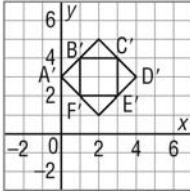


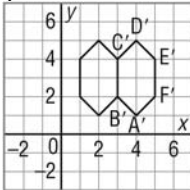
4. a) i)



ii)  $A'(0, 3)$ ,  $B'(1, 4)$ ,  $C'(3, 4)$ ,  $D'(4, 3)$ ,  $E'(3, 2)$ ,  $F'(1, 2)$

iii) 4 lines of symmetry: the vertical line through 2 on the  $x$ -axis, the horizontal line through 3 on the  $y$ -axis, the line through the points (0, 1) and (4, 5), the line through the points (0, 5) and (5, 0); and rotational symmetry of order 4 about (2, 3)

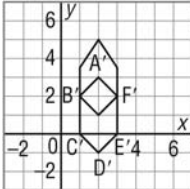
b) i)



ii)  $A'(4, 1)$ ,  $B'(3, 2)$ ,  $C'(3, 4)$ ,  $D'(4, 5)$ ,  $E'(5, 4)$ ,  $F'(5, 2)$

iii) 2 lines of symmetry: the vertical line through 3 on the  $x$ -axis, the horizontal line through 3 on the  $y$ -axis; and rotational symmetry of order 2 about (3, 3)

c) i)



ii)  $A'(2, 3)$ ,  $B'(1, 2)$ ,  $C'(1, 0)$ ,  $D'(2, -1)$ ,  $E'(3, 0)$ ,  $F'(3, 2)$

iii) 2 lines of symmetry: the vertical line through 2 on the  $x$ -axis, the horizontal line through 2 on the  $y$ -axis; and rotational symmetry of order 2 about (2, 2)

## Unit 8 Circle Geometry, page 382

### 8.1 Properties of Tangents to a Circle, page 388

3. a) QR                      b) CE  
 4. a)  $90^\circ$                     b)  $90^\circ$   
 5. a)  $90^\circ$                     b)  $67^\circ$   
 c)  $43^\circ$

6. a) 5                              b) 12  
 c) 20

7. a)  $d^\circ = 62^\circ$ ,  $e^\circ = 55^\circ$       b)  $d^\circ = 57^\circ$ ,  $e^\circ = 21^\circ$

8. a)  $a \doteq 8.5$                     b)  $a \doteq 7.9$

9.  $a \doteq 11.5$ ,  $b \doteq 5.3$

11. Answers may vary. For example: Both the line perpendicular to AB at P and the line perpendicular to CD at Q pass through the centre of the circle. The intersection of these two lines is the centre of the circle.

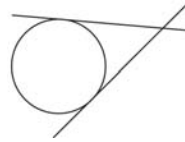
12. About 139 km

13. About 196 km

14.  $x \doteq 10.8$ ;  $y \doteq 10.4$ ;  $z^\circ = 60^\circ$

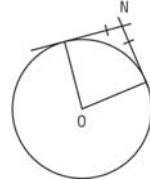
15. a) Two tangents

b) All other lines from this point would intersect the circle twice or not at all.



c) Each of the lines intersects the circle at exactly one point.

16. a) The distances from N to the two points of tangency are equal.



b) The lengths of the two tangents are equal.

c)  $x = y \doteq 19.4$

17. 5 cm

18. 2835 km

19. About 61.7 cm

20. About 8.5 cm

21. 50 cm

22. a) About 6 m

b) The actual strap should be slightly longer to be able to join the ends of the strap.

### 8.2 Properties of Chords in a Circle, page 397

3. a)  $d^\circ = 90^\circ$                     b)  $e = 5$

c)  $f = 7$

4. a)  $x^\circ = 50^\circ$ ,  $y^\circ = 90^\circ$       b)  $x^\circ = 22^\circ$ ,  $y^\circ = 136^\circ$

c)  $x^\circ = y^\circ = 35^\circ$

5. a)  $a = b \doteq 9.5$

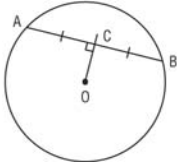
b)  $a \doteq 5.7$ ,  $b \doteq 11.5$

6.  $b \doteq 7.5$

7. a)  $r \doteq 2.2$

b)  $r = 6$

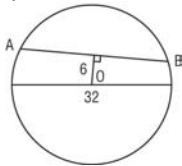
8. The distances between the centre and all chords of the same length are equal.
9. Draw two chords and their perpendicular bisectors. The intersection point of the perpendicular bisectors is the centre of the circle.
10. a)  $s \doteq 3.8$       b)  $s \doteq 7.3$
11. 9.6 cm
12. a) Parts i, ii, and iii  
b) i) About 6.5 cm    ii) About 5.4 cm  
    iii) 0 cm
- 13.



14. About 15.3 cm
15. a) About 5.1 cm  
b) The congruent chords are equidistant from the centre of the circle.
17. About 39.0 km
18. About 3.0 m
19. a) About 21.3 cm; about 4.7 cm  
b) Two answers; the water level could be below or above the centre of the bowl

**Unit 8: Mid-Unit Review, page 403**

1. a)  $x^\circ = 22^\circ, y^\circ = 90^\circ$     b)  $x^\circ = 46^\circ, y = 33^\circ$
2. About 10.4
3. About 35.4 cm
4.  $m^\circ = 19^\circ$
5. a) About 19.6      b) About 6.2
6. a)                      b) About 29.7 cm

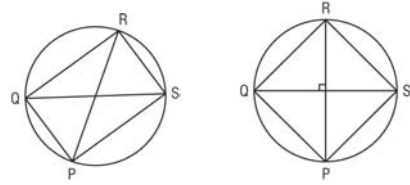


7. About 26.2 cm

**8.3 Properties of Angles in a Circle, page 410**

3. a) Inscribed angle:  $\angle DFE$ ; central angle:  $\angle DOE$   
b) Inscribed angle:  $\angle PRQ$ ; central angle:  $\angle POQ$   
c) Inscribed angles:  $\angle NJM$  and  $\angle NKM$ ; central angle:  $\angle NOM$
4. a)  $x^\circ = 65^\circ$       b)  $x^\circ = 90^\circ$   
c)  $x^\circ = 40^\circ$       d)  $x^\circ = 58^\circ$

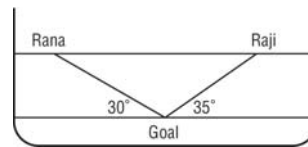
5. a)  $y^\circ = 140^\circ, z^\circ = 70^\circ$     b)  $y^\circ = 25^\circ, z^\circ = 130^\circ$   
c)  $y^\circ = 27^\circ, z^\circ = 42^\circ$
6. a)  $x^\circ = 80^\circ, y^\circ = 50^\circ$     b)  $x^\circ = 25^\circ, y^\circ = 65^\circ$
7. a) A rectangle      b) A square



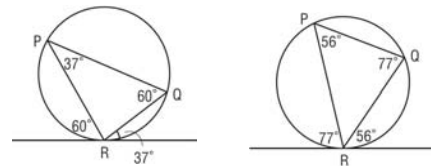
8. a)                      b)
- 

9. a)
- 

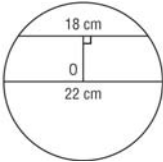
- b) About 7.2 cm
11. a)  $x^\circ = 40^\circ, y = 40^\circ$   
b)  $x^\circ = 45^\circ, y^\circ = 40^\circ$   
c)  $x^\circ = 58^\circ, y^\circ = 116^\circ$
12. Yes
13. a)



- b) Raji
14.  $45^\circ$
15. a)  $\angle QRS = \angle QPR$  and  $\angle PRT = \angle PQR$   
b) For example:



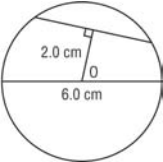
### Unit 8: Review, page 418

- $x^\circ = 90^\circ, y = 65^\circ$
  - $a \doteq 9.7, y^\circ = 36^\circ$
  - $a = b \doteq 17.9$
- Since  $7^2 + 13^2 \neq 16^2$ ,  $\angle HPO \neq 90^\circ$ . So, the wire HP is not a tangent.
- Draw a line perpendicular to the radius OP at the point P. This line is a tangent using the Tangent-Radius Property.
- About 14.1 cm
- $x \doteq 6.2$
  - $x \doteq 3.9$
- 

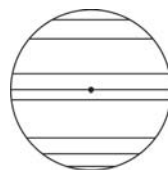
b) The chord is about 6.3 cm from the centre of the circle.

- $x^\circ = 35^\circ, y^\circ = 110^\circ$
  - $x^\circ = y^\circ = 45^\circ$
- About 3.5 cm
- $x^\circ = y^\circ = 90^\circ$
  - $x^\circ = y^\circ = 60^\circ$
  - $x^\circ = 15^\circ, y^\circ = 75^\circ$
- About 34.6 cm

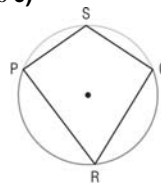
### Unit 8: Practice Test, page 420

- $x \doteq 6.6$  cm,  $y = 34^\circ$
- $x^\circ = 61^\circ, y^\circ = 90^\circ, z^\circ = 30.5^\circ$
- 

- About 4.5 cm
  - CD is shorter than AB.
- The central angle of a semicircle is  $180^\circ$ . The inscribed angle is one-half of the central angle, which is  $90^\circ$ .
  - The longest chord is the diameter. The farther away a chord is from the centre of the circle, the shorter the chord.



- Parts i and ii
  - About 13.9 cm
    - About 10.6 cm
- to c)



d)  $\angle PRQ$  and  $\angle PSQ$  have a sum of  $180^\circ$ .

### Unit 9 Probability and Statistics, page 422

#### 9.1 Probability in Society, page 427

- Experimental probability; decision is based on Andrei's past experience.
  - Theoretical probability; the more tickets you buy, the greater your chance of winning.
  - Experimental probability; decision is based on Anita's past experience.
  - Subjective judgment; decision is based on Doug's feelings.
- Claudia will continue to perform at the same level and the next math quiz will have the same difficulty.
  - Omar will leave work at the same time and the traffic patterns will be the same every day.
- If Winona doesn't go canoeing, her decision will be based on probability (it is likely that it will rain). If she does go, her decision will be based on subjective judgment (the feeling that it will not rain).
- Theoretical probability and subjective judgment
- More money should be spent to increase the probability of recovering a stolen vehicle.
  - Because the probability of recovering a stolen vehicle is so low, there are better ways of spending money than on solving this problem.
- Vanessa made the assumption that the same types of birds visit her birdfeeder at different times of the day, every day.
  - The percent of birds that are cardinals would change.
- Kathryn assumes that the next 10 people she meets are a fair representation of the community.