Answers for Lesson 10-1, pp. 536–538 Exercises

1. 240 cm^2 **2.** 26.79 in.^2 **3.** 20.3 m^2 **4.** 11.2

5. 0.24 **6.** $16\frac{8}{13}$ **7.** 14 m^2 **8.** 13.5 yd^2

9. 3 ft^2

10. **a.** 1390 ft^2

b. Find the entire area of the lot and subtract the area for the flowers.

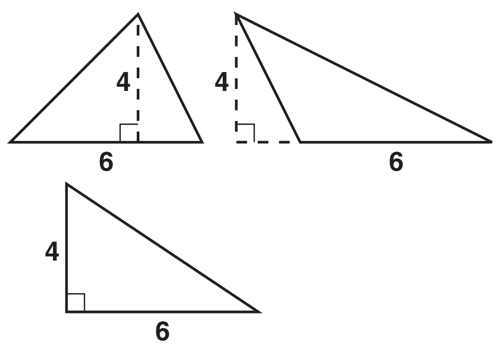
c. $1550 - 160 = 1390 \text{ ft}^2$

11. 4 in. **12.** B

13. 14 cm **14.** 18 in.; 12 in.

15. The area does not change; the height and base *AB* do not change.

16. Answers may vary. Sample:



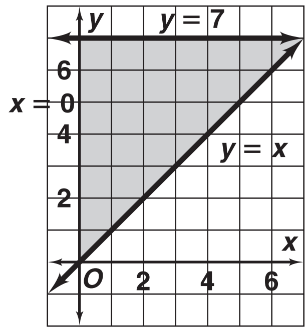
17. 15 units^2 **18.** 6 units^2

19. 6 units^2 **20.** 12 units^2

21. 27 units^2 **22.** 3 units^2

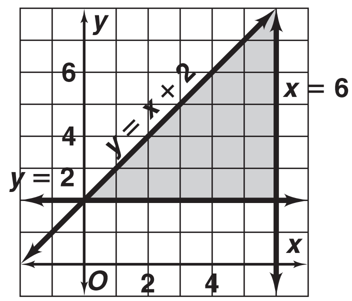
23. 21 units^2

24. a.



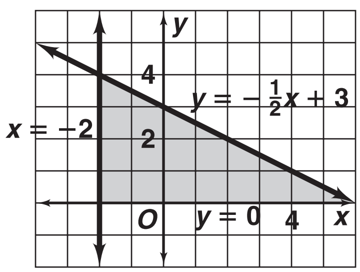
b. 24.5 units^2

25. a.



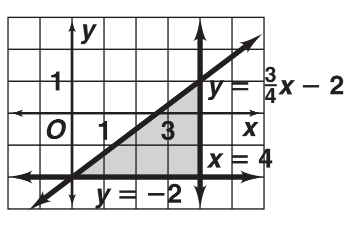
b. 18 units^2

26. a.



b. 16 units^2

27. a.



b. 6 units^2

28. 4200 yd^2

Answers for Lesson 10-1, pp. 536–538 Exercises (cont.)

29. **a.** Blank grid; area is 84 $units^2$ while figures are 36 $units^2$.

b. No; the figures have the same area.

30. 60 $units^2$

31. 28 $units^2$

32. 20 $units^2$

33. 88 $units^2$

34. 312.5 ft^2

35. 525 cm^2

36. 12,800 m^2

37. 34 $in.^2$

38. 126 m^2

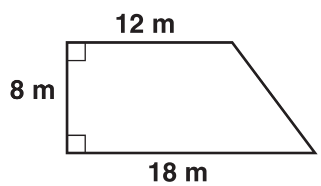
39. **a.** 54 $in.^2$

b. 54 $in.^2$

Answers for Lesson 10-2, pp. 542–544 Exercises

1. 472 $in.^2$
2. 144.5 cm^2
3. 108 ft^2
4. 110,622 mi^2
5. 150 cm^2
6. $\frac{5}{6}$ ft^2
7. about 43,290 mi^2
8. 30 ft^2
9. 72 m^2
10. $52\sqrt{3}$ ft^2
11. 80 $in.^2$
12. 18 m^2
13. 24 ft^2
14. 1200 ft^2
15. 96 $in.^2$
16. 24 m^2
17. 20 $in.^2$

18. **a.**

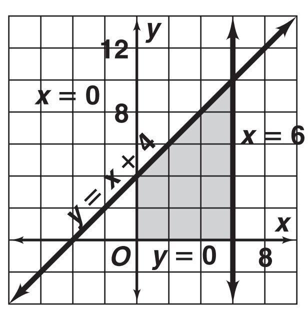


b. 48 m

c. 120 m^2

19. Check students' work.
20. 9 cm^2
21. 19.5 cm^2
22. 11.3 cm^2
23. 49.9 ft^2
24. 1.8 m^2
25. 18 $units^2$
26. 15 $units^2$
27. 15 $units^2$
28. C

29. **a.**



b. trapezoid

c. 42 $units^2$

30. 18 cm^2 **31.** $32\sqrt{3}\text{ m}^2$ **32.** $\frac{128\sqrt{3}}{3}\text{ in.}^2$

33. **a.** $A = \frac{1}{2}b_1h; A = \frac{1}{2}b_2h$

b. The area of the trapezoid is the sum of the areas of the triangles, so $A = \frac{1}{2}b_1h + \frac{1}{2}b_2h = \frac{1}{2}h(b_1 + b_2)$.

34. Sample: Each kite section is one-half of the corresponding rectangle section.

35. $b_1 = 12$ cm, $b_2 = 24$ cm, $h = 18$ cm

36. 1.5 m^2

37. $100 + 50\sqrt{3}$ or about 186.6 in.^2

Answers for Lesson 10-3, pp. 548–550 Exercises

1. $m\angle 1 = 120; m\angle 2 = 60; m\angle 3 = 30$

2. $m\angle 4 = 90; m\angle 5 = 45; m\angle 6 = 45$

3. $m\angle 7 = 60; m\angle 8 = 30; m\angle 9 = 60$

4. 2144.475 cm^2 **5.** 2851.8 ft^2 **6.** 12,080 $in.^2$

7. 2475 $in.^2$ **8.** 1168.5 m^2 **9.** 2192.4 cm^2

10. 841.8 ft^2 **11.** 27.7 $in.^2$ **12.** 93.5 m^2

13. 210 $in.^2$ **14.** 72 cm^2 **15.** $384\sqrt{3}$ $in.^2$

16. $162\sqrt{3}$ m^2 **17.** $75\sqrt{3}$ m^2 **18.** $12\sqrt{3}$ $in.^2$

19. **a.** 72
b. 54

20. **a.** 45
b. 67.5

21. **a.** 40
b. 70

22. **a.** 30
b. 75

23. 73 cm^2

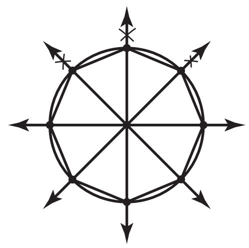
24. D

25. **a.** 9.1 in.
b. 6 in.
c. 3.7 in.
d. Answers may vary. Sample: About 4.6 in.; the length of a side of a pentagon should be between 3.7 in. and 6 in.

26. $m\angle 1 = 36; m\angle 2 = 18; m\angle 3 = 72$

27. The apothem is one leg of a rt. △ and the radius is the hypotenuse.

28. a–c.



regular octagon

d. Construct a 60° angle with vertex at circle's center.

29. $600\sqrt{3}$ m^2

30. Check students' work.

31. 128 cm^2

32. $24\sqrt{3}$ cm^2, 41.6 cm^2

33. $900\sqrt{3}$ m^2, 1558.8 m^2

34. a. $b = s;\ h = \frac{\sqrt{3}}{2}s$

$A = \frac{1}{2}bh$

$A = \frac{1}{2}s \cdot \frac{\sqrt{3}}{2}s$

$A = \frac{1}{4}s^2\sqrt{3}$

b. apothem $= \frac{s\sqrt{3}}{6}$;

$A = \frac{1}{2}ap = \frac{1}{2}\left(\frac{s\sqrt{3}}{6}\right)(3s)$

$= \frac{1}{4}s^2\sqrt{3}$

35. The apothem is ⊥ to a side of the pentagon. Two right △s are formed with the radii of the pentagon. So the △s are ≅ by HL. Therefore, the ∠s formed by the apothem and radii are ≅ by CPCTC, and the apothem bisects the vertex ∠.

36. For regular n-gon $ABCDE \ldots$, let P be the intersection of the bisectors of $\angle ABC$ and $\angle BCD$. $\overline{BC} \cong \overline{DC}$, $\angle BCP \cong \angle DCP$, and $\overline{CP} \cong \overline{CP}$, so $\triangle BCP \cong \triangle DCP$, and $\angle CBP \cong \angle CDP$ by CPCTC. Since $\angle BCP$ is half the size of $\angle ABC$ and $\angle ABC \cong \angle CDE$, $\angle CDP$ is half the size of $\angle CDE$. By a similar argument, P is on the bisector of each $\angle$ around the polygon.

The smaller angles formed by the bisectors are all $\cong$. By the Conv. of the Isosc. $\triangle$ Thm., each of $\triangle APB$, BPC, CPD, and so on are isosceles with $\overline{AP} = \overline{BP} = \overline{CP} = \overline{DP}$ and so on. Thus, P is equidistant from the polygon's vertices, so P is the center of the polygon and the $\angle$ bisectors are radii.

37. **a.** $(2.8, 2.8)$

b. 5.6 units^2

c. 45 units^2

38. **a.** $A = \frac{1}{2}bh$ and $h = a \sin C$

b. two sides; included

c. Form n $\triangle$s with the radii. $A(\text{each } \triangle) = \frac{1}{2}r^2 \sin\left(\frac{360}{n}\right)$, so $A = \frac{nr^2}{2} \sin\left(\frac{360}{n}\right)$.

Answers for Lesson 10-4, pp. 555–558 Exercises

1. $1:2; 1:4$

2. $4:3; 16:9$

3. $2:3; 4:9$

4. $3:5; 9:25$

5. 24 in.^{2}

6. 56 m^2

7. 59 ft^2

8. 439 m^2

9. \$384

10. \$47.20

11. $1:2; 1:2$

12. $5:2; 5:2$

13. $7:3; 7:3$

14. $3:4; 3:4$

15. $4:1; 4:1$

16. $1:10; 1:10$

17. $3:1; 9:1$

18. $2:5; 4:25$

19. $2:3; 4:9$

20. $7:4; 49:16$

21. $6:1; 36:1$

22. C

23. While the ratio of lengths is $2:1$, the ratio of areas is $4:1$.

24. 0.3 cm^2

25. 252 m^2

26. $x = 2$ cm, $y = 3$ cm

27. $x = 2\sqrt{2}$ cm, $y = 3\sqrt{2}$ cm

28. $x = 4$ cm, $y = 6$ cm

29. $x = \frac{8\sqrt{3}}{3}$ cm, $y = 4\sqrt{3}$ cm

30. $x = 4\sqrt{2}$ cm, $y = 6\sqrt{2}$ cm

31. $x = 8$ cm, $y = 12$ cm

32. $2\frac{1}{4}$ in. by 12 in.; 3 in. by 16 in.

33. **a.** Check students' work.

b. Check students' work.

c. Estimates may vary. Sample: 205 m^2

34. Ratio of small to large is 1 : 2.

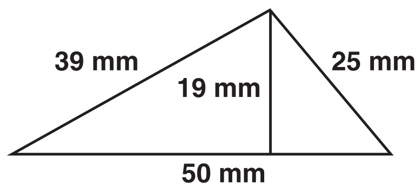
35. a. $\frac{5}{2}$ **36. a.** $\frac{8}{3}$ **37. a.** $\frac{2}{1}$

b. $\frac{25}{4}$ **b.** $\frac{64}{9}$ **b.** $\frac{4}{1}$

38. Answers may vary. Sample: The proposed playground is more than adequate. The number of students has approx. doubled. The proposed playground would be four times larger than the original.

39. Answers may vary. Sample:

a.



b. 114 mm; 475 mm^2

c. 456 yd; 7600 yd^2

40. a. $6\sqrt{3}\ \text{cm}^2$

b. $54\sqrt{3}\ \text{cm}^2$; $13.5\sqrt{3}\ \text{cm}^2$; $96\sqrt{3}\ \text{cm}^2$

41. Always; ~ rectangles with = perimeters have a similarity ratio of 1, so they are ≅.

42. Sometimes; a 1-by-8 rect. and 2-by-4 rect. have the same areas, but are not ~.

43. Never; if they were ≅, both measures would be the same. If they were ~, but not ≅, their areas would not be =.

44. Sometimes; if they are ≅, they have = areas and are ~.

Answers for Lesson 10-5, pp. 561–563 Exercises

1. 173.8 cm^2

2. 84.3 $in.^2$

3. 259.8 m^2

4. 2540.5 yd^2

5. **a.** 72

b. 36

c. about 8.1 in.

d. about 11.8 in.

e. about 58.8 in.

f. about 238 $in.^2$

6. 259.8 ft^2

7. 47.0 $in.^2$

8. 1131.4 cm^2

9. 8 ft^2

10. 151 m^2

11. 27.7 m^2

12. 18.0 ft^2

13. 7554.0 m^2

14. 311.3 km^2

15. 151.4 mm^2

16. 0.7 ft^2

17. 5523 yd^2

18. **a.** 50 mm^2

b. 116 mm^2

19. Answers may vary. Sample:

1. Find the apothem and the side ⊥ to apothem using a 30-60-90 △ with hyp. 1. Then use the formula $A = \frac{1}{2}ap$.

2. After finding the apothem and the ⊥ side, the height of the equil. △ is the apothem + 1. Then use the formula $A = \frac{1}{2}bh$.

20. 1,459,000 ft^2

21. 20.8 m; 20.8 m^2

22. 45.3 in.; 128 $in.^2$

23. 17.6 ft; 21.4 ft^2

24. 42 cm; 127.3 cm^2

25. 61.2 m; 282.8 m^2

26. 6.2 mi; 3 mi^2

27. D

28. (area of sq. A) = 4 · (area of sq. B)

29. (area of pent. A) ≈ 1.53 · (area of pent. B)

30. (area of hex. A) = (area of hex. B)

31. (area of oct. B) ≈ 1.17 · (area of oct. A)

32. (area of dec. A) = 0.01 · (area of dec. B)

33. 5.0 ft^2

34. **a.** Each central ∠ measures (360 ÷ n) and $m\angle C = \frac{1}{2}$ that measure or (180 ÷ n).

b. $\tan C = \frac{s}{1} = s$

c. $s = \tan C$, so $p = n \cdot 2(\tan C)$ or $2n(\tan C)$.

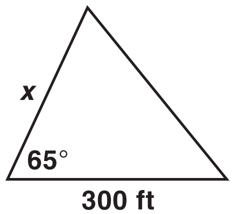
d. Since $a = 1$ and $p = 2n(\tan C)$, $A = \frac{1}{2}ap = \frac{1}{2}(1)(2n \tan C) = n(\tan C) = n\left(\tan \frac{180}{n}\right)$.

e. $X \tan(180/X)$

f. X increases by 1 and Y_1 approaches π.

g. Answers may vary. Sample: 425; as X increases, Y_1 approaches π, so the first 4 viewable decimal places become fixed; the n-gons start to look like a circle of radius 1.

35. Using steps similar to Ex. 34, $A = n\left(\cos \frac{180}{n}\right)\left(\sin \frac{180}{n}\right)$, which also appr. π as n increases.

36. 

320 ft

37. (0.65)

Answers for Lesson 10-6, pp. 569–573 Exercises

1. 18

2. 29

3. 40

4. 22

5. 43

6. 43

7. 40

8. 126

9–14. Answers may vary. Samples are given.

9. $\overset{\frown}{ED}$

10. $\overset{\frown}{FEB}$

11. $\overset{\frown}{BFE}$

12. $\overset{\frown}{FE}$ and $\overset{\frown}{ED}$

13. $\angle FOE$

14. $\angle FOE$ and $\angle BOC$

15. 128

16. 180

17. 218

18. 270

19. 52

20. 308

21. 180

22. 90

23. 232

24. 90

25. 142

26. 270

27. 20π cm

28. 6π ft

29. 8.4π m

30. 14π in.

31. π m

32. 58π cm

33. 25 in.

34. $\frac{7\pi}{2}$ cm

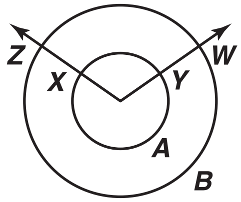
35. 8π ft

36. 27π m

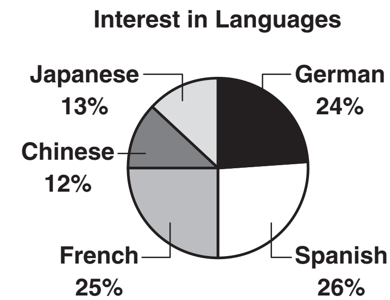
37. 33π in.

38. $\frac{23\pi}{2}$ m

39. $\frac{5\pi}{4}$ m

40. 

no

41. 

42. 70

43. 180

44. 110

45. 55

46. 235

47. 290

48. Check students' work.

49. **a.** 6

b. 30

c. 120

50. **a.** 0.5

b. 2.5

c. 10

51. 100

52. 38

53. 40

54. 100 in.

55. 50 in.

56. $\frac{100\pi}{3}$ in.

57. B

58. 3 : 4

59. 105 ft

60. **a.** 25,000 mi

b. The estimate seems quite accurate.

61. (2.5, 5)

62. 5π units

63. 5.125π ft

64. 2.6π in.

65. 3π m

66. 44.0 cm

67. Outside; a point on the outside travels farther in the same time, so it goes faster.

68. 18 cm

69. 12.6 units

70. **a.** Answers may vary. Sample: $\overset{\frown}{BD}$ and $\overset{\frown}{FE}$

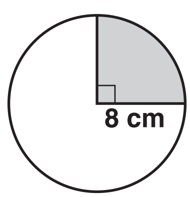
b. 35

71. 2π in.; assumptions may vary.

72. 325.7 yd; 333.5 yd; 341.4 yd; 349.2 yd; 357.1 yd; 364.9 yd; 372.8 yd; 380.6 yd

Answers for Lesson 10-7, pp. 577–579 Exercises

1. 9π m^2
2. 30.25π cm^2
3. 0.7225π ft^2
4. $\frac{\pi}{9}$ in.^{2}
5. about 86,394 ft^2
6. about 22 ft^2
7. 40.5π yd^2
8. 64π cm^2
9. $\frac{169\pi}{6}$ m^2
10. 12π in.^{2}
11. 12π ft^2
12. 56π cm^2
13. $\frac{25\pi}{4}$ m^2
14. $\frac{3\pi}{2}$ ft^2
15. 24π in.^{2}
16. 28.125π cm^2
17. 22.1 cm^2
18. 18.3 ft^2
19. 3.3 m^2
20. 20.4 m^2
21. 120.4 cm^3
22. $(243\pi + 162)$ ft^2
23. $(54\pi + 20.25\sqrt{3})$ cm^2
24. $(120\pi + 36\sqrt{3})$ m^2
25. $(4 - \pi)$ ft^2
26. $(64 - 16\pi)$ ft^2
27. $(784 - 196\pi)$ in.^{2}
28. A
29. Lower outside; the lower inside and top pieces have base areas 8π in.^{2}, but the lower outside pieces have base areas 8.75π in.^{2}.
30. 9 circles
31. 15.7 in.^{2}
32. 12 in.
33. Answers may vary. Sample: 8 cm radius; 90° arc



34. **a.** Answers may vary. Sample: Subtract the minor arc segment area from the area of the circle, or add the areas of the major sector and △ formed.

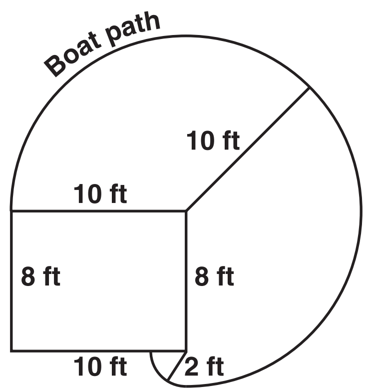
    b. $25\pi - 50; 75\pi + 50$
35. $(49\pi - 73.5\sqrt{3})$ m^2
36. $(200 - 50\pi)$ m^2

37. 4π m^2

38. Blue region; let $AB = 2$. Area of blue $= 4 - \pi$; area of yellow $= \pi - 2$, and $4 - \pi < \pi - 2$.

39. $\left(\frac{200\pi}{3} - 50\sqrt{3}\right)$ units^2

40. a.



b. Find the area of $\frac{3}{4}$ of a circle of radius 10 and add $\frac{1}{4}$ of a circle of radius 2.

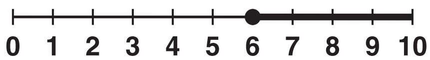
c. 239 ft^2

Answers for Lesson 10-8, pp. 584–587 Exercises

1. $\frac{1}{2}$ **2.** $\frac{1}{10}$ **3.** $\frac{3}{5}$

4. $\frac{2}{5}$ **5.** 1 **6.** $\frac{3}{10}$

7. $\frac{2}{5}$ or 40%



8. $\frac{1}{2}$ or 50%

9. $\frac{4}{15}$ or about 27%

10. $\frac{4}{7}$ or about 57%

11. $\frac{1}{3}$ or about 33%

12. $\frac{7}{15}$ or about 47%

13. $\frac{5}{8}$ or 62.5%

14. $\frac{1}{6}$

15. $\frac{1}{4}$ or 25%

16. 25%

17. $\frac{2}{5}$ or 40%

18. $\frac{2}{3}$ or about 67%

19. $\frac{\pi}{2 + \pi}$ or about 61%

20. $\frac{4 - \pi}{4}$ or about 21%

21. 4%

22. 6

23. $\frac{\pi}{4}$

24. $\frac{\pi}{4}$

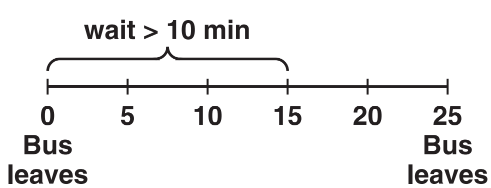
25. $\frac{\pi}{4}$

26. $\frac{10\pi}{200}$ or about 16%

27. **a.** 14 prizes

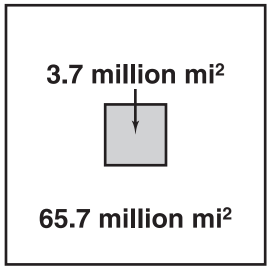
b. $110

28. **a.** $\frac{3}{5}$ or 60%

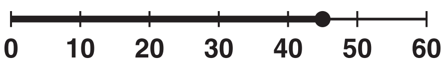


29. 36 s

30. about 5.6%

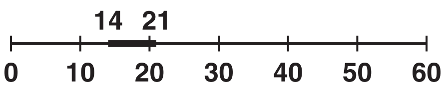


31. a.



If it starts after 45 min, you cannot erase 15 min of a 60-min tape.

b.



$\frac{7}{45}$ or about 16%

32. $\frac{3}{5}$

33. $\frac{3}{10}$

34. $\frac{9}{20}$

35. 0

36. $\frac{1}{40}$

37. 1

38. $\frac{3}{10}$

39. $\frac{\sqrt{10} - \sqrt{2}}{10\pi} \approx 0.06$

40. about 46%

41. about 36%

42. about 59%

43. about 46%

44. a. yes **b.** no **c.** $\frac{2}{3}$

45. a–b. Check students' work.

46. a. 45 cm **b.** 63 cm **c.** 71 cm

d. 77 cm **e.** 89 cm **f.** 100 cm

47. $\frac{24}{49} \approx 49\%$; the probability is the same.