

SECTION 6
Time — 25 minutes
18 Questions

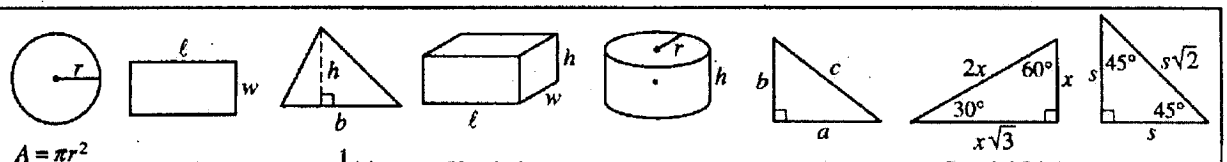
Turn to Section 6 (page 6) of your answer sheet to answer the questions in this section.

Directions: This section contains two types of questions. You have 25 minutes to complete both types. For questions 1-8, 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 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.

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 number of degrees of arc in a circle is 360.
The sum of the measures in degrees of the angles of a triangle is 180.

$$\frac{3 + \diamond}{2} = 7\frac{1}{2}$$

1. What number, when used in place of $\diamond$ above, makes the statement true?

(A) 4
(B) 5
(C) 9
(D) 12
(E) 15

$7\frac{1}{2} = \frac{15}{2}$

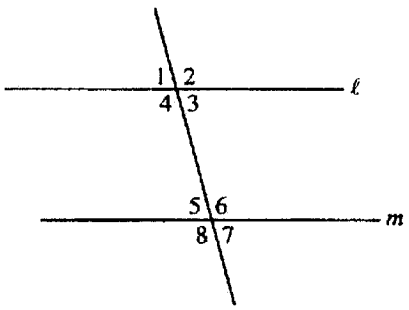
$\frac{3+\diamond}{2} = \frac{15}{2}$

$3 + \diamond = 15$

$-3 \quad -3$

$\diamond = 12$

(D)



2. In the figure above, if $\ell \parallel m$, then the sum of the measures of angles 2 and 4 must equal the sum of the measures of which of the following pairs of angles?

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

WHEN TWO ∥ LINES ARE CUT BY A THIRD, ANGLES THAT LOOK EQUAL ARE EQUAL

2 IS BIG AND 4 IS BIG

GO ON TO THE NEXT PAGE

~~(A)~~ SMALL + BIG (D) BIG + BIG
~~(B)~~ SMALL + SMALL ~~(E)~~ SMALL + BIG
~~(C)~~ BIG + SMALL

(D)

PRESTON CITY WORKFORCE

	Employed	Unemployed	Total
Men	27,000		
Women	21000	500	21,500
Total	48,000		50,500

3. The table above, describing the Preston City workforce, is partially filled in. Based on the information in the table, how many women in the Preston City workforce are unemployed?

(A) 500
(B) 1,000
(C) 1,500
(D) 2,000
(E) 2,500

COMPLETE ENOUGH OF THE CHART TO GET THE CENTER BOX

(A)

4. A group of students washed cars to raise money. The net amount A, in dollars, raised by washing k cars is given by the function $A(k) = 4k - 30$. If the group washed 15 cars, what is the net amount they raised?

(A) \$10
(B) \$15
(C) \$20
(D) \$25
(E) \$30

$A(15) = 4(15) - 30$

$= 60 - 30$

$= 30$

(E)

5. If $xr = v$, $v = kr$, and $rv \neq 0$, which of the following is equal to k?

(A) 1
(B) $\frac{1}{x}$
(C) $x - 1$
(D) x
(E) $x + 1$

$V = KR$, so $\frac{V}{R} = K$

$XR = V$, so $X = \frac{V}{R}$

$K = X$

(D)

6. The eggs in a certain basket are either white or brown. If the ratio of the number of white eggs to the number of brown eggs is $\frac{2}{3}$, each of the following could be the number of eggs in the basket EXCEPT

(A) 10
(B) 12
(C) 15
(D) 30
(E) 60

RATIOS - BE CAREFUL!

THE RATIO OF WHITE TO BROWN IS $\frac{2}{3}$. THAT MEANS THAT FOR EVERY TWO WHITE, THERE ARE THREE BROWN.

WWBBB. FOR A TOTAL OF FIVE EGGS. ANY NUMBER DIVISIBLE BY FIVE IS ACCEPTABLE. (B)

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7. If $18\sqrt{18} = r\sqrt{t}$, where r and t are positive integers and $r > t$, which of the following could be the value of rt?

(A) 18
(B) 36
(C) 108
(D) 162
(E) 324

~~PLUG IN~~.

18 IS $2 \cdot 3 \cdot 3$.

THEREFORE $18\sqrt{18}$ EQUALS

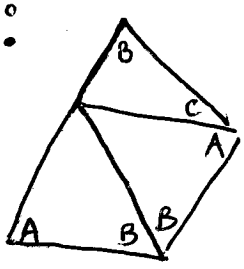
$18\sqrt{2 \cdot 3 \cdot 3}$ OR $3 \cdot 18\sqrt{2}$

$54\sqrt{2}$

IF R IS 54 AND T IS 2

RT = 108 (C)

METHOD #2 ⇒ THE SUM OF THE INTERIOR ANGLES OF ANY TRIANGLE IS 180°.

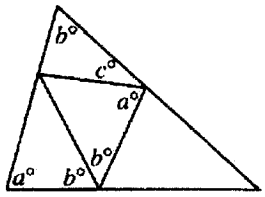


THE INTERIOR ANGLES OF ALL SHOULD ADD TO $3 \cdot 180 = 540$.

THE THREE UNMARKED ANGLES FORM A STRAIGHT LINE. THE DEGREE MEASURE FOR ALL STRAIGHT ANGLES IS 180°

THEREFORE, THE DEGREE TOTAL FOR THE MARKED ANGLES TOTALS 540 − 180 OR 360° ⇒ $360 = B + C + A + B + B + A$

SAME AS METHOD #1

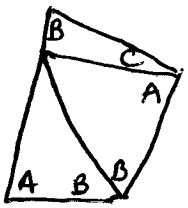


8. In the figure above, what is the value of c in terms of a and b?

(A) $a + 3b - 180$
(B) $2a + 2b - 180$
(C) $180 - a - b$
(D) $360 - a - b$
(E) $360 - 2a - 3b$

TWO WAYS.

METHOD #1
IGNORE THE UNLABELED TRIANGLE:



THE SUM OF THE ANGLES OF ANY QUADRILATERAL = 360, SO

$360 = B + C + A + B + B + A$

$= 2A + 3B + C$

$-2A - 3B = -2A - 3B$

$360 - 2A - 3B = C$ (E)

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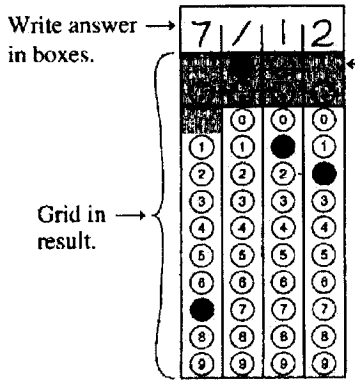
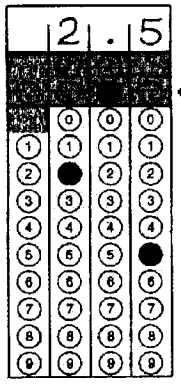
Directions: For Student-Produced Response questions 9-18, use the grids at the bottom of the answer sheet page on which you have answered questions 1-8.

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

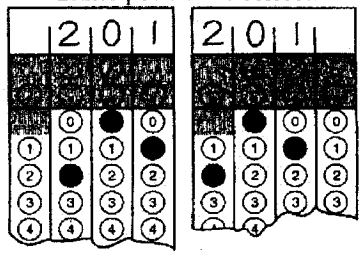
Answer: $\frac{7}{12}$



Answer: 2.5



Answer: 201
Either position is correct.

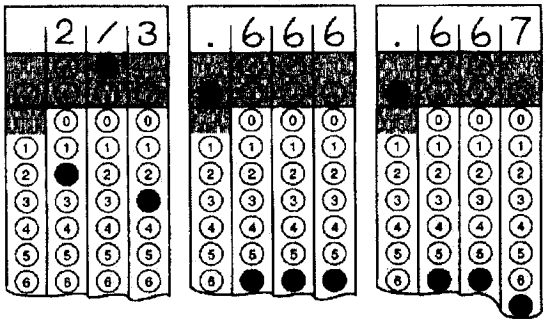


Note: You may start your answers in any column, space permitting. Columns not needed should be left blank.

- 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 3 1 / 1 2 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:

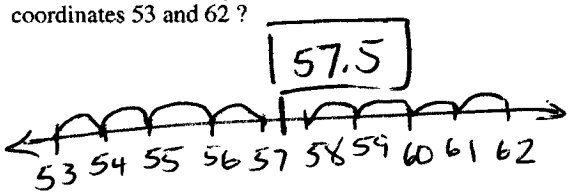


9. If $t^3 = 351$, what is the value of $4t^3$?

$t^3 = 351$

$4t^3 = 4(351) = \boxed{1404}$

10. What is the coordinate of the point on a number line that is exactly halfway between the points with coordinates 53 and 62 ?



OR

$\frac{53+62}{2} = \frac{115}{2} = \boxed{57.5}$

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  6 ✧ ✧ 6

11. A certain triangle has two angles that have the same measure. If the lengths of two of the sides of the triangle are 50 and 30, what is the least possible value for the perimeter of the triangle?

TWO WAYS TO DRAW IT

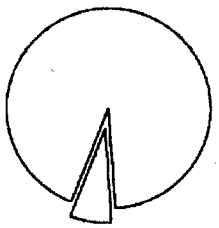
110 VS 130

12. If $x^2 - y^2 = 77$ and $x + y = 11$, what is the value of x?

$x^2 - y^2 = (x+y)(x-y)$

$= 11\ (x-y)$

SINCE $x-y=7$, $x+y=11$, $2x=18$, $x=9$



13. Tameka cut a circular pizza into wedge-shaped pieces, one of which is shown above. The tip of each piece is at the center of the pizza and the angle at the tip is always greater than 20°, but less than 30°. What is one possible value for the number of pieces into which the pizza is cut?

IF IT WERE 20°, THERE WOULD BE $\frac{360}{20} = 18$ PIECES

IF IT WERE 30°, THERE WOULD BE $\frac{360}{30} = 12$ PIECES.

13, 14, 15, 16, 17

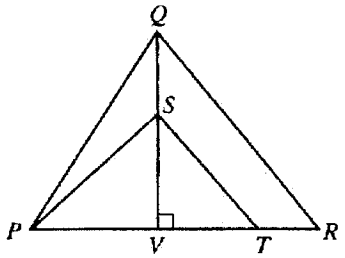
ALL ARE CORRECT.

$a, 3a, \ldots$

14. The first term in the sequence above is a, and each term after the first is 3 times the preceding term. If the sum of the first 5 terms is 605, what is the value of a?

$a, 3a, 9a, 27a, 81a$ ADDED TOGETHER

IS $\frac{121a}{121} = \frac{605}{121}$ $a = 5$



Note: Figure not drawn to scale.

15. In $\triangle PQR$ above, $\frac{QS}{QV} = \frac{1}{3}$ and $\frac{PT}{PR} = \frac{3}{4}$.

What is the value of the fraction $\frac{\text{area } \triangle PST}{\text{area } \triangle PQR}$?

AREA $\triangle PST = \frac{1}{2}Bh$; $A\triangle PQR = \frac{1}{2}Bh$

MAKE $QS=1$, $QV=3$. $SV=2$

MAKE $PR=4$, $PT=3$. $PST = \frac{1}{2}(3)(2) = 3$ $\frac{1}{2}$

$PQR = \frac{1}{2}(4)3 = 6$

16. Let the function h be defined by $h(x) = 14 + \frac{x^2}{4}$.

If $h(2m) = 9m$, what is one possible value of m?

$h(2m) = 14 + \frac{(2m)^2}{4} = 14 + \frac{4m^2}{4}$

$= 14 + m^2$

SET THAT EQUAL TO $9m$:

$9m = 14 + m^2$

$-9m \quad -9m$

$0 = m^2 - 9m + 14$

FOIL

$= (m-7)(m-2)$ 2 OR 7

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INVENTORY OF CLOCKS AND FREQUENCY OF CHIMES

	Number of Clocks	Chimes n Times on the n th Hour	Chimes Once on the Hour	Chimes Once on the Half Hour
Type A	10	✓		✓
Type B	5	✓		
Type C	3		✓	✓

17. A merchant sells three types of clocks that chime as indicated by the check marks in the table above. What is the total number of chimes of the inventory of clocks in the 90-minute period from 7:15 to 8:45 ?

TOTAL CHIMES TYPE A → 10 CLOCKS CHIME 8 TIMES AT 8:00 = 80
→ 10 CHIME 1 TIME AT 7:30 = 10
→ 10 CHIME 1 TIME AT 8:30 = 10
100

TOTAL CHIMES TYPE B → 5 CLOCKS CHIME 8 TIMES AT 8:00 = 40

TOTAL CHIMES TYPE C → 3 CLOCKS CHIME 1 TIME AT 730 = 3
1 TIME AT 800 = 3
~~1 TIME AT~~ 830 = 3
149

9

18. If the 5 cards shown above are placed in a row so that  is never at either end, how many different arrangements are possible? HANDLE THE RESTRICTIONS FIRST.

4 3 2 1 3
STEP 1 STEP 3 STEP 4 STEP 2

STEP 1 - FOUR CHOICES ACCORDING TO THE RESTRICTIONS

STEP 2 - THREE CHOICES LEFT SINCE YOU USED ONE IN STEP 1.

STEP 3 - NO RESTRICTIONS, THREE CHOICES.

STEP 4 - TWO CHOICES LEFT

STEP 5 - ONLY ONE CARD REMAINS

MULTIPLY ~~ACCR~~ ACROSS : 4 x 3 · 2 · 1 x 3 = 72

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.