WS 6—Skills 21-25

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. If the sum of the consecutive integers form -30 to x, inclusive, is 96, what is the value of x?
(A) 30
(B) 31
(C) 32
(D) 33
(E) 34

2. The smallest integer of a set of even consecutive integers is -20. If the sum of these integers is 72, how many integers are in the set?
(A) 24
(B) 25
(C) 43
(D) 44
(E) 45

3. The greatest integer of a set of consecutive integers is 61. If the sum of these integers is 61, how many integers are in the set?
(A) 2
(B) 61
(C) 121
(D) 122
(E) 125

$$2x - 5y = 8$$
$$4x + ky = 17$$

4. For which of the following values of k willl the system of equations above have <u>no</u> solution?
(A) 10
(B) 5
(C) 0
(D) -5
(E) -10

$$5x - 2y = 3$$
$$ax + by = 6$$

5. For the system of equations above, the system has <u>infinite</u> solutions. What is the value of $a + b$?
(A) 6
(B) 4
(C) 0
(D) -4
(E) -6

$$3x + by = 3$$
$$ax - 4y = 6$$

6. For which of the following values of $\{a, b\}$ will the system of equations above have <u>no</u> solution?
(A) $\{-1, 2\}$
(B) $\{1, 1\}$
(C) $\{2, 1\}$
(D) $\{3, -4\}$
(E) $\{6, 2\}$

7. If $x(k-2)=0$ for any value of x, what is the value of k?
   (A) 0
   (B) 2
   (C) 4
   (D) 6
   (E) 8

8. If $ax^2 + bx + c = 0$ for any value of x, what is the value of $a+b+c$?
   (A) 0
   (B) 1
   (C) 2
   (D) 3
   (E) It cannot be determined from the information given.

$$(k+1)x+5 = ax+k$$

9. If the two expressions above are true for any value of x, what is the value of a?
   (A) 6
   (B) 5
   (C) 2
   (D) 0
   (E) It cannot be determined from the information given.

$$a(x+1)+b(x-1) = 2x+4$$

10. If the two expressions above are true for any value of x, what is the value of a?
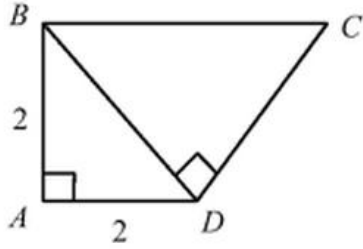   (A) 0
    (B) 1
    (C) 2
    (D) 3
    (E) 4
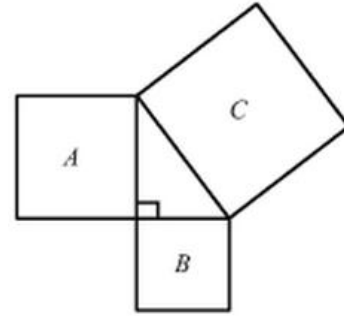
11. In the figure above, the area of the square A is 20 and the area of the square B is 16. What is the length of a side of the square C?
    (A) 4
    (B) 6
    (C) 8
    (D) 10
    (E) 36
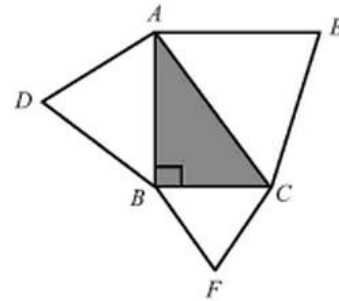
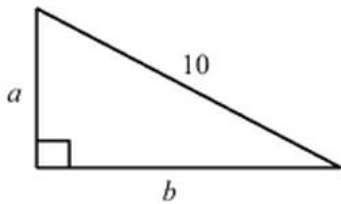Note: Figure not drawn to scale.

12. In the figure above, $\triangle ABD$, $\triangle ACE$, and $\triangle BCF$ are equilateral triangles, and the ratio of BC to AB is $1:2$. If the area of $\triangle ACE$ is 20, what is the area of $\triangle ABD$?
   (A) 18
    (B) 16
    (C) 15
    (D) 14
    (E) 12

Note: Figure not drawn to scale.

13. In the figure above, $AB = AD = 2$, and $\triangle BCD$ is an isosceles triangle. What is the length of $\overline{BC}$?
(A) 3
(B) $3\sqrt{2}$
(C) 4
(D) $4\sqrt{2}$
(E) 6

Note: Figure not drawn to scale.

14. Which of the following is true bout the lengths a and b of the sides of the triangle above?

(A) $0 < (a+b)^2 \leq 10$

(B) $10 < (a+b)^2 \leq 40$

(C) $40 < (a+b)^2 \leq 80$

(D) $80 < (a+b)^2 \leq 100$

(E) $100 < (a+b)^2$

15. There are two joggers; one runs 8 miles north and then 5 miles east, and the other jogger runs 10 miles west and then 12 miles south. What is the shortest distance between these two joggers?
(A) 20
(B) 25
(C) 28
(D) 30
(E) 36
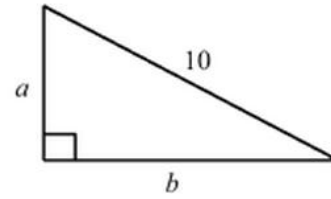
Note: Figure not drawn to scale.

16. In $\triangle ABC$ above, $AB = 10$ and $AC = 20$. What is the length of $\overline{AD}$?
(A) 5
(B) $5\sqrt{3}$
(C) $4\sqrt{5}$
(D) $6\sqrt{3}$
(E) $8\sqrt{5}$

For questions 17-19 refer to the following figure and information.
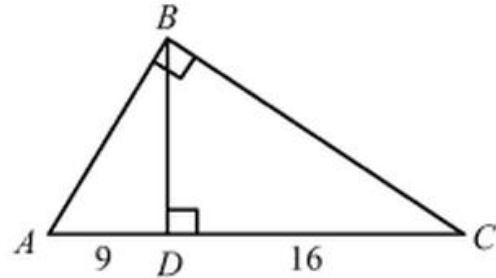
Note: Figure not drawn to scale.

In the figure above, $AD = 9$ and $CD = 16$.

17. What is the length of $\overline{AB}$?
(A) 12
(B) 13
(C) 14
(D) 15
(E) 18

18. What is the length of $\overline{BC}$?
(A) 18
(B) 20
(C) 25
(D) 28
(E) 30

19. What is the length of $\overline{BD}$?
(A) 10
(B) 11
(C) 12
(D) 13
(E) 14

Problem Number	Correct Answer	Skill Number
1	D	21
2	A	21
3	D	21
4	E	22
5	A	22
6	D	22
7	B	23
8	A	23
9	A	23
10	D	23
11	B	24
12	B	24
13	C	24
14	E	24
15	B	24
16	C	24
17	D	25
18	B	25
19	C	25