Dr. John Chung's SAT Math

TEST 3

ANSWER SHEET TEST #:

SECTION 3

1	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	11	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	21	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	31	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
2	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	12	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	22	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	32	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
3	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	13	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	23	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	33	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
4	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	14	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	24	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	34	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
5	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	15	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	25	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	35	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
6	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	16	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	26	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	36	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
7	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	17	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	27	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	37	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
8	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	18	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	28	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	38	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
9	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	19	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	29	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	39	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
10	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	20	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	30	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	40	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

SECTION 5

1	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	11	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	21	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	31	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
2	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	12	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	22	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	32	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
3	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	13	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	23	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	33	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
4	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	14	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	24	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	34	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
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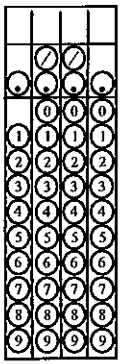
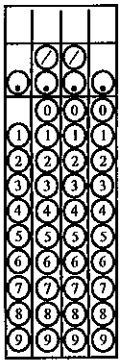
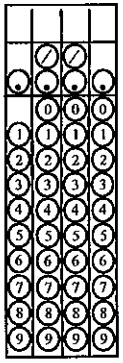
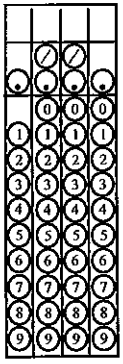
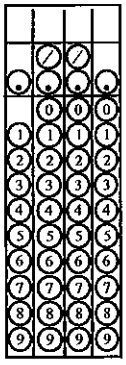
10	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	20	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	30	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	40	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

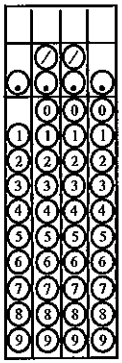
9 

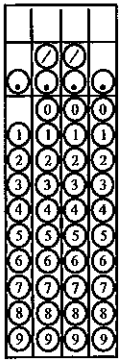
10 

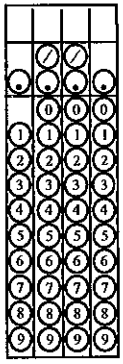
11 

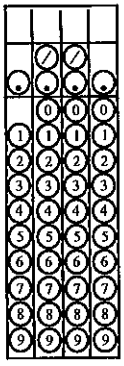
12 

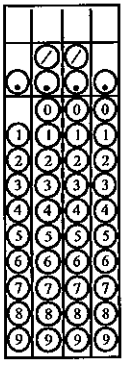
13 

14 

15 

16 

17 

18 

SECTION 7								
1	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	11	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	21	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	31	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
2	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	12	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	22	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	32	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
3	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	13	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	23	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	33	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
4	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	14	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	24	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	34	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
5	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	15	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	25	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	35	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
6	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	16	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	26	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	36	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
7	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	17	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	27	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	37	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
8	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	18	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	28	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	38	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
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10	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	20	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	30	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	40	Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

Math Scoring Worksheet

A. Section 3 _____ (*numer of correct*) _____ (*number of incorrect*)

\+ \+

B. Section 5 (1-8) _____ (*numer of correct*) _____ (*number of incorrect*)

\+

C. Section 5 (9-18) _____ (*numer of correct*)

\+ \+

D. Section 7 _____ (*numer of correct*) _____ (*number of incorrect*)

= =

E. Total Unrounded Raw Score _____ (*numer of correct*) – _____ (*number of incorrect*) +4 = _____

F. Total Rounded Raw Score _____ (See table)

Math Score Range = [—]

Math Conversion Table

Raw Score	Scaled Score	Raw Score	Scaled Score
54	800	**23**	490-550
53	780-800	**22**	480-540
52	760-800	**21**	470-530
51	740-800	**20**	460-520
50	720-780	**19**	450-510
49	700-760	**18**	450-510
48	690-750	**17**	440-500
47	680-740	**16**	430-490
46	670-730	**15**	420-480
45	660-720	**14**	420-480
44	650-710	**13**	410-470
43	650-710	**12**	400-460
42	640-700	**11**	390-450
41	630-690	**10**	380-440
40	620-680	**9**	390-430
39	610-670	**8**	380-420
38	610-670	**7**	370-410
37	600-660	**6**	360-400
36	590-650	**5**	340-380
35	580-640	**4**	320-370
34	570-630	**3**	310-360
33	560-620	**2**	300-350
32	560-620	**1**	270-320
31	550-610	**0**	240-300
30	540-600	**-1**	200-290
29	530-590	**-2**	200-270
28	530-590	**-3**	200-260
27	520-580	**-4**	200-240
26	510-570	**-5**	200-220
25	500-560	**-6 and below**	200
24	500-560		

SECTION 3
Time- 25 minutes
20 Questions

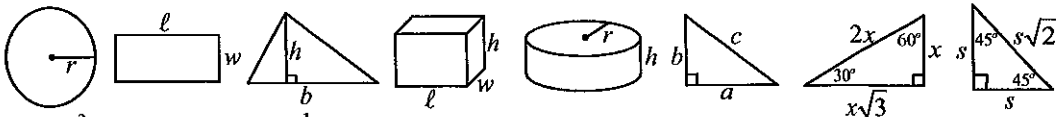
Turn to Section 3 (Page 1) of your answer sheet to answer the questions in this section.

Directions: For this section, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. 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 figure lie in a plane unless other indicated.
4. Unless otherwise specified, the domain of any function f is assumed to be set of all real numbers x for which $f(x)$ is a real number.

Reference Information



$A=\pi r^2$ $C=2\pi r$ $A=\ell w$ $A=\frac{1}{2}bh$ $V=\ell wh$ $V=\pi r^2 h$ $c^2=a^2+b^2$ Special Right Triangles

The numbers of degrees of arc in a circle is 360°.

The sum of the measures in degrees of the angles is 180°.

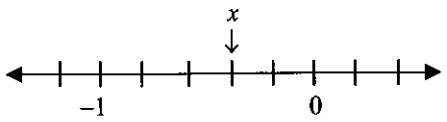
1. If $p+q-2=5$, what is the value of $p+q-7$?

(A) -3
(B) 0
(C) 3
(D) 6
(E) 9

2. Robert earns $152 in 4 days. At this rate, how many days will it take him to earn $532?

(A) 10
(B) 12
(C) 14
(D) 16
(E) 18

GO ON TO THE NEXT PAGE



3. If the tick marks are equally spaced on the number line above, what is the value of $|x+1|$?

(A) $\frac{1}{5}$

(B) $\frac{2}{5}$

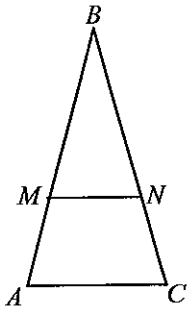
(C) $\frac{3}{5}$

(D) $\frac{4}{5}$

(E) $\frac{7}{5}$

4. If Cathy sells two apple pies and three tacos for \$7 and she sells three apple pies and two tacos for \$8, what is the cost, in dollars, of three apple pies and three tacos ?

(A) 9
(B) 10
(C) 12
(D) 15
(E) 18



Note: Figure not drawn to scale.

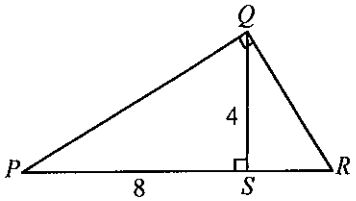
5. The figure above shows that an isosceles triangle of area 100 is cut by $\overline{MN}$ into an isosceles trapezoid and a smaller isosceles triangle. If the area of the trapezoid is 75 and the altitude of $\triangle ABC$ from B is 20, what is the length of $\overline{MN}$?

(A) 3
(B) 5
(C) 10
(D) 12
(E) 15

6. For all values of x, the function is defined by $f(x)=(x-1)(x-5)$. For which of the following intervals does $f(x)$ have negative values ?

(A) $x<-1$
(B) $-1<x<0$
(C) $0<x<1$
(D) $1<x<5$
(E) $x>5$

GO ON TO THE NEXT PAGE



Note: Figure not drawn to scale.

7. In the figure above, $\overline{PS}$ is equal to 8 and $\overline{QS}$ is equal to 4. What is the area of $\triangle PQR$?

(A) 10
(B) 20
(C) 30
(D) 40
(E) 50

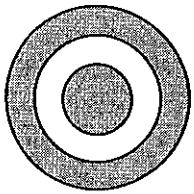
9. If each of the 8 members from the JFK Hockey team shake hands with all the members in the same team, which of the following is the number of handshakes?

(A) 28
(B) 56
(C) 60
(D) 120
(E) 240

Row 1		1		2
Row 2	1		3	2
Row 3	1	4	5	2

8. In the array of numbers above, the first number in each row is 1 and the last number is 2. If each of the other entries is the sum of the two numbers nearest it in the row directly above it, what is the sum of all of the numbers in row 5?

(A) 26
(B) 48
(C) 52
(D) 60
(E) 70



10. The figure above shows a dartboard with a radius 9. Each of the concentric circles has a radius 3 less than the next large circle. If 24 darts land randomly on the target, how many darts will be expected to land in the shaded regions?

(A) 18
(B) 16
(C) 14
(D) 12
(E) 10

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11. While driving on an m mile trip from New York City to Washington D.C, Allen drove at the rate of p miles per hour for the first t hours and took w hours to complete the rest of the trip. Which of the following could represent the speed after t hours?

(A) $\frac{m-p}{2}$

(B) $\frac{pt}{w}$

(C) $\frac{m-pt}{w}$

(D) $m-\frac{p}{t}$

(E) $m-\frac{pt}{w}$

x	y
0	2
k	14
$k+2$	17

12. The table above shows the points (x, y) represented on a straight line. If the point $(16, m)$ lies on the same line, what is the value of m?

(A) 20
(B) 22
(C) 24
(D) 26
(E) 28

13. James spent $\frac{3}{4}$ of his allowance on a music CD. He spent $\frac{2}{3}$ of what was left on a hamburger. If this left him p dollars, which of the following was his allowance in dollars?

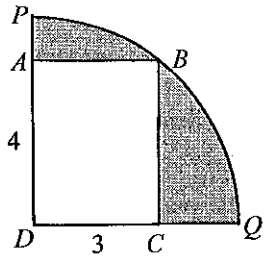
(A) $12p$
(B) $14p$
(C) $16p$
(D) $18p$
(E) $20p$

Note: Figure not drawn to scale.

14. In the figure above, which of the following could not be true?

(A) $x+y=180$
(B) $x>v$
(C) $w>y$
(D) $x+w>y+v$
(E) $x-y<0$

GO ON TO THE NEXT PAGE



Note: Figure not drawn to scale.

15. In the figure above, a rectangle is inscribed in the part of a circle. If the length of $\overline{AD}$ is 4 and the length of $\overline{DC}$ is 3, what is the area of the shaded region?

(A) $\frac{5\pi}{2}$
(B) $25\pi - 12$
(C) $\frac{25\pi - 12}{2}$
(D) $\frac{25\pi - 24}{2}$
(E) $\frac{25\pi - 48}{4}$

16. According to the formula $P = \frac{4}{3}K + 81$, if the value of P increases by 16, by how much does the value of K increase?

(A) 12
(B) 14
(C) 25
(D) $\frac{64}{3}$
(E) $\frac{81}{7}$

17. For all positive values of p and q, let $p \circledast q$ be defined by $\frac{pq}{p+q}$. If $p \circledast q = \frac{1}{p} \circledast \frac{1}{q}$, which of the following must be true?

(A) $p = q + 1$
(B) $p = q$
(C) $p = -q$
(D) $pq = 1$
(E) $pq = p + q$

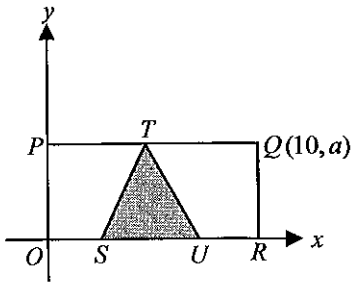
18. If five lines not parallel to each other are drawn on a sheet of paper, what is the greatest possible number of intersections from the five lines?

(A) 8
(B) 10
(C) 12
(D) 14
(E) 16

GO ON TO THE NEXT PAGE

19. If $2 \le p \le 6$ and $1 \le q \le 12$, what is the smallest value of $(p+q)^2 - (p-q)^2$?

(A) 20
(B) 18
(C) 8
(D) 6
(E) 4



Note: Figure not drawn to scale.

20. In the figure above, $OPQR$ is a rectangle and ΔSTU is an equilateral triangle. A point in the rectangle $OPQR$ is to be chosen at random. If the probability that the point will be in the shaded region is $\frac{1}{4}$, what is the value of a?

(A) $2\sqrt{3}$
(B) $\frac{5}{2}$
(C) $\frac{3\sqrt{3}}{2}$
(D) $\frac{5\sqrt{3}}{2}$
(E) $\frac{7\sqrt{3}}{2}$

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.

SECTION 5
Time- 25 minutes
18 Questions

Turn to Section 5 (Page 1) of your answer sheet to answer the questions in this section.

Directions: For this section, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratchwork.

Notes

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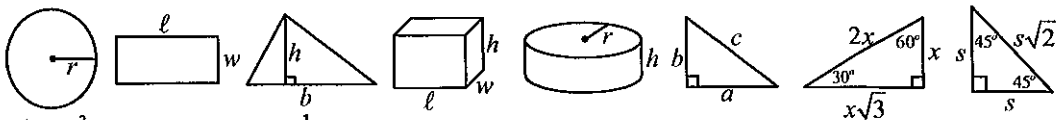

$A=\pi r^2$ $C=2\pi r$ | $A=\ell w$ | $A=\frac{1}{2}bh$ | $V=\ell wh$ | $V=\pi r^2 h$ | $c^2=a^2+b^2$ | Special Right Triangles

The numbers of degrees of arc in a circle is $360°$.

The sum of the measures in degrees of the angles is $180°$.

1. If $a=16-b$ and $\frac{b}{6}=3$, what is the value of a?

(A) -4
(B) -2
(C) 2
(D) 4
(E) 6

2. The scale of a map for Bear Mountain National Park is 2 inches = 9 miles. The distance between Discovery Point and Overlook on the map is about $1\frac{1}{2}$ inches. What is the distance between these two places in miles?

(A) 5
(B) 6
(C) $6\frac{1}{3}$
(D) $6\frac{3}{4}$
(E) 8

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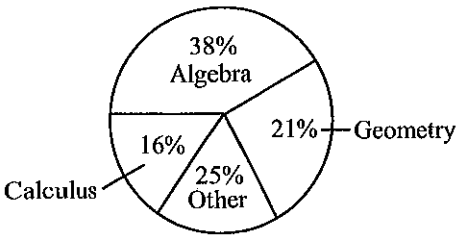
CLASSES STUDENTS ARE TAKING

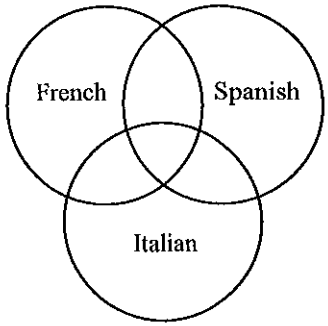


3. The circle graph above shows the percent of which 200 students are taking each subject. How many more students are taking Algebra than Geometry?

(A) 30
(B) 32
(C) 34
(D) 36
(E) 38

4. If k is a positive integer, then $\frac{2^{k+5}}{2^4}$ could equal which of the following?

(A) 20
(B) 14
(C) 12
(D) 8
(E) 2



5. In the figure above, of the 40 foreign exchange students attending an International School, 20 speak French, 23 speak Spanish, and 22 speak Italian. Nine students speak French and Spanish, but not Italian. Six students speak French and Italian, but not Spanish. Ten students speak Spanish and Italian but not French. If only 4 of the students speak all three languages, how many exchange students do not speak any of these languages?

(A) 4
(B) 6
(C) 8
(D) 10
(E) 12

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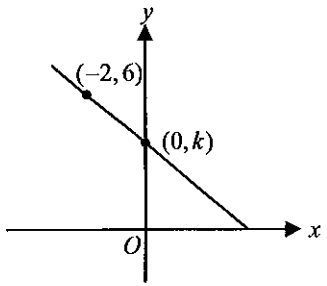


Note: Figure not drawn to scale.

6. In the figure above, the slope of the line is $-\frac{2}{3}$.

What is the value of k ?

(A) 3

(B) $\frac{10}{3}$

(C) $\frac{11}{3}$

(D) 4

(E) $\frac{14}{3}$

7. If $\frac{a}{b} = 5$ and $\frac{p^2}{b^2} = \frac{q^2}{a^2}$, where p and q are positive, which of the following must be equal to $\frac{p}{q}$?

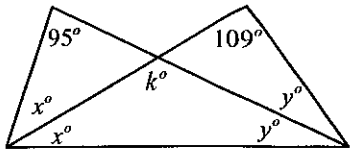
(A) 5

(B) $\frac{1}{5}$

(C) $\frac{a}{5}$

(D) $\frac{a}{b}$

(E) ab



Note: Figure not drawn to scale.

8. In the figure above, what is the value of k ?

(A) 118

(B) 120

(C) 128

(D) 130

(E) 132

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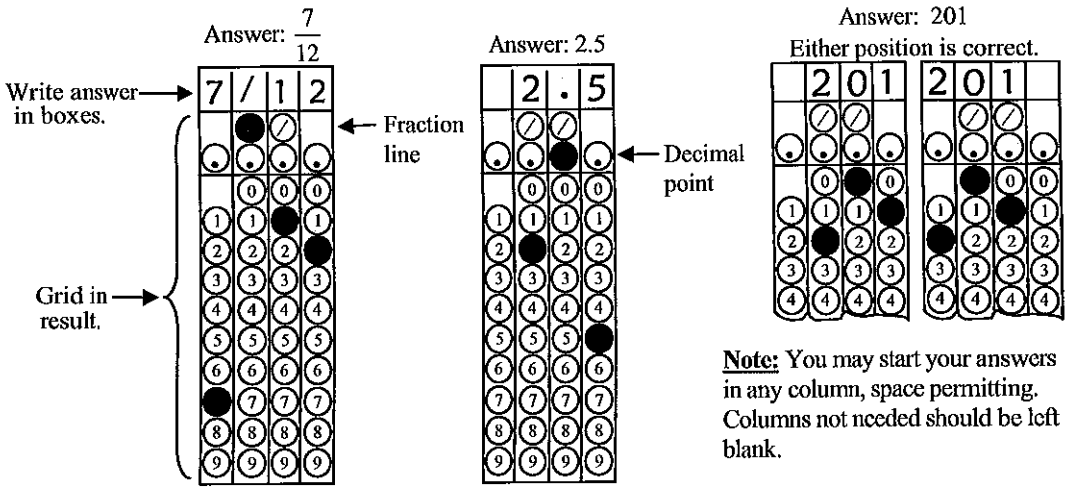
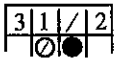
Directions: For Students-Produced Response questions 9-18, use the grid at the bottom of the answer sheet page on which you have answered questions 1-8.

Each of the remaining 10 questions requires you to solve the problem and enter your answer by making the circles in the special grid, as shown in the examples below. You may use any available space for scratchwork.

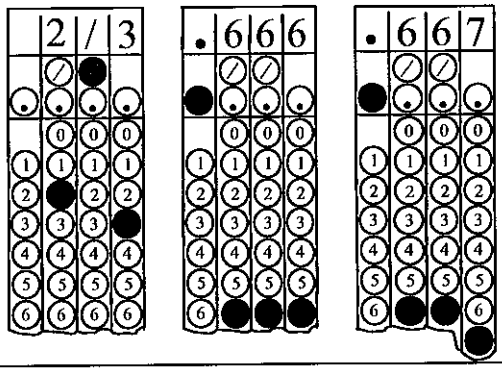


Note: You may start your answers in any column, space permitting. Columns not needed should be left blank.

- Mark no more than one circle in any column.
- Because the answer sheet will be machine-scored, **you will receive credit only if the circles are filled in correctly.**
- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- No question has a negative answer.
- **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If  is gridded, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)

- **Decimal Answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid. For example, if you obtain an answer such as 0.6666..., you should record your result as .666 or .667. **A less accurate value such as .66 or .67 will be scored as incorrect.**

Acceptable ways to grid $\frac{2}{3}$ are:



9. If $\frac{1}{n-1}=\frac{2}{n+2}$, what is the value of n?

10. A recipe for making 20 pepperoni pizza pies requires 32 pounds of flour, 5 pounds of baking powder, and 4 pounds of pepperoni. If the proportions in this recipe are to be used to make 15 pepperoni pizza pies, how many pounds of pepperoni will be needed?

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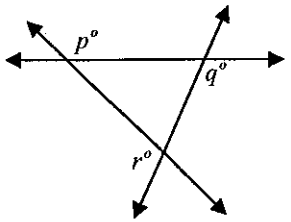


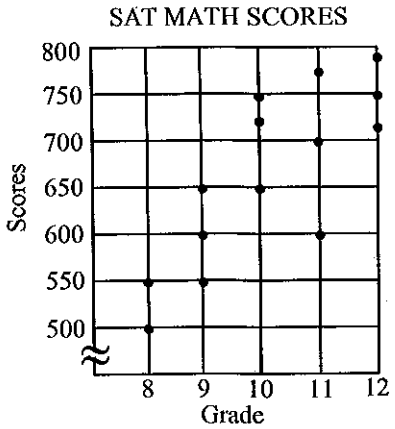
Note: Figure not drawn to scale.

11. In the figure above, three different lines intersect at three points. If $p = 125$, what is the value of $q + r$?

12. The length, width, and height of a rectangular solid have distinct integral values. If the volume of the rectangular solid is 75, what is one possible value for the surface area of the solid?

$3,\ 3^2,\ 3^3,\ 3^4 \ldots$

13. The sequence above is formed by multiplying 3 to the preceding term. What is the ones digit of the 100^{th} term of the sequence?



14. The scatterplot above shows SAT math scores for 14 students in a certain group. What is the median math score for the 14 students?

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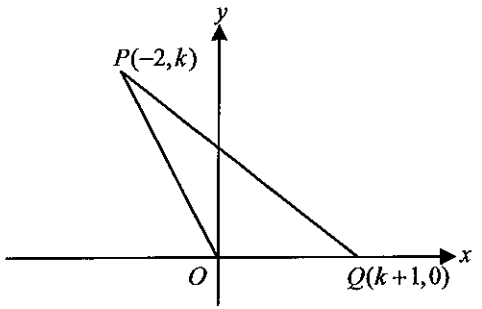
15. If $(k-1)x^2+(k+1)x+2k=ax^2+bx+4$ for all values of x, where k, a, and b are constant, what is the value of $a+b$?



Note: figure not drawn to scale.

16. In the xy-plane above, the area of $\triangle OPQ$ is 3. What is the value of k?

17. Let the function v be defined so that $v(x)$ is the volume of a cube with side x.
If $v(1)+v(6)+v(8)=v(k)$, what is the value of k?

18. The total cost of an internet phone-call is the sum of

(1) a basic fixed charge for using the internet

and

(2) an additional charge for each $\frac{1}{2}$ of a minute that is used.

If the total cost of a 20 minute-call is \$11.00 and the total cost of a 35 minute-call is \$18.50, what is the total cost, in dollars, of a 40 minute-call?

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section in the test.

SECTION 7
Time- 20 minutes
16 Questions

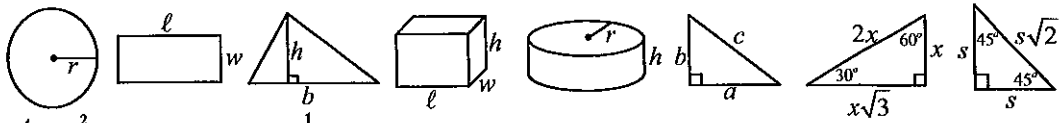
Turn to Section 7 (Page 2) of your answer sheet to answer the questions in this section.

Directions: For this section, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. 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 figure lie in a plane unless other indicated.
4. Unless otherwise specified, the domain of any function f is assumed to be set of all real numbers x for which $f(x)$ is a real number.

Reference Information



$A=\pi r^2$ $C=2\pi r$ $A=\ell w$ $A=\frac{1}{2}bh$ $V=\ell wh$ $V=\pi r^2 h$ $c^2=a^2+b^2$ Special Right Triangles

The numbers of degrees of arc in a circle is $360°$.

The sum of the measures in degrees of the angles is $180°$.

1. If the price of a jacket was increased by 10% last week and then decreased 10% this week, what is the overall percent change from the original price?

(A) 0%
(B) 1%
(C) 2%
(D) 20%
(E) No change

2. If $x=\frac{3}{2z}$ and $xy=\frac{1}{2z}$ for $z\neq 0$, what is the value of y?

(A) -1
(B) $\frac{1}{4}$
(C) $\frac{1}{3}$
(D) $\frac{2}{3}$
(E) 1

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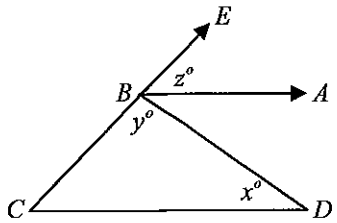

Note: Figure not drawn to scale.

3. In the figure above, $\overline{AB}$ is parallel to $\overline{CD}$. Which of the following MUST be true ?

(A) $x > z$
(B) $x = z$
(C) $z > x$
(D) $180 = x + y + z$
(E) $180 = 2x + z$

4. If $p < q < 0$, which of the following MUST be greater than 1 ?

(A) pq

(B) $p + q$

(C) $p - q$

(D) $\frac{p}{q}$

(E) $\frac{q}{p}$

5. If $a + a^{-1} = 3$, what is the value of $a^2 + a^{-2}$?

(A) 9
(B) 8
(C) 7
(D) 6
(E) 5

6. If $-12 < w < -4$, which of the following must be true ?

(A) $|w| = 4$
(B) $|w| < 4$
(C) $|w - 8| > 4$
(D) $|w + 8| > 4$
(E) $|w + 8| < 4$

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x	-1	0	1	2
$g(x)$	1	-1	1	7

7. The table above shows values of the function g and values of x. Which of the following defines g ?

(A) $y = 2x - 1$
(B) $y = -2x - 1$
(C) $y = x^2 - 1$
(D) $y = 2x^2 - 1$
(E) $y = -2x^2 - 1$

8. In a chemistry class, some of the students are boys and none of these boys are less then 13 years old. Which of the following MUST be true ?

(A) Most of the students in the class are boys.
(B) Most of the students are older than 13 years old.
(C) None of the students in the class are less than 13 years old.
(D) Some of the students are older than or equal to 13 years old.
(E) Some of the students are less than 13 years old.

9. If $-10 < x < 10$, which of the following must be true ?

I. $x^2 < 10$
II. $|x| < 10$
III. $(x+10)(x-10) < 0$

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

10. The average (arithmetic mean) of a, $2a$, b, and $(b+1)$ is equal to the median of the four numbers, where $a < 2a < b < (b+1)$. What is the value of a ?

(A) $\frac{b+1}{2}$
(B) $2b-3$
(C) 6
(D) 4
(E) 1

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(2)-(1) : $30b = 7.5 \Rightarrow b = 0.25$ and $a = 1$.
For the 40 minutes phone call:
$1 + 80 \times 0.25 = 21$

TEST 3 SECTION 7

1. (B)
$P = (1-0.1)(1+0.1)x = 0.99x$.
$\Rightarrow 0.99 = (1-0.01)$
Therefore, there is a 1% of change.

---

2. (C)
Since $x = \frac{2}{2z}$, $xy = \left(\frac{3}{2z}\right)y = \frac{1}{2z}$
$\frac{2z}{3} \times \left(\frac{3}{2z}\right)y = \frac{1}{2z} \times \frac{2z}{3}$. It follows that
$y = \frac{1}{3}$.

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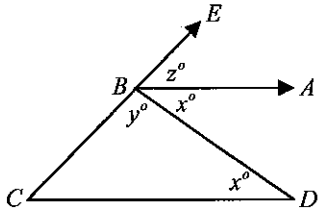
3. (D)



$\angle ABD = x$, because alternate angles are $\cong$.
Therefore, $x + y + z = 180$.

---

4. (D)
Since $p < q < 0$, when divided by
q (negative number), then $\frac{p}{q} > 1$. When
divided by q, $\frac{q}{p} < 1$.
Or, use some numbers as $p = -5$ and $q = -1$.
$\frac{p}{q} = \frac{-5}{-1} = 5 > 1$.

---

5. (C)
$\left(a + \frac{1}{a}\right)^2 = 9 \Rightarrow a^2 + 2 + \frac{1}{a^2} = 9$. Therefore,
$a^2 + \frac{1}{a^2} = 9 - 2 = 7$.

---

6. (E)
Since $-12 < w < -4$, the midpoint is -8 and the distance between -4 and -8 is 4.
Therefore, $|w - (-8)| < 4 \Rightarrow |w + 8| < 4$.

---

7. (D)
Check the equations for the values of x.
(D) is true for the values of x.

---

8. (D)
The only information is "some of them are boys and they are all greater than or equal to 13 years old"
(A) May be girls. (B) May be less than 13 years.
(C) May be less than 13. (D) True (E) maybe they all greater than 13 years old.

---

9. (B)
$-10 < x < 10$ is equivalent to $|x| < 10$,
$x^2 < 100$, and $(x+10)(x-10) < 0$.
I is not true ($x^2 < 100$)

---

10. (E)
$\frac{a + 2a + b + (b+1)}{4} = \frac{2a+b}{2}$. It follows that
$\frac{3a + 2b + 1}{4} = \frac{2a+b}{2} \Rightarrow a = 1$.

---

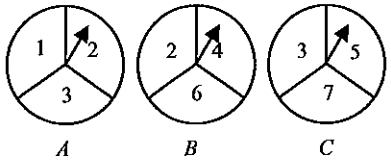
11. (B)
c cents $= \frac{c}{100}$ dollars $\Rightarrow$ for 10 letters.
300 letters = 30 of 10 letters. Therefore, the total amount $= d + \left(\frac{c}{100}\right) \times 30 \Rightarrow d + \frac{3c}{10}$.

---

12. (D)
Since $\triangle PQR$ is an equilateral triangle, the radius of the circle $= k$. $\widehat{PQ} = 2\pi k \times \frac{1}{6} = \frac{\pi k}{3}$.

Therefore, the perimeter of the sector = $\frac{\pi k}{3}+2k=\frac{(\pi+6)k}{3}$.

13. (E)



Since the numbers on spinner B are even, available combinations are as follows:

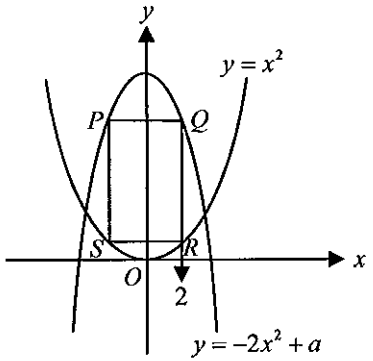
Spinner A	Spinner B	Spinner C
odd	even	odd
(1,3)	(2,4,6)	(3,5,7)

Therefore, $2\times3\times3=18$. The answer is $\frac{18}{27}=\frac{2}{3}$.

14. (C)

Inverse proportion. $1\times k=2\times x \Rightarrow x=\frac{k}{2}$ for two farmers. For double the job, it will take $2\left(\frac{k}{2}\right)=k$.

15. (E)



Since $PQ=4$, $RQ=\frac{24}{4}=6$. At $x=2$,

$f(2)=-2(2)^2+a=-8+a$ and

$g(2)=2^2=4$. Thus,

the length of $\overline{RQ}=-8+a-4=a-12$.

Therefore, $a-12=6 \Rightarrow a=18$.

16. (D)

$(x+5)(x-5)\geq 0 \Rightarrow x\leq -5$ or $x\geq 5$.

END

NO MATERIAL ON THIS PAGE