# Chapter 3 Practice Test

**Student Text Pages**
154–155

**Suggested Timing**
45–70 min

**Tools**
- grid paper
- protractor
- compasses

**Technology Tools**
- *The Geometer's Sketchpad*®
- computer
- Cabri® Jr.
- graphing calculator

**Related Resources**
- G–1 Grid Paper
- G–4 Protractor
- T–4 *The Geometer's Sketchpad*® 3
- T–5 *The Geometer's Sketchpad*® 4
- BLM 3–12 Chapter 3 Practice Test
- BLM 3–13 Chapter 3 Test
- BLM 3–14 Chapter 3 Practice Test Achievement Check Rubric

**Accommodations**

**Gifted and Enrichment**—Challenge students to create extra review questions for their classmates.

**Motor**—Let students give oral responses to the Chapter Review questions and the Practice Test questions.

**Memory**—Provide students with cue cards with the definitions and diagrams for each of the following: median and centroid; altitude and orthocentre; angle bisector and incentre; right bisector and circumcentre.

**ESL**—Allow students to use their dictionaries and translators when completing the Chapter Review and Practice Test questions.

## Study Guide

Use the following study guide to direct students who have difficulty with specific questions to appropriate examples to review.

| Question | Section(s) | Refer to |
|---|---|---|
| 1 | 3.1 | Investigate (pages 110–112), Example (page 113) |
| 2 | 3.1 | Example (page 113) |
| 3 | 3.3 | Investigate (pages 128–131) |
| 4 | 3.1 | Investigate (pages 110–112), Example (page 113) |
| 5 | 3.2 | Example 1a) (pages 119–121) |
| 6 | 3.2 | Example 2 (pages 122–123) |
| 7 | 3.4 | Example 2 (page 141) |
| 8 | 3.3 | Example 1 (page 132) |
| 9 | 3.5 | Example 2a) (page 148) |
| 10 | 3.4 | Example 2a) (page 141) |
| 11 | 3.4 | Investigate Method 2 (page 138) |
| 12 | 3.4 | Example 2 (page 141) |
| 13 | 3.3/3.4 | Example 1 (page 132)/Investigate (pages 137–139) |
| 14 | 3.1/3.2 | Example (page 113)/Investigate (pages 117–119), Example 1a) (pages 119–121) |

### Using the Practice Test

This Practice Test can be assigned as an in-class or take-home assignment. If it is used as an assessment, use the following guidelines to help you evaluate the students.

Can students do each of the following?
- Describe the properties of an equilateral triangle and an isosceles triangle
- Use analytical geometry skills, technology, and paper folding to verify the properties of triangles
- Use analytical geometry skills, technology, and paper folding to determine the centre of mass of a triangle
- Describe the properties of a square, a rectangle, a rhombus, a parallelogram, and a kite
- Use analytical geometry skills, technology, and paper folding to verify the properties of quadrilaterals
- Describe the properties of a circle
- Use analytical geometry skills, technology, and paper folding to verify the properties of circles
- Use analytical geometry skills, technology, and paper folding to determine the centre of a circle given three points

## Summative Assessment

- After students complete **BLM 3–12 Chapter 3 Practice Test**, use **BLM 3–13 Chapter 3 Test** as a summative assessment.

### Achievement Check Sample Solution, question 14, page 155

Provide students with **BLM 3–14 Chapter 3 Practice Test Achievement Check Rubric** to help them understand what is expected. This question requires a lengthy solution. Possible modifications that would reduce the time needed are

- Omit part d).
- For part d), ask students to conjecture any special relationships among the points P, Q, and R, but do not prove the conjecture.
- Provide students with one of the special points, e.g., the circumcentre.

This question can also be done using geometry software. In this case, have students provide a GSP sketch showing their constructions.

**14. a)** The midpoint of EG is $\mathrm{M}\left(\frac{-3+6}{2}, \frac{5+5}{2}\right) = (1.5, 5)$.

Find the equation of line FM.

$$m_{\mathrm{FM}} = \frac{5-(-1)}{1.5-0} \qquad y = mx + b$$
$$= \frac{6}{1.5} \qquad -1 = 4(0) + b$$
$$= 4 \qquad -1 = b$$

The equation for line FM is $y = 4x - 1$.

The midpoint of FG is $\mathrm{N}\left(\frac{6+0}{2}, \frac{5+(-1)}{2}\right) = (3, 2)$.

Find the equation of line EN.

$$m_{\mathrm{EN}} = \frac{2-5}{3-(-3)} \qquad y = mx + b$$
$$= \frac{-3}{6} \qquad 2 = -\frac{1}{2}(3) + b$$
$$= -\frac{1}{2} \qquad \frac{7}{2} = b$$

The equation for line EN is $y = -\frac{1}{2}x + \frac{7}{2}$.

The intersection of FM and EN, or the centroid, is P(1, 3).

**b)** The slope of EG is 0. So, the right bisector is a vertical line and has equation $x = 1.5$.

The slope of FG is $\frac{-1-5}{0-6}$, or 1. So, the slope of the line perpendicular to FG is –1. Find the equation of the right bisector of FG, using the midpoint N found in part a).

$$y = mx + b$$
$$2 = -1(3) + b$$
$$5 = b$$

The equation of the right bisector of FG is $y = -x + 5$.

To find the intersection of these two right bisectors, substitute $x = 1.5$ into $y = -x + 5$.

$$y = -1.5 + 5$$
$$= 3.5$$

The circumcentre is Q(1.5, 3.5).

**c)** The altitude to EG is the $y$-axis, since EG is horizontal and point F is on the $x$-axis. Its equation is $x = 0$.

The slope of the altitude to FG is –1, as found in part b).

$$y = mx + b$$
$$5 = -1(-3) + b$$
$$2 = b$$

The equation of the altitude to FG is $y = -x + 2$.

The intersection of the altitudes is the orthocentre, R(0, 2).

**d)** To verify collinearity, check slopes.

$$m_{\mathrm{QR}} = \frac{3.5-2}{1.5-0} \qquad m_{\mathrm{PR}} = \frac{3-2}{1-0}$$
$$= 1 \qquad = 1$$

Since the line segments have the same slope and share the point R, the three points must be collinear.