

WS 2—Skills 1-5

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.

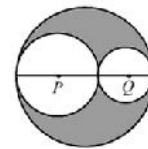
Notes:

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.

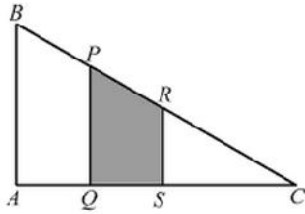
1. An art class of 20 students took a final exam and ten of the students scored between 78 and 86 on the exam. If s is defined as the scores of the ten students, which of the following describes all possible values of s ?
 - (A) $|s - 82| = 4$
 - (B) $|s + 82| = 4$
 - (C) $|s - 82| < 4$
 - (D) $|s + 82| < 4$
 - (E) $|s - 82| > 4$

2. At a bottling company, a computerized machine accepts a bottle only if the number of fluid ounces is greater than or equal to $5\frac{7}{8}$ and less than or equal to $6\frac{4}{7}$. If the machine accepts a bottle containing f fluid ounces, which of the following describes all possible values of f ?
 - (A) $|f - 6| < \frac{4}{7}$
 - (B) $|f - 6| \leq \frac{3}{7}$
 - (C) $|f + 6| > \frac{4}{7}$
 - (D) $|6 - f| \leq \frac{4}{7}$
 - (E) $|f + 6| \leq \frac{4}{7}$

3. At the Moo-Moo Milk Company, machine X fills a carton with milk, and machine Y eliminates the milk carton if the weight is less than 450 grams or greater than 500 grams. If the weight of the carton that will be eliminated by machine Y is E , in grams, which of the following describes all possible values of E ?
 - (A) $|E - 475| < 25$
 - (B) $|E + 475| < 25$
 - (C) $|E - 500| > 450$
 - (D) $|475 - E| = 25$
 - (E) $|E - 475| > 25$

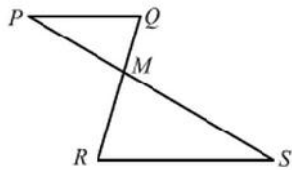


4. In the figure above, circle P and Q are inscribed in a circle. If the radius of circle P is 4 and the radius of circle Q is 2, what is the ratio of the shaded region to the area of the largest circle?
 - (A) $\frac{2}{9}$
 - (B) $\frac{4}{9}$
 - (C) $\frac{5}{9}$
 - (D) $\frac{5}{12}$
 - (E) $\frac{7}{12}$



Note: Figure not drawn to scale.

5. In $\triangle ABC$ above, $AB \parallel PQ \parallel RS$ and the ratio of the lengths, $AQ : QS : SC = 2 : 2 : 3$. If the area of quadrilateral $PRSQ$ is 48, what is the area of $\triangle ABC$?
- (A) 84
 (B) 92
 (C) 105
 (D) 144
 (E) 147



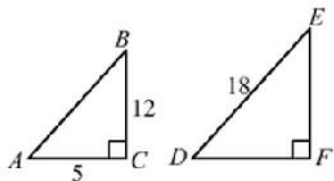
Note: Figure not drawn to scale.

6. In the figure above, \overline{PQ} is parallel to \overline{RS} . If the ratio of the area of $\triangle PQM$ to the area of $\triangle SRM$ is 4:9 and the perimeter of $\triangle PQM$ is 15, what is the perimeter of $\triangle SRM$?
- (A) $22\frac{1}{2}$
 (B) $33\frac{3}{4}$
 (C) $35\frac{1}{2}$
 (D) $37\frac{1}{2}$
 (E) $39\frac{1}{3}$

7. If $-2 < x < 4$ and $-3 < y < 2$, what are all possible values of $x - y$?
- (A) $-4 < x - y < 2$
 (B) $1 < x - y < 7$
 (C) $1 < x - y < 4$
 (D) $-4 < x - y < 7$
 (E) $-5 < x - y < 7$
8. The value of p is between 1 and 4, and the value of q is between 2 and 6. Which of the following is a possible value of $\frac{q}{p}$?
- (A) Between $\frac{1}{2}$ and $\frac{2}{3}$
 (B) Between $\frac{2}{3}$ and 2
 (C) Between $\frac{1}{2}$ and 6
 (D) Between 2 and 6
 (E) Between $\frac{1}{2}$ and $1\frac{1}{2}$
9. On a certain college faculty, $\frac{4}{7}$ of the professors are male, and the ratio of the professors older than 50 years to the professors less than or equal to 50 years is 2:5. If $\frac{1}{5}$ of the male professors are older than 50 years, what fraction of the female professors are less than or equal to 50 years?
- (A) $\frac{1}{7}$
 (B) $\frac{1}{3}$
 (C) $\frac{2}{5}$
 (D) $\frac{3}{5}$
 (E) $\frac{2}{3}$

10. Of the 24 company presidents attending a corporate meeting, $\frac{3}{4}$ of the presidents are male and $\frac{2}{3}$ of the presidents have children. If 2 female presidents do not have children, what is the number of the male presidents who have children?
- (A) 6
(B) 8
(C) 10
(D) 12
(E) 14

11. In a certain group at NBHS, $\frac{3}{7}$ of the students are boys and the ratio of the students older than or equal to 15 years old to the students less than 15 years old is 3:8. If $\frac{3}{4}$ of the girls are less than 15 years old, then what fraction of the boys are less than 15 years old?
- (A) $\frac{1}{3}$
(B) $\frac{4}{11}$
(C) $\frac{5}{11}$
(D) $\frac{23}{33}$
(E) $\frac{40}{77}$



12. In the figure above, $\triangle ABC$ is similar to $\triangle DEF$. What is the length of \overline{DF} ?
- (A) 6
(B) $\frac{82}{13}$
(C) $\frac{90}{13}$
(D) 8
(E) $\frac{100}{13}$

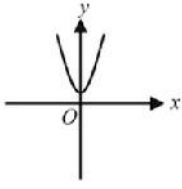
x	y
1	a
a	$5a$

13. In the table above, y is directly proportional to x , where $a \neq 0$. Which of the following is the value of a ?
- (A) 3
(B) 4
(C) 5
(D) 6
(E) 7
14. If y is directly proportional to x , which of the following could be the graph of $y = f(x)$?

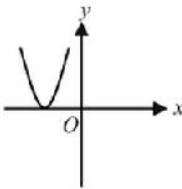
- (A)
- (B)
- (C)
- (D)
- (E)

15. If y is directly proportional to x^2 , which of the following could be the graph of $y = f(x)$?

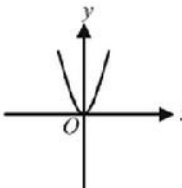
(A)



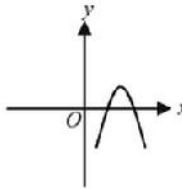
(B)



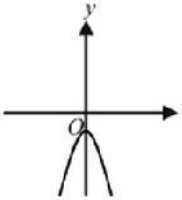
(C)



(D)



(E)



Problem Number	Correct Answer	Skill Number
1	C	1
2	D	1
3	E	1
4	B	2
5	E	2
6	A	2
7	D	3
8	C	3
9	D	4
10	D	4
11	D	4
12	C	5
13	C	5
14	C	5
15	C	5