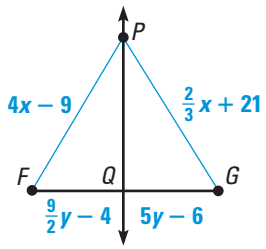
CHAPTER 5

Chapter Standardized Test

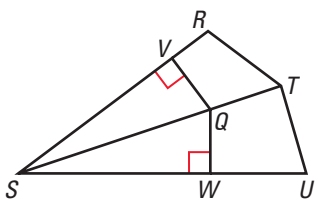
TEST-TAKING STRATEGY If you find yourself spending too much time on one test question and getting frustrated, move on to the next question. You can revisit a difficult problem later with a fresh perspective.

1. MULTIPLE CHOICE In the diagram below, $\overleftrightarrow{PQ}$ is the perpendicular bisector of $\overline{FG}$. What are the values of x and y?



(A) $x = 9, y = 1$ (B) $x = 9, y = 4$
(C) $x = 4, y = 9$ (D) $x = \frac{1}{2}, y = 9$
(E) $x = 9, y = 6$

2. MULTIPLE CHOICE In the diagram, $\overrightarrow{ST}$ bisects $\angle RSU$. Which segments do you know are congruent?



(A) $\overline{SR} \cong \overline{SU}$ (B) $\overline{VR} \cong \overline{WU}$ (C) $\overline{RT} \cong \overline{UT}$
(D) $\overline{QV} \cong \overline{QW}$ (E) $\overline{SQ} \cong \overline{QT}$

3. MULTIPLE CHOICE Which of the following statements are true about the circumcenter P of an isosceles triangle?

I. Point P is equidistant from the sides.

II. Point P is equidistant from the vertices.

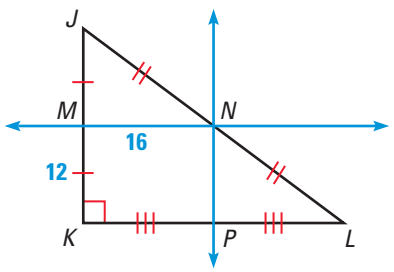
III. Point P is two thirds of the distance from each vertex to the midpoint of the opposite side.

(A) I only (B) II only
(C) III only (D) I and II
(E) none of these

4. MULTIPLE CHOICE What are the coordinates of the centroid C of a triangle whose vertices are $F(-12, 1)$, $G(-2, 1)$, and $H(-7, -11)$?

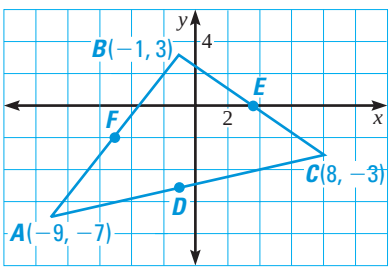
(A) $(-7, -7)$ (B) $\left(-7, -\frac{9}{2}\right)$
(C) $\left(-7, -\frac{5}{4}\right)$ (D) $\left(-7, -\frac{7}{2}\right)$
(E) $(-7, -3)$

5. MULTIPLE CHOICE Use the diagram to find the perimeter of $\triangle NPL$.



(A) 28 (B) 36 (C) 48
(D) 88 (E) 96

6. MULTIPLE CHOICE Points D, E, and F are the midpoints of the sides of $\triangle ABC$. Which of the following statements is false?

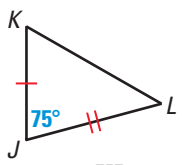
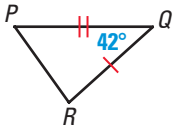


(A) The intersection of $\overline{AE}$ and $\overline{BD}$ is the orthocenter of $\triangle ABC$.
(B) $\overline{EF} \parallel \overline{CA}$
(C) $m\angle A < m\angle C$
(D) $DE = \frac{1}{2}AB$
(E) $\overline{BD}$ is a median of $\triangle ABC$.

7. MULTIPLE CHOICE A triangle has two sides that have lengths of 16 inches and 28 inches. Which of the following lengths could *not* represent the length of the third side?

Ⓐ 12 in. Ⓑ 26 in. Ⓒ 33 in. Ⓓ 40 in. Ⓔ 43 in.

8. QUANTITATIVE COMPARISON Two quantities are described below.

Column A	Column B
 KL	 PR

Choose the statement that is true.

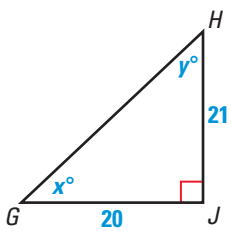
Ⓐ The quantity in column A is greater.

Ⓑ The quantity in column B is greater.

Ⓒ The two quantities are equal.

Ⓓ The relationship cannot be determined from the given information.

MULTI-STEP PROBLEM In Exercises 9–12, use $\triangle GHJ$ at the right.



9. What is the sum of x and y?

10. Which measure is greater, $x°$ or $y°$?

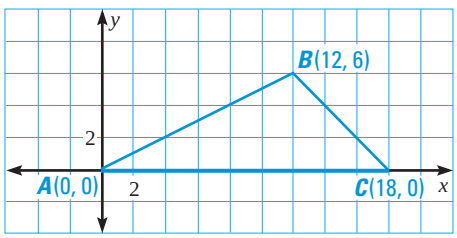
11. Which of the following is true?

Ⓐ $x = 45$ Ⓑ $x < 45$ Ⓒ $x > 45$

12. Describe the location of the intersection point of the perpendicular bisectors of $\triangle GHJ$.

MULTI-STEP PROBLEM In Exercises 13–15, use the following information.

In 1765, a Swiss mathematician, Leonhard Euler, proved that the centroid, orthocenter, and circumcenter of a triangle are all collinear. The line containing these three points is called the *Euler Line*. Euler also proved that the centroid of a triangle is one third the distance from the circumcenter to the orthocenter.



13. Find equations of the lines that contain the medians. Use the equations to find the coordinates of the centroid of $\triangle ABC$.

14. Find equations of the lines that contain the altitudes of $\triangle ABC$. Use the equations to find the coordinates of the orthocenter.

15. In Exercise 30 on page 278, you found that the circumcenter of a $\triangle ABC$ with the given vertices is the point $(9, -3)$.

a. Verify that the centroid and the orthocenter you found in Exercises 13 and 14 and the circumcenter above are all collinear.

b. Verify that the distance from the circumcenter to the centroid is one third the distance from the circumcenter to the orthocenter.