# WS 10—Skills 41-45

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. The total cost c, in dollars, of repairing shoes is given by the function $c(x) = \dfrac{200x - 400}{x} + k$, where x is the number of repairing shoes and k is a constant. If 50 shoes were repaired at a cost of $300, what is the value of k?
   (A) 100
   (B) 108
   (C) 126
   (D) 150
   (E) 300

2. The value of a computer decreases each year by 1.2 percent. This year the price of the computer was $1,200. If the price p of the computer n years from now is given by the function $p(n) = 1200c^n$, what is the value of c?
   (A) 0.012
   (B) 0.88
   (C) 0.988
   (D) 1.012
   (E) 1.12

3. Let the function m, average rate of change between a and b in the domain of the function, be defined by $m(x) = \dfrac{f(b) - f(a)}{b - a}$. If $f(x) = x^2$, what is the value of m between -2 and 3?
   (A) -2
   (B) -1
   (C) 0
   (D) 1
   (E) 2

4. The present value p of a certain car that depreciates for a number of years is defined by $p(t) = k\left(1 - \dfrac{r}{100}\right)^t$, where k is the initial value of the car, r is the percent of depreciation per year, and t is the number of years. If a person purchases the car for $20,000 and the value of the car depreciates by 10% per year, how much will the value of the car be after three years from the date of purchase?
   (A) $18,000
   (B) $16,200
   (C) $14,580
   (D) $14,000
   (E) $12,250

COST VS. WEIGHT FOR 10 MEATS
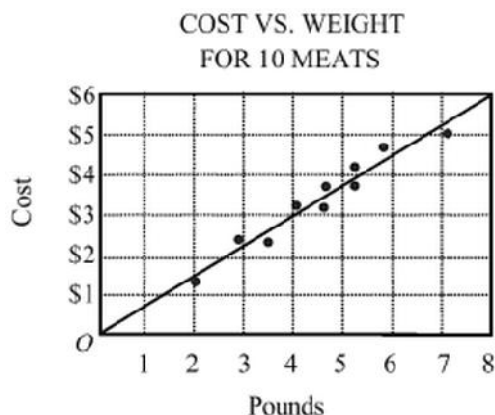
5. For 10 meats of different weights, the cost and weight of each are displayed in the scatter plot above, and the line of best fit for the data is shown. Which of the following is closest to the average (arithmetic mean) cost per pound for the 10 meats?
   (A) $0.06
   (B) $0.18
   (C) $0.56
   (D) $0.62
   (E) $073

ITEMS PURCHASED BY CUSTOMERS

Numbers of Customers	Number of Items
10	10
25	8
45	5
50	Fewer than 5

6. The table above shows the number of items 130 customers purchased form a stationary store on a particular day. Which of the following can be obtained from the information in the table?
   I.   The average (arithmetic mean) number of items
   II. The median number of items
   III. The mode of the number of items
   (A) I only
   (B) II only
   (C) III only
   (D) I and II only
   (E) II and III only

PEOPLE AT J.C HIGH SCHOOL
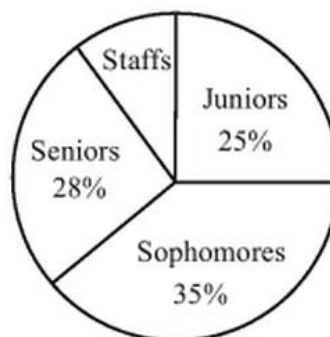
7. In the circle above, there are 125 juniors in the school. How many people make up the staff?
   (A) 100
   (B) 85
   (C) 65
   (D) 45
   (E) 30

8. The probability of a boy being born is $\frac{1}{3}$, and if a family plans to have 6 children, what is the expected number of boys?
   (A) 1
   (B) 2
   (C) 3
   (D) 4
   (E) 6
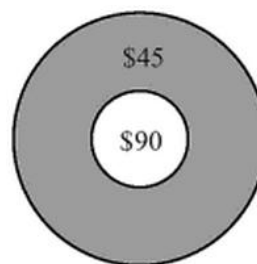
9. A carnival game consists of tossing a dart, which lands at a random spot within the larger circle. The shaded region loses $45 and the unshaded region wins $90. If the ratio of the radius of the smaller circle to the radius of the larger circle is 1:3, which of the following can be expected in this game?
   (A) lose $30
   (B) lose $10
   (C) make $10
   (D) make $20
   (E) make $30

10. How many 3-digit positive integers are odd and do not contain the digit 5?
    (A) 64
    (B) 288
    (C) 360
    (D) 400
    (E) 420

11. For 4-digit numbers, the first digit is 8 and the third digit is 7. If the 4-digit numbers must have at least a 6 as a digit, and the numbers are even, how many numbers satisfy this condition?
    (A) 10
    (B) 12
    (C) 14
    (D) 16
    (E) 18

12. How many 4-digit numbers between 5,000 and 10,000 are odd numbers?
    (A) 200
    (B) 400
    (C) 1000
    (D) 2500
    (E) 3000

13. Between 500 and 1000, how many integers are multiples of 5?
    (A) 99
    (B) 100
    (C) 150
    (D) 200
    (E) 300

14. For the first 1000 positive integers, how many integers are multiples of 3 or 4?
    (A) 470
    (B) 480
    (C) 500
    (D) 520
    (E) 550

15. Between 300 and 800, how many integers are multiples of 5 and 8?
    (A) 10
    (B) 12
    (C) 300
    (D) 799
    (E) 800

Problem Number	Correct Answer	Skill Number
1	B	41
2	C	41
3	D	41
4	C	41
5	E	42
6	B	42
7	C	42
8	B	43
9	A	43
10	B	44
11	C	44
12	D	44
13	A	45
14	C	45
15	B	45