Answers

8.4 Warm Up
For use before Activity 8.4

1. 100 ft^2 **2.** 256 in.^2

3. 150 m^2 **4.** 30 cm^2

5. about 314 ft^2 **6.** about 7850 yd^2

8.4 Start Thinking!
For use before Lesson 8.4

Check students' drawings and calculations.

8.4 Warm Up
For use before Lesson 8.4

1. 21 units^2 **2.** 20 units^2

3. 12 units^2 **4.** about 12.53 units^2

5. 18 units^2 **6.** about 17.72 units^2

8.4 Practice A

1. 30 units^2 **2.** 33 units^2 **3.** 16 units^2

4. 48 in.^2 **5.** about 178.5 mm^2

6. 402 ft^2 **7.** 210 cm^2

8. 60 yd^2 **9.** 40 m^2

10. perimeter: about 37.85 ft; area: about 69.625 ft^2

11. a. 144 in.^2 **b.** 72 in.^2 **c.** \$172.80

8.4 Practice B

1. perimeter: about 23.42 ft; area: about 38.13 ft^2

2. perimeter: 18 mm; area: 16 mm^2

3. perimeter: 26.6 cm; area: 42.6 cm^2

4. 27.98 in.^2 **5.** about 4.55 m^2 **6.** 6.63 yd^2

7. The area calculation included the area of the circle instead of the area of the semicircle.

$$\text{Shaded area} \approx (4 \bullet 4) - \left(\frac{3.14 \bullet 2^2}{2} \right)$$
$$= 16 - 6.28$$
$$= 9.72 \text{ ft}^2$$

8. a. 39 in.   **b.** 54 in.^2

     c. no; The dimensions of the logo are 10.5 in. by 12 in., but the dimensions of the notebook cover are 8.5 in. by 11 in.

8.4 Enrichment and Extension

1. I: 78 m^2 **2.** P: about 50.7 m^2

3. M: 50 m^2 **4.** S: about 75.36 m^2

5. C: about 21.98 m^2 **6.** T: 82.775 m^2

7. O: about 58.875 m^2 **8.** E: 98.935 m^2

9. O: about 37.68 m^2 **10.** COMPOSITE

8.4 Puzzle Time

DO WE WALK OR HOP ON A DOG

Technology Connection

1. 260.62 cm   **2.** 260.8571429 cm

3. 260.7521902 cm

4. no; They would be 260.62, 260.86, and 260.75.

5. *Sample answer:* In this example, rounding to the nearest integer would give a consistent value.

6. 433 mi or 434 mi

Chapter 9

9.1 Start Thinking!
For use before Activity 9.1

Sample answer: Measure the length, width, and height of the box and find the sum of the areas of each side. Take the box apart and find the area of the net.

9.1 Warm Up
For use before Activity 9.1

1. 62   **2.** 28   **3.** 54

4. 142   **5.** 40   **6.** 304
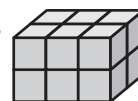
9.1 Start Thinking!
For use before Lesson 9.1

Sample answer: Area is the amount of space a two-dimensional object takes up. Surface area is the sum of the areas of each surface of a three-dimensional object. Surface area is measured in square units.
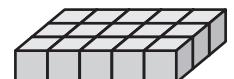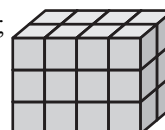
9.1 Warm Up
For use before Lesson 9.1

1. 32 in.^2;

2. 22 in.^2;

3. 52 in.^2;

4. 46 in.^2;

Answers

9.1 Practice A

1. 232 cm^2 **2.** 336 in.^2 **3.** 360 ft^2

4. 672 m^2 **5.** 2640 in.^2

6. 384 cm^2 **7.** 171 in.^2

8. *Sample answer:*
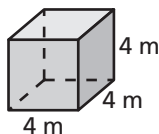
9.1 Practice B

1. 2520 cm^2 **2.** 136 ft^2 **3.** 85.6 in.^2

4. 1544 m^2 **5.** 600 cm^2 **6.** 456 ft^2

7. a. 482 cm^2 **b.** 452.75 cm^2

8. 5 in.

9.1 Enrichment and Extension

1. a. *Sample answer:*
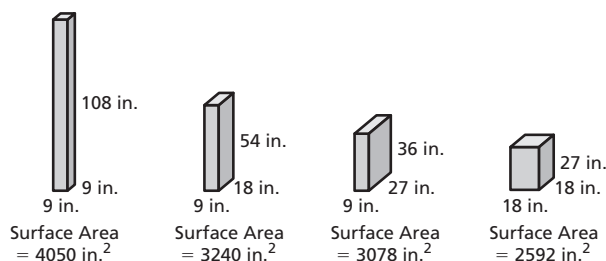
b. *Sample answer:*
28.125 ft^2; 22.5 ft^2; 21.375 ft^2; 18 ft^2

c. *Sample answer:* 1012.5 ft^2

2. a. Original box: 283.12 in.^2; 532.8 in.^2;
238.74 in.^2; 231.78 in.^2

b. 356.5 ft^2

c. *Sample answer:* The design with the least surface area will be the cheapest to make and produce the least waste. But, a cube is inconvenient to store in a cupboard. It would take up the same amount of space, but because it is wider and shorter, you would have to stack them on top of and in front of each other in order to best use the cupboard space. The original design is still probably best for storage reasons because it is tall and skinny, but not really tall like one of the new designs.

3. a cube

9.1 Puzzle Time

A BIG WHEEL

9.2 Start Thinking!
For use before Activity 9.2

Sample answer: Yes, because a pyramid goes to a point. No, the base can be any polygon.

9.2 Warm Up
For use before Activity 9.2

1. 24 cm^2 **2.** 21 in.^2

3. 171 ft^2 **4.** 195.5 cm^2

9.2 Start Thinking!
For use before Lesson 9.2

Sample answer: To make sure your neighbor buys enough roofing materials.

9.2 Warm Up
For use before Lesson 9.2

1. 297 in.^2 **2.** 148.3 ft^2

9.2 Practice A

1. 37 cm^2 **2.** 7 ft^2

3. 33 m^2 **4.** 210.6 in.^2

5. a. 30 ft^2 **b.** 30 ft^2 **c.** 30.4 ft^2

d. yes; The lateral surface areas are almost the same, so you will get the same amount of coverage from each.

9.2 Practice B

1. 70.09 cm^2 **2.** 525.7 ft^2

3. a. 52 ft   **b.** 3640 ft^2 **c.** \$12,740.00

4. 7.8 m   **5.** 7 yd

9.2 Enrichment and Extension

1. *Sample answer:* If you use $1 \text{ m} = 1 \text{ cm}$ as your scale, then the model of the Cheops Pyramid would have a side length of 230 centimeters, which is more than 7.5 feet. A square that is 7.5 feet by 7.5 feet cannot be cut from a sheet of plywood that is 4 feet by 8 feet. If the scale is $1 \text{ m} = 0.5 \text{ cm}$, then the model's side length will be half as long, which is less than 4 feet and can be cut from the sheet of plywood.

Answers

2.

Pyramid	Model side length (cm)	Model slant height (cm)
Cheops Pyramid in Egypt	115	93
Muttart Conservatory in Edmonton	13	13.5
Louvre Pyramid in Paris	17.5	14
Pyramid of Caius Cestius in Rome	11	14.5

3. $36{,}371.25 \text{ cm}^2$; 2 sheets of plywood

4. a. yes; A full sheet and a half sheet have an area of about $44{,}593.5 \text{ cm}^2$, which is greater than the amount of plywood needed for the models.

    b. You cannot use a half sheet. With one full sheet and one half sheet, you can cut out everything except one triangle needed for the sides of the Cheops Pyramid. So, you need 2 full sheets of plywood.
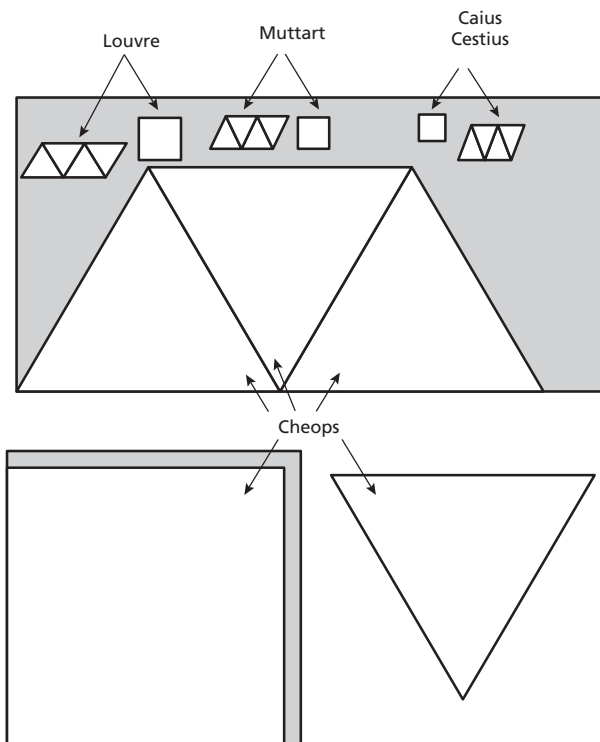
9.2 Puzzle Time
THE INFANTRY

9.3 Start Thinking!
For use before Activity 9.3

Sample answer: recovering a cylindrical ottoman with new fabric

9.3 Warm Up
For use before Activity 9.3

  1. 28.26 in.^2 **2.** 153.86 ft^2

  3. 314 cm^2 **4.** 50.24 cm^2
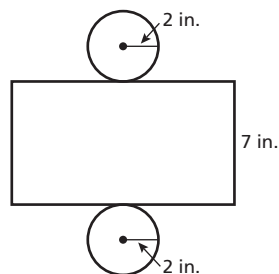
9.3 Start Thinking!
For use before Lesson 9.3

The cylinder with a radius of 10 centimeters and height of 4 centimeters has a greater surface area (approximately 879.2 square centimeters compared to approximately 351.68 square centimeters).
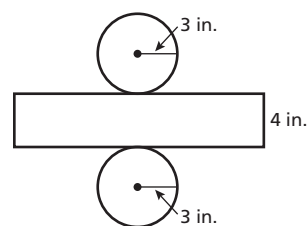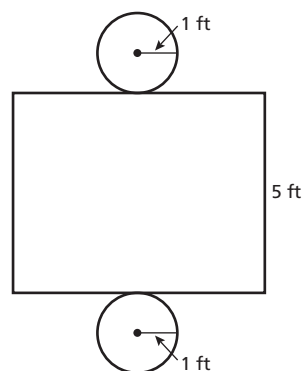
9.3 Warm Up
For use before Lesson 9.3

  1. surface area: $36\pi \approx 113.0 \text{ in.}^2$

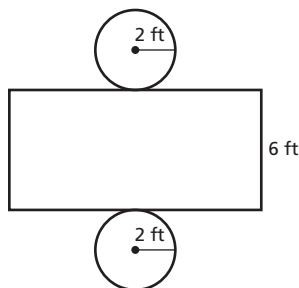 **2.** surface area: $42\pi \approx 131.9 \text{ in.}^2$

  3. surface area: $12\pi \approx 37.7 \text{ ft}^2$

Answers

4. surface area: $32\pi \approx 100.5 \text{ ft}^2$

9.3 Practice A

1. $48\pi \approx 150.7 \text{ in.}^2$ **2.** $60\pi \approx 188.4 \text{ m}^2$

3. $128\pi \approx 401.9 \text{ ft}^2$ **4.** $176\pi \approx 552.6 \text{ mm}^2$

5. $18\pi \approx 56.5 \text{ cm}^2$ **6.** $18\pi \approx 56.5 \text{ yd}^2$

7. $84\pi \approx 263.8 \text{ in.}^2$

9.3 Practice B

1. $408\pi \approx 1281.1 \text{ ft}^2$ **2.** $20\pi \approx 62.8 \text{ cm}^2$

3. $260\pi \approx 816.4 \text{ m}^2$ **4.** 552.6 in.^2

5. a. $\dfrac{255}{512}\pi \approx 1.56 \text{ in.}^2$ **b.** $\dfrac{189}{256}\pi \approx 2.32 \text{ in.}^2$

   c. $\dfrac{\$0.25}{1.56 \text{ in.}^2} \neq \dfrac{\$0.50}{2.32 \text{ in.}^2}; 0.58 \neq 0.78$

   d. $\dfrac{\$0.25}{1.56 \text{ in.}^2} = \dfrac{\$0.50}{x \text{ in.}^2}; x = 3.12 \text{ in.}^2$

9.3 Enrichment and Extension

1. a. 169.6 in.^2 **b.** 304.6 in.^2 **c.** 34.8%

   d. *Sample answer:* After the cake is cut into pieces, it has more surface area. Because more of the cake is exposed to air, more moisture can escape and evaporate. So, the cake does not stay as moist.

2. a. 12.7 oz

   b. He will have to buy 2 containers, and he will have 3.3 ounces of icing left over.

9.3 Puzzle Time

THE MAN WHO BOUGHT A NEW BOOMERANG AND SPENT A WEEK TRYING TO THROW HIS OLD ONE AWAY

9.4 Start Thinking!
For use before Activity 9.4

No, two-dimensional figures do not have volume because they do not have depth (height). Yes, three-dimensional figures do have volume because they have depth (height).

9.4 Warm Up
For use before Activity 9.4

1. 280   **2.** 672   **3.** 910

4. 495   **5.** 1120   **6.** 4032

9.4 Start Thinking!
For use before Lesson 9.4

Sample answer: Find the volume of the sand and the box. If the volume of the box is greater than the volume of the sand, then the sand will fit in the box.

9.4 Warm Up
For use before Lesson 9.4

1. 24 cm^3 **2.** 168 ft^3 **3.** 1120 in.^3 **4.** 126 m^3

9.4 Practice A

1. 36 in.^3 **2.** 135 m^3 **3.** 120 cm^3

4. 16 yd^3 **5.** 15 in.^3 **6.** 300 m^3

7. 8 in.^3 **8.** 5280 in.^3 **9.** 8.7 gal

9.4 Practice B

1. $12{,}000 \text{ cm}^3$ **2.** 1875 m^3 **3.** 63.7 in.^3

4. 22.5 cm^3 **5.** 10.8 yd^3 **6.** 1290 m^3

7. 936 in.^3 **8.** 0.85 L   **9.** 27 ft^3

9.4 Enrichment and Extension

1. a−b.

Length (in.)	Width (in.)	Height (in.)	Volume (in.^{3})	Surface Area (in.^{2})
5	5	5	125	150
5	5	10	250	250
5	5	15	375	350
5	10	10	500	400
5	10	15	750	550
10	10	10	1000	600
5	15	15	1125	750
10	10	15	1500	800
10	15	15	2250	1050
15	15	15	3375	1350

Answers

2. a−b.

Length (in.)	Width (in.)	Height (in.)	Volume (in.³)	Surface Area (in.²)
5	5	5	125	150
5	5	8	200	210
5	8	8	320	288
5	5	15	375	350
8	8	8	512	384
5	8	15	600	470
8	8	15	960	608
5	15	15	1125	750
5	5	50	1250	1050
8	15	15	1800	930
5	8	50	2000	1380
8	8	50	3200	1728
15	15	15	3375	1350
5	15	50	3750	2150
8	15	50	6000	2540
15	15	50	11,250	3450
5	50	50	12,500	6000
8	50	50	20,000	6600
15	50	50	37,500	8000
50	50	50	125,000	15,000

3. The surface area usually increases. There are a few times in the second table where the surface area will decrease.

4. In order to maximize volume and minimize surface area, the dimensions should be close to the same value. A cube is the rectangular prism with the least surface area for its volume.

9.4 Puzzle Time

TIC TAC DOUGH

9.5 Start Thinking!

For use before Activity 9.5

Sample answer: Slant height deals with the height of the triangle on the outside of the pyramid and is used to find the surface area of a pyramid. The height of the pyramid is the distance from the top of the pyramid straight down to the base and is used to find the volume of the pyramid.

9.5 Warm Up

For use before Activity 9.5

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

4. 6 **5.** $16\frac{2}{3}$ **6.** $22\frac{2}{13}$

9.5 Start Thinking!

For use before Lesson 9.5

Sample answer: A company is making pyramid-shaped paperweights that will be filled with a liquid. The company will need to know how much liquid to fill the paperweights, so they will need to know how much each paperweight can hold (or the volume).

9.5 Warm Up

For use before Lesson 9.5

1. 45 in.³ **2.** 2700 ft³

3. 28 m³ **4.** 180 cm³

9.5 Practice A

1. 4 cm³ **2.** 84 in.³ **3.** 50 m³

4. 120 ft³ **5.** 320 ft³ **6.** $84

7. a. 72 cm³ **b.** 24 cm

8. The volume is halved.

9.5 Practice B

1. 600 mm³ **2.** 140 ft³

3. 1375 cm³ **4.** 200 in.³

5. a. 400 ft³ **b.** 400 ft³ **c.** same as

9.5 Enrichment and Extension

1. The sand will spill over. About 10.7 cubic inches of sand will spill out.

2. The sand will not spill over. The sand will be about 3.8 inches high in the cylindrical bucket.

3. 2 in.

Answers

4. This cylindrical bucket has a smaller diameter than the cylindrical bucket from Exercise 2. This cylindrical bucket is holding 64 cubic inches of water because that is the volume of the cube bucket. If the cylindrical bucket from Exercise 2 was filled to a height of 7 inches, it would hold about 197.9 cubic inches of water. Because the cylindrical bucket would hold less with the same height, the diameter must be smaller.

5. *Answer should include, but is not limited to:* A picture must be included in which the shapes are labeled with their names, dimensions, and volumes. The total volume of the shapes must be less than or equal to 360 in.^{3}

9.5 Puzzle Time

FRUIT SALAD

Extension 9.5 Start Thinking!
For use before Extension 9.5

Check students' work.

Extension 9.5 Warm Up
For use before Extension 9.5

1. cylinder   **2.** rectangular prism

3. pyramid   **4.** sphere

Extension 9.5 Practice

1. square   **2.** triangle

3. rectangle   **4.** triangle

5. point   **6.** triangle

7. circle   **8.** circle

Technology Connection

1. The surface area is multiplied by a factor of 4.

2. The surface area is multiplied by a factor of 9.

3. The surface area is multiplied by a factor of 16.

4. The surface area is multiplied by a factor of n^2. The formula for the surface area is $S = 6s^2$, so when s is multiplied by n, the formula becomes $S = 6(ns)^2 = n^2 \cdot 6s^2$.

Chapter 10

10.1 Start Thinking!
For use before Activity 10.1

2; 4; 4

10.1 Warm Up
For use before Activity 10.1

1. $\dfrac{6}{25}$ **2.** $\dfrac{1}{2}$ **3.** $\dfrac{4}{5}$

4. $\dfrac{1}{5}$ **5.** $\dfrac{3}{5}$ **6.** $\dfrac{4}{7}$

10.1 Start Thinking!
For use before Lesson 10.1

Answers will vary. Check students' work.

10.1 Warm Up
For use before Lesson 10.1

1. 8   **2.** 4; 4

10.1 Practice A

1. Choosing 4   **2.** Choosing 2, 4, 6, or 8

3. Choosing 1   **4.** Choosing 7 or 9

5. Choosing 2, 4, 6, or 8   **6.** no favorable outcomes

7. a. 3   **b.** Choosing any 1 of the 3 triangles

8. a. 1   **b.** Choosing a star

9. a. 6
   b. Choosing a star, choosing any 1 of the 2 circles or 3 triangles

10. a. 5
   b. Choosing a star, a square, or any 1 of the 3 triangles

11. a. 22   **b.** 24   **12. a.** 3   **b.** 2

10.1 Practice B

1. Choosing 8   **2.** Choosing 2, 4, or 6

3. Choosing 5 or 7   **4.** no favorable outcomes

5. Choosing 2 or 3   **6.** Choosing 3, 6, 8 or 9

7. a. 1   **b.** Choosing a triangle

8. a. 4   **b.** Choosing any 1 of the 4 stars