



MATHEMATICS TEST

60 Minutes—60 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

1. $|7 - 3| - |3 - 7| = ?$

- A. -8
- B. -6
- C. -4
- D. 0
- E. 8

2. A consultant charges \$45 for each hour she works on a consultation, plus a flat \$30 consulting fee. How many hours of work are included in a \$210 bill for a consultation?

F. $2\frac{4}{5}$

G. 4

H. $4\frac{2}{3}$

J. $5\frac{1}{2}$

K. 7

3. Vehicle A averages 14 miles per gallon of gasoline, and Vehicle B averages 36 miles per gallon of gasoline. At these rates, how many more gallons of gasoline does Vehicle A need than Vehicle B to make a 1,008-mile trip?

- A. 25
- B. 28
- C. 44
- D. 50
- E. 72

4. $t^2 - 59t + 54 - 82t^2 + 60t$ is equivalent to:

F. $-26t^2$

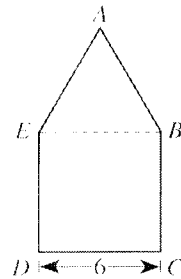
G. $-26t^6$

H. $-81t^4 + t^2 + 54$

J. $-81t^2 + t + 54$

K. $-82t^2 + t + 54$

5. The figure below is composed of square $BCDE$ and equilateral triangle $\triangle ABE$. The length of $\overline{CD}$ is 6 inches. What is the perimeter of $ABCDE$, in inches?



- A. 18
- B. 24
- C. 30
- D. 42
- E. 45

6. The expression $(4z + 3)(z - 2)$ is equivalent to:

F. $4z^2 - 5$

G. $4z^2 - 6$

H. $4z^2 - 3z - 5$

J. $4z^2 - 5z - 6$

K. $4z^2 + 5z - 6$

7. If 40% of a given number is 8, then what is 15% of the given number?

- A. 1.2
- B. 1.8
- C. 3.0
- D. 5.0
- E. 6.5

8. The 6 consecutive integers below add up to 447.

$$\begin{aligned} x - 2 \\ x - 1 \\ x \\ x + 1 \\ x + 2 \\ x + 3 \end{aligned}$$

What is the value of x ?

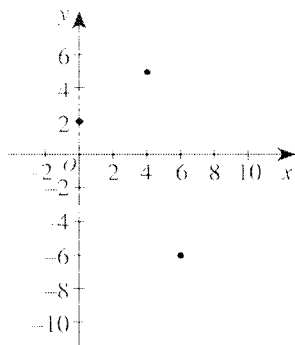
- F. 72
- G. 73
- H. 74
- J. 75
- K. 76



9. In the standard (x,y) coordinate plane, point M with coordinates $(5,4)$ is the midpoint of $\overline{AB}$, and B has coordinates $(7,3)$. What are the coordinates of A ?

A. $(17,11)$
 B. $(9,2)$
 C. $(6,3.5)$
 D. $(3,5)$
 E. $(-3,-5)$

10. Rectangle $ABCD$ has vertices $A(4,5)$, $B(0,2)$, and $C(6,-6)$. These vertices are graphed below in the standard (x,y) coordinate plane. What are the coordinates of vertex D ?



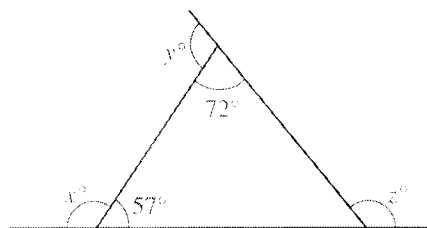
F. $(10,-3)$
 G. $(9,-2)$
 H. $(8,2)$
 J. $(7,1)$
 K. $(2,-9)$

11. Daisun owns 2 sportswear stores (X and Y). She stocks 3 brands of T-shirts (A, B, and C) in each store. The matrices below show the numbers of each type of T-shirt in each store and the cost for each type of T-shirt. The value of Daisun's T-shirt inventory is computed using the costs listed. What is the total value of the T-shirt inventory for Daisun's 2 stores?

	A	B	C		Cost
X	100	200	150	A	\$5
Y	120	50	100	B	\$10
				C	\$15

A. \$2,200
 B. \$2,220
 C. \$4,965
 D. \$5,450
 E. \$7,350

12. Given the triangle shown below with exterior angles that measure x° , y° , and z° as shown, what is the sum of x , y , and z ?



F. 180
 G. 231
 H. 309
 J. 360
 K. Cannot be determined from the given information

Use the following information to answer questions 13–15.

A poll of 200 registered voters was taken before the election for mayor of Springdale. All 200 voters indicated which 1 of the 4 candidates they would vote for. The results of the poll are given in the table below.

Candidate	Number of voters
Blackcloud	50
Lue	80
Gomez	40
Whitney	30

13. What percent of the voters polled chose Whitney in the poll?

A. 15%
 B. 20%
 C. 25%
 D. 30%
 E. 40%

14. If the poll is indicative of how the 10,000 registered voters of Springdale will actually vote in the election, which of the following is the best estimate of the number of votes Lue will receive in the election?

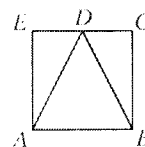
F. 1,500
 G. 2,500
 H. 4,000
 J. 5,000
 K. 8,000

15. If the information in the table were converted into a circle graph (pie chart), then the central angle of the sector for Gomez would measure how many degrees?

A. 54°
 B. 72°
 C. 90°
 D. 108°
 E. 144°

16. In square $ABCE$ shown below, D is the midpoint of $\overline{CE}$. Which of the following is the ratio of the area of $\triangle ADE$ to the area of $\triangle ADB$?

F. 1:1
 G. 1:2
 H. 1:3
 J. 1:4
 K. 1:8



Alg. 2 ~ ACT Practice

① $|7-3| - |3-7| = ?$

$$|4| - |-4|$$

$$4 - 4 = \boxed{0}$$

② $C = \text{Charge } (\$)$ $h = \text{hours worked}$

$$C = 45h + 30$$

if $C = \$210$, $h = ?$

$$\begin{array}{r} 210 = 45h + 30 \\ - 30 \qquad - 30 \end{array}$$

$$180 = 45h$$

$$\therefore \boxed{h = 4 \text{ hrs}}$$

③ Vehicle A $\Rightarrow 14 \frac{\text{mi}}{\text{gal}}$ $\Rightarrow$ How many more
gal for A if
trip = 1008 mi
B $\Rightarrow 36 \frac{\text{mi}}{\text{gal}}$

$$A \Rightarrow \frac{1008 \text{ mi}}{14 \frac{\text{mi}}{\text{gal}}} = \frac{504}{7} = 72 \text{ gal}$$

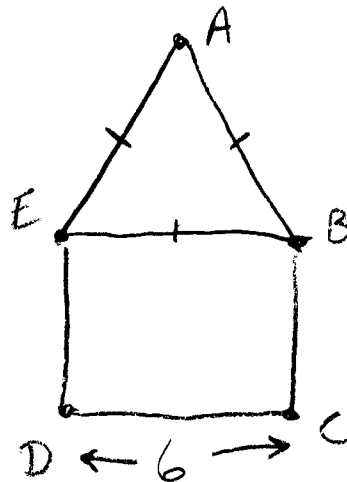
$$B \Rightarrow \frac{1008}{36} = \frac{112}{4} = -28 \text{ gal}$$

$\boxed{44 \text{ gal more}}$

$$\textcircled{4} \quad \underline{\underline{t^2 - 59t + 54 - 82t^2 + 60t}}$$

$$\boxed{-81t^2 + t + 54}$$

⑤



$\triangle AEB = \text{Equilateral}$

$\square BCDE = \text{Square}$

Perimeter ABCDE ?

$\therefore$ SIDES OF SQUARE
EQUAL SIDE OF $\triangle$

$$\text{Perimeter} = 5 \cdot 6 = \boxed{30 \text{ UNITS}}$$

$$\textcircled{6} \quad (4z+3)(z-2)$$

$$4z^2 - 8z + 3z - 6$$

$$\boxed{4z^2 - 5z - 6}$$

$$\textcircled{7} \quad 40\% = .4 = \frac{4}{10}$$

$$\frac{.4X}{.4} = \frac{8}{.4} \quad \therefore X = \frac{8}{\frac{4}{10}} = 8 \cdot \frac{10}{4} = 20$$

$$15\% = .15 = \frac{15}{100} = \frac{3}{20}$$

$$.15(20) = \frac{3}{20} \cdot 20 = \boxed{3}$$

$\textcircled{8}$ Find X if

$$X - 2$$

$$X - 1$$

$$X$$

$$X + 1$$

$$X + 2$$

$$\textcircled{+} \quad X + 3$$

$$6X + 3 = 447$$

$$6X = 444$$

$$X = \frac{444}{6} = \frac{222}{3}$$

$$\boxed{X = 74}$$

$$(9) \quad M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$(x_1, y_1) = A$$

$$(7, 3) = B$$

$$(5, 4) = \left(\frac{x_1 + 7}{2}, \frac{y_1 + 3}{2} \right)$$

$$\therefore 5 = \frac{x_1 + 7}{2}$$

$$10 = x_1 + 7$$

$$x_1 = 3$$

$$4 = \frac{y_1 + 3}{2}$$

$$8 = y_1 + 3$$

$$5 = y_2$$

$$(3, 5) \text{ Point A}$$

(10)

$$m_{AB} = \frac{5-2}{4-0} = \frac{3}{4} \therefore m_{\perp} = -\frac{4}{3}$$

$$m_{AD} = \frac{3}{4}$$

$$\overline{AD} \Rightarrow 5 = -\frac{4}{3}(4) + b$$

$$\frac{15}{3} = 5 = -\frac{16}{3} + b$$

$$\frac{31}{3} = b \therefore y = -\frac{4}{3}x + \frac{31}{3}$$

$$\overline{CD} \Rightarrow -6 = \frac{3}{4} \cdot 6 + b$$

$$-\frac{12}{2} = -6 = \frac{9}{2} + b$$

$$-\frac{21}{2} = b \therefore y = \frac{3}{4}x - \frac{21}{2}$$

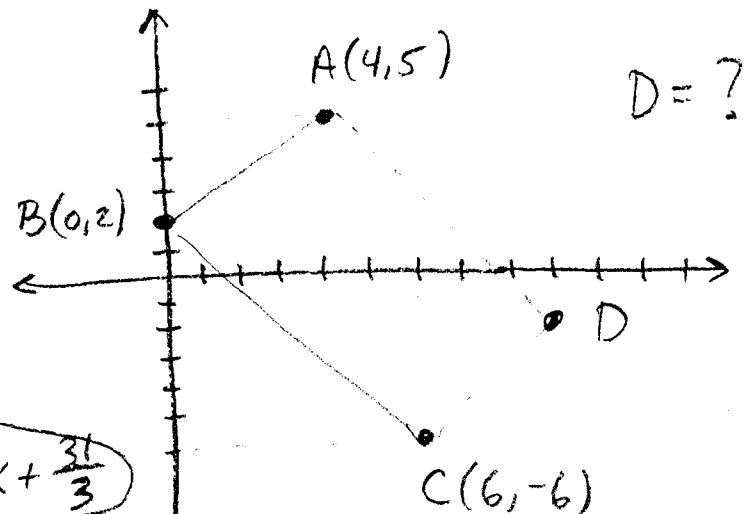
$\overline{AD}$
 $\overline{CD}$

$$-\frac{4}{3}x + \frac{31}{3} = \frac{3}{4}x - \frac{21}{2}$$

$$-16x + 124 = 9x - 126$$

$$250 = 25x \therefore x = 10$$

$$y = -3$$

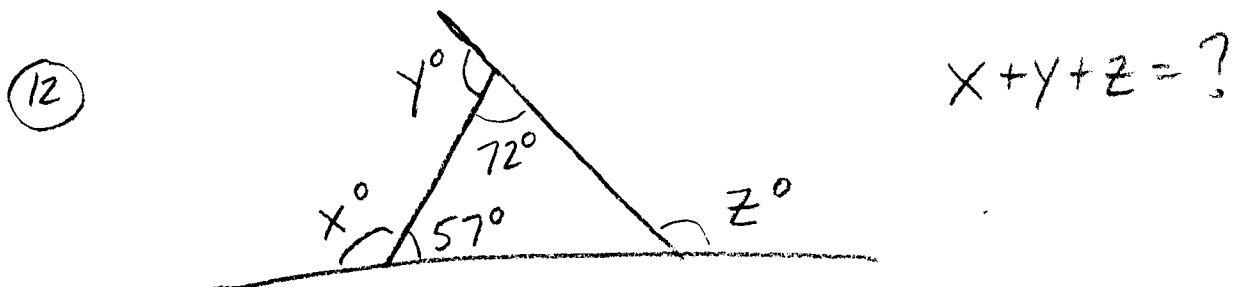


$$\textcircled{11} \quad \begin{array}{ccc} \swarrow & & \searrow \\ 5 & 10 & 15 \\ \swarrow & & \searrow \end{array} \quad [2 \times 3] \cdot [3 \times 1] = [2 \times 1] \quad \checkmark$$

$$\begin{bmatrix} 100 & 200 & 150 \\ 120 & 50 & 100 \end{bmatrix} = \begin{bmatrix} 500 + 2000 + 2250 \\ 600 + 500 + 1500 \end{bmatrix}$$

$$= \begin{bmatrix} 4750 \\ 2600 \end{bmatrix}$$

$$\boxed{\text{7350}}$$



$$y = 180 - 72 = 108^\circ$$

$$z \Rightarrow [180 - (72 + 57)] = 180 - 129 = 51$$

$$z = 180 - 51 = 129^\circ$$

$$x = 180 - 57 = 123^\circ$$

$$\therefore x + y + z = \boxed{360^\circ}$$

⑬ $\Rightarrow$ ⑮ $\Rightarrow$

CANDIDATE	No. OF VOTERS
B	50
L	80
G	40
W	30
	<u>200</u>

⑬ % W = ?

$$\frac{30}{200} = \frac{15}{100} = \boxed{15\%}$$

⑭ 10,000 Voters VOTE proportionately
Est. VOTES for L?

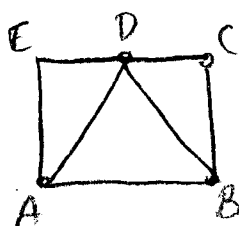
$$L \Rightarrow \frac{80}{200} \cdot 10000 = 40 \cdot 100 = \boxed{4000}$$

L VOTES

⑮ G $\Rightarrow$ WHAT part of 360°

$$G = \frac{40}{200} \cdot 360 \Rightarrow 2 \cdot 36 = \boxed{72^\circ}$$

⑯



SQUARE ABCE
 $\overline{ED} = \overline{DC}$

RATIO AREA $\triangle ADE$ to $\triangle ADB$?

$$\frac{\frac{1}{2} \overline{AB} \cdot \overline{EA}}{\frac{1}{2} \overline{AB} \cdot \overline{EA}} = \frac{\frac{1}{4} \overline{AB} \cdot \overline{EA}}{\frac{1}{2} \overline{AB} \cdot \overline{EA}} = \frac{\frac{1}{4}}{\frac{1}{2}} = \frac{2}{4} = \boxed{\frac{1}{2}}$$

Base $\cdot$ h Base $\cdot$ h