6. 51°
7. 113°
8. TWV
9. $\overline{VT}$
10. $10^2 + LL^2 = 20^2$
    $100 + LL^2 = 400$
    $LL^2 = 300$
    $LL = \sqrt{300}$
    $LL = \sqrt{100}\sqrt{3} = 10\sqrt{3}$
11. This triangle's sides follow the pattern of 30° – 60° –90° triangles, so ∠a = 60°
12. This triangle's sides follow the pattern of 30° – 60° –90° triangles, so ∠b = 30°
13. $A = \frac{1}{2}bh = \frac{1}{2}(10)\left(10\sqrt{3}\right) = 50\sqrt{3}$
    ≈ 86.60 square units
14. $P = 20 + 10 + 10\sqrt{3} = 30 + 10\sqrt{3}$
    ≈ 47.32 units
15. Exterior angles must add to 360°. Since there 10, each exterior angle must have a measure of $\frac{360°}{10}$ or 36°. Each interior angle, therefore will have a measure of 180° – 36° = 144°.
16. Arc BAC has a measure of 264°, so arc BC has a measure of 360° – 264° = 96°. The measure of the inscribed angle is half the measure of the arc, so $m\angle BAC = \frac{1}{2} \times 96° = 48°$
17. $\frac{3}{\sqrt{5}} + \frac{7}{\sqrt{2}} = \frac{3\sqrt{5}}{\sqrt{5}\sqrt{5}} + \frac{7\sqrt{2}}{\sqrt{2}\sqrt{2}} =$
    $\frac{3\sqrt{5}}{\sqrt{25}} + \frac{7\sqrt{2}}{\sqrt{4}} = \frac{3\sqrt{5}}{5} + \frac{7\sqrt{2}}{2} =$
    $\frac{(2)3\sqrt{5}}{(2)5} + \frac{(5)7\sqrt{2}}{(5)2} = \frac{6\sqrt{5} + 35\sqrt{2}}{10}$
18. $1{,}450{,}000 = 1.45 \times 10^6$
19. $.0076 = 7.6 \times 10^{-3}$
20. $640{,}000{,}000{,}000 = 6.4 \times 10^{11}$

Lesson Practice 25A

1. given
2. ∠BAD ≅ ∠BCD
3. given
4. $\overline{DB}$ bisects ∠ABC
5. definition of bisector
6. △ABD ≅ △CBD
7. ASA
8. yes: given; also, CPCTRC
9. ∠ABD ≅ ∠ACD
10. given
11. $\overline{AD}$ bisects ∠BAC
12. definition of bisector
13. $\overline{AD} \cong \overline{AD}$
14. △ADB ≅ △ADC
15. AAS
16. yes: CPCTRC
17. $\overline{BD}$ bisects ∠ABC and ∠ADC
18. ∠ABD ≅ ∠CBD
    (18 and 19 may be reversed)
19. ∠ADB ≅ ∠CDB
20. $\overline{BD} \cong \overline{BD}$
21. △BAD ≅ △BCD
22. ∠BAD ≅ ∠BCD
23. E is the midpoint of $\overline{FG}$
24. $\overline{EF} \cong \overline{EG}$
25. definition of midpoint
26. $\overline{DG} \parallel \overline{HF}$
27. ∠DGE ≅ ∠HFE
28. ∠DEG ≅ ∠HEF
29. △DEG ≅ △HEF
30. ∠GDE ≅ ∠FHE

Lesson Practice 25B

1. given
2. $\overline{AB} \cong \overline{CD}$

25B

3. $\overline{AB} \parallel \overline{CD}$
4. $\triangle ABC \cong \triangle ADC$
5. $\overline{BC}$ bisects $\angle ABC$
6. given
7. definition of bisector
8. $\angle BAD \cong \angle BCD$
9. $\overline{BD} \cong \overline{BD}$
10. $\triangle ABD \cong \triangle CBD$
11. yes; CPCTRC
12. given
13. alternate interior angles
14. given
15. $\overline{HG} \cong \overline{FG}$
16. definition of bisector
17. $\angle HGM \cong \angle FGE$
18. $\triangle HGM \cong \triangle FGE$
19. yes: CPCTRC
20. given
21. alternate interior angles
22. $\angle BAF$ and $\angle EDC$ are right angles
23. $\angle BAF \cong \angle EDC$
24. $\overline{CE} \cong \overline{FB}$
25. $\triangle CDE \cong \triangle FAB$
26. AAS
27. yes: CPCTRC

Systematic Review 25C

1. $\angle QPT \cong \angle QSU$
   (1 and 2 may be reversed)
2. Q is the midpoint of $\overline{UT}$
3. $\overline{UQ} \cong \overline{TQ}$
   (3 and 5 may be reversed)
4. definition of midpoint
   (4 and 6 may be reversed if 3 and 5 were reversed)
5. $\angle UQS \cong \angle TQP$
6. vertical angles
7. $\triangle QSU \cong \triangle QPT$
8. AAS
9. yes: CPCTRC
10. $180° - 123° = 57°$
11. $180° - 111° = 69°$
12. $180° - (57° + 69°) =$
    $180° - 126° = 54°$
13. QRS
14. $\overline{RS}$
15. If the square is viewed as two congruent triangles, one pointing up, and one pointing down, we can find the area of these two triangles, and add them to find the area of the square. Since the diagonals are 12 inches long, and bisect each other, we know that the height of each triangle is 6 inches, so the area of one triangle would be:
    $\frac{1}{2}bh = \frac{1}{2}(12)(6) = 36 \text{ in}^2$
    Area of both triangles combined:
    $36 \text{ in}^2 + 36 \text{ in}^2 = 72 \text{ in}^2$

    In problems 16 – 20, your answer may be slightly different from the one given, depending upon whether the intermediate steps were rounded or not. Answers that are close may be considered correct.

16. Looking at one of the four small triangles, each of the legs has a length of 6 in, so the hypotenuse of these triangles is:
    $6^2 + 6^2 = H^2$
    $36 + 36 = H^2$
    $72 = H^2$
    $H = \sqrt{72}$ or $6\sqrt{2} \approx 8.49$ in
    $P = 4(8.49) = 33.96$ in
17. area of circle:
    $\pi r^2 \approx 3.14(8)^2 = 200.96 \text{ in}^2$
    sector $= \frac{36°}{360°} = \frac{1}{10}$ of the circle
    $\frac{1}{10}(200.96 \text{ in}^2) = 20.096 \text{ in}^2$

18. circumference of circle:
$c = 2\pi r \approx 2(3.14)(8) = 50.24$ in
sector $= \frac{36^\circ}{360^\circ} = \frac{1}{10}$ of the circle
$\frac{1}{10}(50.24) = 5.024$ in

19. 2 m = 200 cm
$V = (200)(340)(560) =$
$38{,}080{,}000\ cm^3$
or
340 cm = 3.4 m and 560 cm = 5.6 m
$V = (2)(3.4)(5.6) = 38.08\ m^3$

20. SA =
$2(2)(3.4)+2(2)(5.6)+2(3.4)(5.6) =$
$13.6+22.4+38.08 = 74.08\ m^2$
or
SA =
$2(200)(340)+2(200)(560)+2(340)(560) =$
$136{,}000+224{,}000+380{,}800 =$
$740{,}800\ cm^2$

Systematic Review 25D

Keep in mind the fact that the order of some steps in these proofs may be interchangeable.

1. $\overline{KZ}$ bisects $\angle JKX$
2. $\overline{KZ}$ bisects $\angle XZJ$
3. $\angle JKZ \cong \angle XKZ$
4. definition of bisector
5. $\angle XZK \cong \angle JZK$
6. definition of bisector
7. $\overline{KZ} \cong \overline{KZ}$
8. reflexive property
9. $\triangle JKZ \cong \triangle XKZ$
10. ASA
11. $\overline{KJ} \cong \overline{KX}$
12. $180^\circ - 83^\circ = 97^\circ$
13. $180^\circ - (28^\circ + 97^\circ) =$
$180^\circ - 125^\circ = 55^\circ$

14. $S^2 + 6^2 = 15^2$
$S^2 + 36 = 225$
$S^2 = 189$
$S = \sqrt{189} = \sqrt{9}\sqrt{21} = 3\sqrt{21} \approx 13$

15. Base of top triangle = 6 cm
Height of top triangle $= \frac{1}{2}(8) =$
4 cm
Area of top triangle $= \frac{1}{2}(6)(4) =$
$12\ cm^2$
Top and bottom triangles are congruent, so:
$A = 12+12 = 24\ cm^2$

16. The four small triangles each have sides measuring 4 cm and 3 cm, so the hypotenuse of each is:
$H^2 = 4^2 + 3^2$
$H^2 = 16+9$
$H^2 = 25$
$H = 5$
Perimeter $= 4(5) = 20$ cm

17. Volume of cylinder:
$V = Bh = \pi r^2 h \approx$
$3.14(4)^2(3.3) \approx 165.79\ cm^3$
section $= \frac{10^\circ}{360^\circ} = \frac{1}{36}$ of cylinder
$\frac{1}{36}(165.79\ cm^3) \approx 4.61\ cm^3$

18. Circumference of circle:
$C = 2\pi r \approx 2(3.14)(4) = 25.12$ cm
arc $= \frac{10^\circ}{360^\circ} = \frac{1}{36^\circ}$ of circle
$\frac{1}{36}(25.12) \approx .70$ cm

19. convert all measurements to yards:

$$\frac{6 \text{ ft}}{1} \times \frac{1 \text{ yd}}{3 \text{ ft}} = \frac{6 \text{ yds}}{3} = 2 \text{ yds}$$

$$\frac{3\sqrt{3} \text{ ft}}{1} \times \frac{1 \text{ yd}}{3 \text{ ft}} = \frac{3\sqrt{3} \text{ yds}}{3} =$$

$$\frac{\sqrt{3} \text{ yds}}{1} = \sqrt{3} \text{ yds}$$

volume = area of base times height. Triangular end is base, so:

$$V = Bh = \frac{1}{2}(2)(\sqrt{3})(5)$$

$$= 5\sqrt{3} \approx 8.66 \text{ yds}^3$$

20. SA = area of three rectangular sides, plus area of two triangular ends. Note that the ends are equilateral triangles. This can be verified by using the pythagorean theorem and the information given.

SA =

$$3(5 \text{ yds})(2 \text{ yds}) + 2(\tfrac{1}{2})(2 \text{ yds})(\sqrt{3} \text{ yds}) =$$

$$30 \text{ yds}^2 + 2\sqrt{3} \text{ yds}^2 =$$

$$30 + 2\sqrt{3} \text{ yds}^2 \approx 33.46 \text{ yds}^2$$

Systematic Review 25E

1. $\angle LPG \cong \angle RGP$

2. alternate interior angles

3. $\angle RPG \cong \angle LGP$

4. alternate interior angles

5. $\overline{PG} \cong \overline{PG}$

6. reflexive

7. $\triangle PLG \cong \triangle GRP$

8. ASA

9. yes: CPCTRC

10. Exterior angles of a polygon add up to 360°:

$360° - (115° + 119°) =$

$360° - 234° = 126°$

11. $180° - 115° = 65°$

12. $180° - 126° = 54°$

(126° from answer #10)

13. $180° - 119° = 61°$

14. Top triangle:

$$A = \frac{1}{2}bh = \frac{1}{2}(10)(6) = 30 \text{ in}^2$$

Bottom triangle:

$$A = \frac{1}{2}bh = \frac{1}{2}(10)(10) = 50 \text{ in}^2$$

Total area:

$$30 \text{ in}^2 + 50 \text{ in}^2 = 80 \text{ in}^2$$

15. One of two small triangles:

$$h^2 = 6^2 + 5^2$$

$$h^2 = 36 + 25$$

$$h^2 = 61$$

$$h = \sqrt{61} \approx 7.81 \text{ in}$$

One of two large triangles:

$$h^2 = 10^2 + 5^2$$

$$h^2 = 100 + 25$$

$$h^2 = 125$$

$$h = \sqrt{125} \approx 11.18 \text{ in}$$

$P = 2(7.81) + 2(11.18) =$

$15.62 + 22.36 = 37.98 \text{ in}$

16. circle :

$$A = \pi r^2 \approx 3.14(7)^2 = 153.86 \text{ mm}^2$$

$$\text{sector} = \frac{240°}{360°} = \frac{2}{3} \text{ of circle}$$

$$\frac{2}{3}(153.86 \text{ mm}^2) \approx 102.57 \text{ mm}^2$$

17. circle :

$$C = 2\pi r \approx 2(3.14)(7) = 43.96 \text{ mm}$$

$$\text{sector} = \frac{240°}{360°} = \frac{2}{3} \text{ of circle}$$

$$\frac{2}{3}(43.96 \text{ mm}) \approx 29.31 \text{ mm}$$

18. $5{,}000 \times 8{,}000{,}000 =$

$(5 \times 10^3)(8 \times 10^6) =$

$(5 \times 8)(10^3 \times 10^6) =$

$40 \times 10^9 = 4 \times 10^{10}$

19. $18{,}000 \times .007 =$
$(1.8 \times 7.0)(10^4 \times 10^{-3}) =$
$(12.6)(10^1) = 12.6 \times 10^1 =$
1.26×10^2
or: 1×10^2
if the student took significant digits into account.
20. $1{,}400{,}000 \div 290 =$
$(1.4 \times 10^6) \div (2.9 \times 10^2) =$
$(1.4 \div 2.9)(10^6 \div 10^2) =$
$.48 \times 10^4 = 4.8 \times 10^3$

Lesson Practice 26A

1. $\overline{AC} \perp \overline{BD}$
2. definition of perpendicular
3. definition of perpendicular
4. $\triangle ABD$ is isosceles
5. $\overline{AB} \cong \overline{AD}$
6. $\overline{AC} \cong \overline{AC}$
7. $\triangle ABC \cong \triangle ADC$
8. CPCTRC
9. C is the midpoint of $\overline{BD}$
10. definition of midpoint
11. $\triangle HJM$ is equilateral
12. angles in an equilateral triangle are congruent
13. $\overline{HK} \perp \overline{JM}$
14. definition of perpendicular
15. definition of perpendicular
16. $\overline{HK} \cong \overline{HK}$
17. $\triangle HJK \cong \triangle HMK$
18. ABCD is a rhombus
19. $\overline{AB} \cong \overline{CD}$
20. $\overline{AC} \perp \overline{DB}$
21. given
22. $\angle AOB$ is a right angle
23. $\angle COD$ is a right angle
24. O is the midpoint of $\overline{BD}$
25. $\overline{OD} \cong \overline{OB}$
26. definition of midpoint
27. $\triangle ABO \cong \triangle CDO$
28. HL

Lesson Practice 26B

1. $\overline{HE} \perp \overline{FC}$
2. $\overline{BG} \perp \overline{FC}$
3. $\angle BGC$ is a right angle
4. $\angle EHF$ is a right angle
5. $\overline{HE} \cong \overline{GB}$
6. given
7. $\overline{FE} \cong \overline{CB}$
8. given
9. $\triangle FHE \cong \triangle CGB$
10. HL
11. $\overline{AC}$ is tangent to circle at B
12. $\angle DBA$ is a right angle
13. property of tangent (see lesson 12)
14. $\angle DBC$ is a right angle
15. property of tangent
16. B is the midpoint of $\overline{AC}$
17. $\overline{AB} \cong \overline{CB}$
18. definition of midpoint
19. $\overline{DB} \cong \overline{DB}$
20. reflexive property
21. $\triangle ABD \cong \triangle CBD$
22. LL
23. $\overline{AG}$ is tangent to circle at G
24. $\overline{DE}$ is tangent to circle at E
25. $\overline{AG} \perp \overline{GF}$
26. property of tangent
27. $\overline{DE} \perp \overline{EF}$
28. property of tangent
29. $\angle AGF$ is a right angle
30. $\angle DEF$ is a right angle
31. $\angle GAF \cong \angle EDF$
32. given
33. $\overline{GF} \cong \overline{EF}$

34. If two line segments have equal lengths, they are congruent. Radii of a circle have equal lengths.
35. $\triangle AGF \cong \triangle DEF$
36. LA
37. $\overline{AF} \cong \overline{DF}$
38. CPCTRC

Systematic Review 26C

1. $\overline{RL} \cong \overline{GN}$ or $\overline{RN} \cong \overline{GL}$
2. opposite sides of a rectangle are congruent (APT)
3. $m\angle NRL \cong m\angle LGN = 90°$
4. opposite sides of a rectangle are congruent (APT)
5. $\overline{LN} \cong \overline{LN}$
6. reflexive property
7. $\triangle RNL \cong \triangle GLN$
8. HL
9. $$L^2 + \left(6\sqrt{2}\right)^2 = 12^2$$
$$L^2 + (6)(6)\left(\sqrt{2}\right)\left(\sqrt{2}\right) = 144$$
$$L^2 + (36)(2) = 144$$
$$L^2 + 72 = 144$$
$$L^2 = 72$$
$$L = \sqrt{72}$$
$$L = \sqrt{36}\sqrt{2}$$
$$L = 6\sqrt{2}$$
or ≈ 8.49 units
10. $$6^2 + 9^2 = H^2$$
$$36 + 81 = H^2$$
$$117 = H^2$$
$$H = \sqrt{117} \text{ or } \approx 10.82 \text{ units}$$
11. 180°
12. 2
13. $\sqrt{2}$
14. $\frac{2}{\sqrt{5}} \times \frac{5}{\sqrt{2}} = \frac{10}{\sqrt{10}} =$
$\frac{10}{\sqrt{10}} \times \frac{\sqrt{10}}{\sqrt{10}} = \frac{10\sqrt{10}}{\sqrt{100}} =$
$\frac{10\sqrt{10}}{10} = \sqrt{10}$
15. $C = 2\pi r \approx 2(3.14)(2.3) \approx 14.44$ cm
16. $A = \pi r^2 \approx (3.14)(2.3)^2 \approx 16.61$ cm^2
17. Exterior angles add up to 360°, so the measure of each exterior angle is $\frac{360°}{15} = 24°$.
interior angles = 180° − 24° = 156°
18. point
19. 123°
20. Alternate exterior angles are congruent.

Systematic Review 26D

1. $\overline{PT} \cong \overline{PS}$
2. definition of midpoint
3. $\overline{PQ} \cong \overline{PQ}$
4. reflexive property
5. $\triangle PTQ \cong \triangle PSQ$
6. LL
7. $\overline{SQ} \cong \overline{TQ}$
8. CPCTRC
9. The perpendicular bisector will divide the triangle into two smaller triangles, each of which will have a base of 4 inches, because of the definition of bisector. Using one of these small triangles, we have a leg of 4 and a hypotenuse of 8. Using L for the unknown leg:
$$L^2 + 4^2 = 8^2$$
$$L^2 + 16 = 64$$
$$L^2 = 48$$
$$L = \sqrt{48}$$
$$L = \sqrt{16}\sqrt{3}$$
$$L = 4\sqrt{3} \text{ in}$$

10. $A = \frac{1}{2}bh = \frac{1}{2}(8)\left(4\sqrt{3}\right) =$
$(4)\left(4\sqrt{3}\right) = 16\sqrt{3}\ \text{in}^2$
11. Each of the smaller triangles are $45°-45°-90°$ triangles, so they both have a pair of legs with equal measures. Therefore, the base of the larger triangle has a measure of $7 + 7 = 14$ inches. The hypotenuse of each of the smaller triangles is $\sqrt{2}$ times the leg, or $7\sqrt{2}$.
$P = S+S+S = 14+7\sqrt{2}+7\sqrt{2} =$
$14+14\sqrt{2} \approx 33.80$ in
12. $A = \frac{1}{2}bh = \frac{1}{2}(14)(7) = 49\ \text{in}^2$
13. 8
14. $\frac{\sqrt{5}}{3\sqrt{2}} \times \frac{\sqrt{3}}{4\sqrt{2}} = \frac{\sqrt{15}}{12\sqrt{4}} =$
$\frac{\sqrt{15}}{12(2)} = \frac{\sqrt{15}}{24}$
15. $V = \frac{4}{3}\pi r^3 \approx \frac{4}{3}(3.14)(4)^3 \approx$
$267.95\ \text{in}^3$
16. $A = 4\pi r^2 \approx 4(3.14)(4)^2$
$= 200.96\ \text{in}^2$
17. Exterior angles add up to 360°, so the measure of each exterior angle $= \frac{360°}{18} = 20°$.
Interior angles $= 180°-20° = 160°$
18. line or line segment or ray
19. $m\angle A = 180°-72° = 108°$
20. They are supplementary angles.

Systematic Review 26E

1. $\angle RQS \cong \angle TQS$
2. definition of bisector
3. $\overline{QS} \cong \overline{QS}$
4. reflexive property
5. $\triangle RSQ \cong \triangle TSQ$
6. LA
7. $\overline{RQ} \cong \overline{TQ}$
8. CPCTRC
9. convert 30 cm to m:
$\frac{30}{100} = .3$
$V = Bh = \pi r^2 h \approx 3.14(.3)^2(4) \approx$
$1.13\ \text{m}^3$
10. $SA = 2\pi r^2 + 2\pi rh \approx$
$2(3.14)(.3)^2 + 2(3.14)(.3)(4) \approx$
$.57 + 7.54 = 8.11\ \text{m}^2$
Your answer may differ slightly from this, depending upon how and when you rounded.
11. side-side-side
12. side-angle-side
13. angle-side-angle
14. angle-angle-side
15. hypotenuse-leg
16. leg-leg
17. hypotenuse-angle
18. leg-angle
19. $A = \pi r^2 \cong 3.14(2X)^2 = 3.14(2X)(2X) =$
$3.14\left(4X^2\right) = 12.56X^2\ \text{units}^2$
20. $(2X)^2 + (3X)^2 = H^2$
$4X^2 + 9X^2 = H^2$
$13X^2 = H^2$
$\sqrt{13X^2} = H$

Lesson Practice 27A

1. $\overline{AB} \perp \overline{BD}$
2. $\overline{EC} \perp \overline{BD}$
3. $\angle ABD \cong \angle ECD$
4. definition of perpendicular
5. $\angle EDC \cong \angle ADB$
6. reflexive property