frac{1}{n^2}$   
(E)  $n^2 - \frac{1}{n^2}$



Note: Figure not drawn to scale.

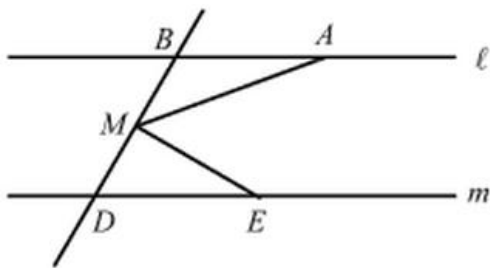
7. In the figure above, the graph of a function  $f$  is defined by  $f(x) = x + 2$  and the graph of a quadratic function  $g$  is defined by  $g(x) = -x^2 + 4$ . What is the area of  $\triangle ABC$ ?
- (A) 18  
(B) 12  
(C) 9  
(D) 6  
(E) 5
8. If  $k$  is divisible by 2, 3, and 15, which of the following is also divisible by these numbers?
- (A)  $k + 10$   
(B)  $k + 15$   
(C)  $k + 20$   
(D)  $k + 30$   
(E)  $k + 40$
9. If  $k$  is a positive integer divisible by 7, then which of the following must also be divisible by 7?
- (A)  $\frac{k}{7}$   
(B)  $k + \frac{k}{7}$   
(C)  $2k + 14$   
(D)  $\frac{77}{k}$   
(E)  $3k + 10$
10. If  $n$  is divisible by 2, 3, and 5, which of the following is also divisible by these numbers?
- (A)  $n + 12$   
(B)  $2n + 15$   
(C)  $3n + 20$   
(D)  $4n + 45$   
(E)  $5n + 60$
11. Which of the following numbers is divisible by the largest prime factor?
- (A) 250  
(B) 260  
(C) 300  
(D) 320  
(E) 400
12. If  $a$ ,  $b$ , and  $c$  are consecutive integers, which of the following must be true?
- I.  $a + b + c$  is divisible by 2  
II.  $a + b + c$  is divisible by 3  
III.  $a + b + c$  is divisible by 6
- (A) I only  
(B) II only  
(C) III only  
(D) I and II only  
(E) II and III only
13. Worker  $A$  can finish a job in 5 hours. When worker  $A$  works together with worker  $B$ , they can finish the job in 4 hours. How long does it take for worker  $B$  to finish the job if he works alone?
- (A) 3 hours  
(B) 8 hours  
(C) 12 hours  
(D) 16 hours  
(E) 20 hours
14. Raymond and Peter can paint a house in 20 hours when working together at the same time. If Raymond works twice as fast as Peter, how long would it take Peter to paint the house if he works alone?
- (A) 10 hours  
(B) 20 hours  
(C) 30 hours  
(D) 40 hours  
(E) 60 hours

15. A swimming pool can be filled by pipe  $A$  in 5 hours and by pipe  $B$  in 8 hours. How long would it take to fill the pool if both pipes were used?

(A)  $3\frac{1}{13}$  hours  
 (B)  $5\frac{2}{3}$  hours  
 (C) 7 hours  
 (D)  $8\frac{1}{3}$  hours  
 (E) 9 hours

16. If it takes 5 people 12 hours to paint 3 identical houses, then how many hours will it take 4 people working at the same rate to paint 5 identical houses?

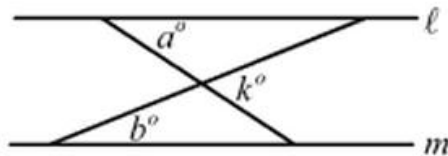
(A) 15 hours  
 (B) 18 hours  
 (C) 19 hours  
 (D) 20 hours  
 (E) 25 hours



Note: Figure not drawn to scale.

17. In the figure above, if  $AB = BM = DM = DE$  and  $\ell \parallel m$ , what is the measure of  $\angle AME$ ?

(A)  $45^\circ$   
 (B)  $50^\circ$   
 (C)  $60^\circ$   
 (D)  $75^\circ$   
 (E)  $90^\circ$

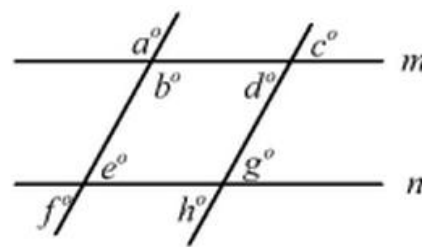


Note: Figure not drawn to scale.

18. In the figure above  $\ell \parallel m$ ,  $a = 65$ , and  $b = 45$ .

What is the value of  $k$ ?

(A) 70  
 (B) 80  
 (C) 90  
 (D) 100  
 (E) 110



Note: Figure not drawn to scale.

18. In the figure above line  $m$  is parallel to line  $n$ . Which of the following must be true?

I.  $a = c$   
 II.  $d = g$   
 III.  $b + e = 180^\circ$

(A) I only  
 (B) II only  
 (C) III only  
 (D) II and III only  
 (E) I, II, and III

| Problem<br>Number | Correct<br>Answer | Skill<br>Number |
|-------------------|-------------------|-----------------|
| 1                 | B                 | 46              |
| 2                 | A                 | 46              |
| 3                 | A                 | 46              |
| 4                 | A                 | 47              |
| 5                 | C                 | 47              |
| 6                 | D                 | 47              |
| 7                 | D                 | 48              |
| 8                 | C                 | 48              |
| 9                 | E                 | 48              |
| 10                | B                 | 48              |
| 11                | B                 | 48              |
| 12                | E                 | 49              |
| 13                | E                 | 49              |
| 14                | A                 | 49              |
| 15                | E                 | 49              |
| 16                | E                 | 50              |
| 17                | E                 | 50              |
| 18                | D                 | 50              |