

Chapter 3 SE Answers

Chapter 3 Measuring Area

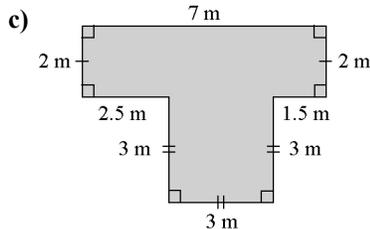
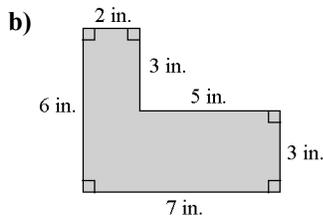
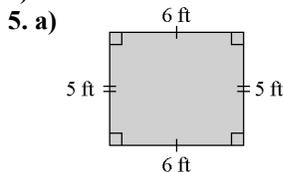
Chapter Opener, pages 112 to 113

Examples:

1. rectangles, squares, circles and semicircles, triangle
2. length and width of rectangles and squares; base length and height of triangle; diameter of circles and semicircles
3. The side length of each square represents 2 ft.
4. landscaper, roofer, carpenter, builder

Get Ready, pages 114 to 115

1. a) millimetre, centimetre, metre, kilometre
b) Example: centimetres, metres, millimetres, kilometres
2. a) inch, foot, yard, mile
b) Example: inches, yards, miles
3. b) 300 cm c) 3 ft d) 1.5 m e) 48 in. f) 0.5 km
g) 265 cm
4. Examples: b) $3\frac{1}{3}$ yd c) 10 ft d) 8 in. e) 24 mi
f) 800 km



6. a) 22 ft b) 26 in. c) 24 m
7. a) 36 b) 40 c) 21 d) 120 e) 49 f) 36
8. a) 28.4 m b) 25 in. c) 3 m d) 4 ft
9. a) 6 b) 7 c) 5 d) 4.5

3.1 Imperial Area Measurements, pages 116 to 127

On the Job 1

Check Your Understanding

1. a) Examples: Figure A: 2 in. by 2 in., area: 4 in.^2 ; Figure B: 4 in. by 1 in., area: 4 in.^2
b) Figure A: 2 in. by 2 in., area: 4 in.^2 ; Figure B: 4 in. by 1.25 in., area: 5 in.^2
2. a) 288 b) 72 c) 36 d) 18 e) $4\frac{1}{2}$ f) 1 g) 2 h) 1

3. Examples: a) square yards b) square inches
c) square feet d) square inches e) square inches
f) square yards
4. a) Examples: computer screen: 144 in.^2 ; screen on a calculator: $1\frac{1}{2}\text{ in.}^2$
c) Examples: computer screen: 143 in.^2 ; screen on a calculator: 2 in.^2
5. a) 3888 in.^2 b) 27 ft^2 c) 3 yd^2
6. a) Example: 11 in. by 7 in. b) 77 in.^2 c) 80 in.^2
d) Because 1 ft^2 is equal to 144 in.^2 and the area of the page is 80 in.^2 , the area of the page is less than 1 ft^2 .
7. 4 bags; area of yard: $45 \times 60 = 2700$. The area of the yard is 2700 ft^2 ; area covered by one bag of grass seed: $75\text{ yd}^2 = 675\text{ ft}^2$; $2700 \div 675 = 4$
8. a) 50 ft^2 b) 64 ft^2

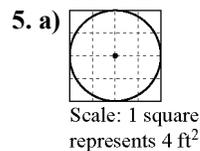
On the Job 2

Check Your Understanding

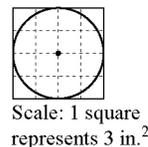
1. Examples: a) 7 in.^2 b) 19 in.^2
2. Examples: a) 28 in.^2 b) 76 in.^2
3. a) 16 in.^2 b) 25 in.^2
4. Examples: a) 13 in.^2 b) 19 in.^2
5. From #1: a) 28 in.^2 b) 79 in.^2 ; from #3: a) 13 in.^2 b) 20 in.^2
6. a) 1 in.^2 b) 0.9 in.^2
7. $20\,106\text{ ft}^2$
8. 1257 mi^2
9. a) 0.8 ft^2 b) 113.1 ft^2 c) 12.6 ft^2

Work With It

1. 660 tiles
2. a) 7.1 in.^2 b) 11.8 cm^2
3. a) 7150 yd^2 b) 1950 yd^2
4. 50 bundles



- b) Example: 208 ft^2 c) 201 ft^2 d) $\$66.80$
6. The square shown has an area of 1 ft^2 ; Because the circle is smaller than the square, its area is less than 1 ft^2 .



7. Example: It is a good idea to estimate area to make sure that my calculated area is a reasonable answer.
8. Example: Mark is not right. In the formula for the area of a circle ($A = \pi r^2$), the radius is squared, so the area of the ring is not doubled when the diameter is doubled. When the diameter is 4 ft, the area is approximately 13 ft^2 . When the diameter is 8 ft, the area is approximately 50 ft^2 .



9. a) Example: An installer needs to know the area of a space to be covered by a sprinkler system and the area that a sprinkler can cover in order to determine how many sprinklers are needed and how far apart they should be placed. b) Examples: contractor, civil engineer

3.2 SI Area Measurements, pages 128 to 139

On the Job 1

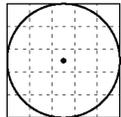
Check Your Understanding

- Examples: a) width: 1.5 cm; height: 1.5 cm; area: 2.3 cm^2
b) width: 4.5 cm; height: 3 cm; area: 6.8 cm^2
- a) width: 1.7 cm; height: 1.7 cm; area: 2.9 cm^2
b) width: 4.6 cm; height: 2.8 cm; area: 6.4 cm^2
- a) 10 000 b) 5000 c) 1000 d) 2500, 0.25
e) 5000, 0.5 f) 2500, 0.0025
- a) square metres b) square centimetres
c) square centimetres d) square centimetres
e) square metres f) square centimetres
- Examples: a) parking space: 10 m^2 ; computer keyboard: 600 cm^2
c) parking space: 10.6 m^2 ; computer keyboard: 672 cm^2
- a) 7200 cm^2 b) 0.72 m^2
7. 7.2 m^2
- Examples: a) 4 m by 1 m b) $40\,000 \text{ cm}^2$; 4 m^2
c) 416 cm by 110 cm; $45\,760 \text{ cm}^2$ d) 4.2 m by 1.1 m; 4.6 m^2
- b) 2.5 L c) Example: 160 L
- 100 m^2

On the Job 2

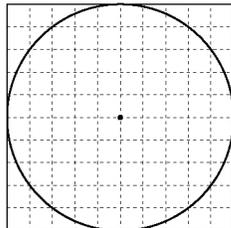
Check Your Understanding

- a) 16 cm^2 b) 25 m^2
- Examples: a) 12 cm^2 b) 20 m^2
- a) 13 cm^2 b) 20 m^2
- a)



Scale: 1 square represents 5 cm^2

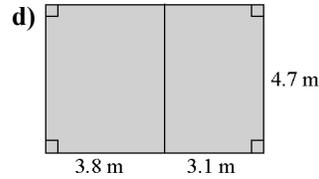
- Example: 500 cm^2 c) 491 cm^2
- 531 cm^2
- 552 in.^2
- a)



- b) Example: 80 cm^2 c) 78.5 cm^2
- 113.1 in.^2

Work With It

- a) 9.9 m^2 b) 330 cm by 300 cm c) 110 tiles
- a) 380 cm = 3.8 m; 310 cm = 3.1 m; 270 cm = 2.7 m
b) larger room: 10.3 m^2 ; smaller room: 8.4 m^2
c) larger room: 3.8 m by 4.7 m; smaller room: 3.1 m by 4.7 m



- d) larger room: 17.9 m^2 ; smaller room: 14.6 m^2
- a) 177 cm^2 b) 28 in.^2
- a) Example: Measure one of my paces, then count the number of paces in the length and the width of the driveway. Multiply the length by the width to determine the area.
b) Example: 40 m^2 c) 37.74 m^2 d) Example: My estimate was too large.
- Jennifer's thinking is not correct. Less than half of the pot is on the burner. The area of a circle is given by the formula $A = \pi r^2$. When the radius is doubled, the area is increased four-fold. So, actually only one-quarter of the pot is on the burner. The area of the burner is approximately 177 cm^2 , while the area of the base of the pot is approximately 707 cm^2 .
- It is easier to convert in the SI system because it uses base 10. Example: $10 \text{ mm} = 1 \text{ cm}$, $100 \text{ cm} = 1 \text{ m}$, and $1000 \text{ m} = 1 \text{ km}$. In the imperial system different numbers occur. Example: $12 \text{ in.} = 1 \text{ ft}$, $3 \text{ ft} = 1 \text{ yd}$, $1760 \text{ yd} = 1 \text{ mi}$.
- Examples: 6 m by 6 m; 3 m by 12 m; 4 m by 9 m; 1.5 m by 24 m; 2.5 m by 14.4 m; 3.6 m by 10 m
- Examples: a) In SI units: my arm span is approximately 1.5 m; in imperial units: my regular paces are approximately 2 ft apart.
b) My regular paces are more useful because I can walk across the middle of the classroom, whereas I must use my arm span along a wall.

3.3 Working With Area, pages 140 to 151

On The Job 1

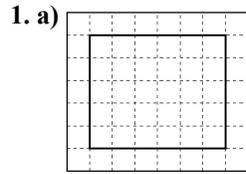
Check Your Understanding

- a) 42 cm^2 b) 168 in.^2
- a) 20.2 m^2 b) 5.1 m^2 c) 50.6 m^2
- a) Estimate: 200 ft^2 ; actual: 245 ft^2 b) 1 can
- 198 tiles
- 8827 m^2
- a) 454 ft^2 b) 3 cans

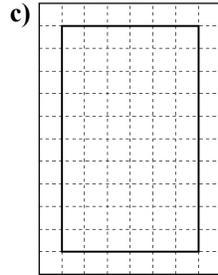


On The Job 2

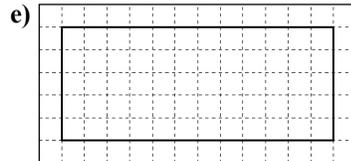
Check Your Understanding



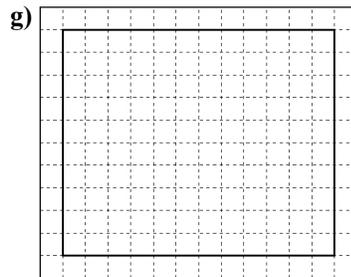
b) 30 cm^2



d) two times as great



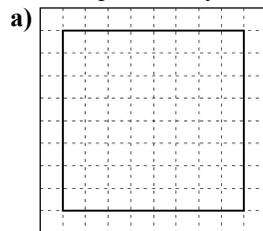
f) They both have the same area of 60 cm^2 .



h) four times as great

2. a) 15 cm b) 45 cm by 30 cm c) 7.5 cm by 5 cm

3. Example: 8 m by 8 m



b) 100 times as great c) 100 times as great

d) 10 000 times as great

4. Chloe is correct in tripling the length of the photo, but she has not tripled the width of the photo: $4 \times 3 = 12$, so the enlarged photo should measure 18 cm by 12 cm.

5. a) 1000 ft^2 b) The areas will be the same. If you double one dimension, then you double the area.

c) The area of the expanded garden is four times as large as the original garden.

Work With It

1. a) 44.4 m^2

b) $\$88.97 + \text{HST (assume 13\% HST)} = \100.54

2. a) 21 m^2 b) 18 m^2 c) 45 m^2 d) 180 m^2

3. a) 5472 in.^2 b) 38 ft^2

c) Examples: A laminate countertop from Habitat for Humanity Restore costs \$6 per linear foot, so the total cost would be \$138. A granite countertop at a kitchen store costs \$130 per square foot, so the total cost would be \$4940.

4. The perimeter would decrease by 2×4 or 8 m, because each length is decreased by 4 m.

5. Example: a) A photograph measuring 5 cm by 8 cm is enlarged to 10 cm by 16 cm. How many times larger is the area of the larger photo?

b) Since both the length and the width are doubled, the area of the enlargement is 4 times as large as the original.

6. Example: Divide the head and base of the artifact into two rectangles, each with two triangles missing, and calculate their areas.

7. Examples: A landscaper may need to calculate the area of a circular patio. A tiler may need to calculate the area of a circular tiling detail.

3.4 Surface Area of Three-Dimensional Objects, pages 152 to 163

On the Job 1

Puzzler

Block 2

Check Your Understanding

1. a) 225 in.^2 b) 4 m^2

2. a) 5 b) 7313 in.^2 c) 49.5 ft^2

3. a) 2.4 cm by 3.2 cm by 0.2 cm b) 17.6 cm^2

c) 472 cm^2 d) The surface area of the package is 26.8 or 27 times as great as the surface area of the SD card.

4. 23.04 m^2

5. a) 158 in.^2 b) 216 in.^2

On the Job 2

Check Your Understanding

1. a) 352 in.^2 b) 2714 cm^2

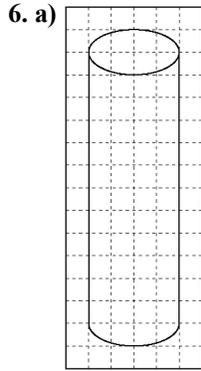
2. a) 319.2 cm^2 b) 471.2 cm^2

3. 628.3 cm^2

4. 191.6 ft^2

5. a) 54 mm b) 84 mm c) 188 cm^2

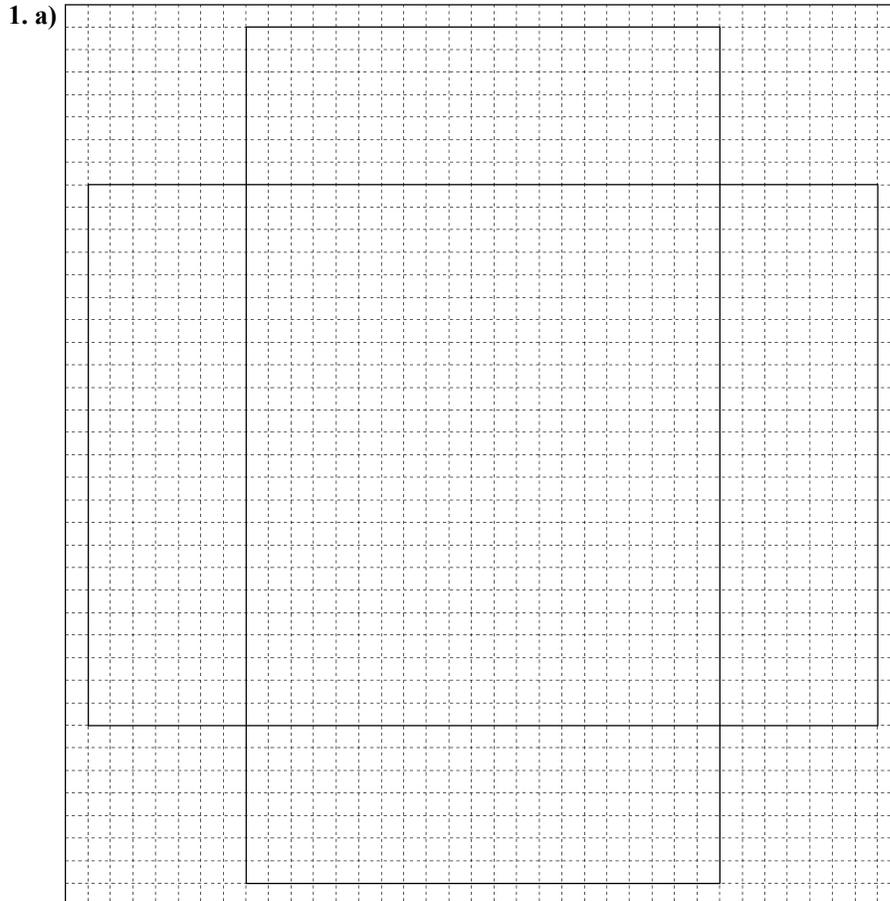




Scale: 1 square represents 2 cm²

- b) 653 cm²
7. 1910 ft²

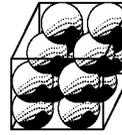
Work With It



- b) 704 ft² c) 7 rolls. They may need to buy an extra roll.

2. Example:

Step 1:



Step 2: 86 mm by 86 mm by 129 mm

Step 4: 591.68 cm²

3. a) 1571 m² **b)** 628 L

4. The circumference of the top opens out to a rectangle like the label of a soup can, or conversely, the width of the rectangle has to wrap around the circular top and bottom of the can.

5. The cube has a greater surface area than the cylinder, because the cylinder fits inside the cube with extra room to spare.

6. In the second line of the solution, Beth used the value 3 ft for the radius, but the radius is actually 1.5 ft.

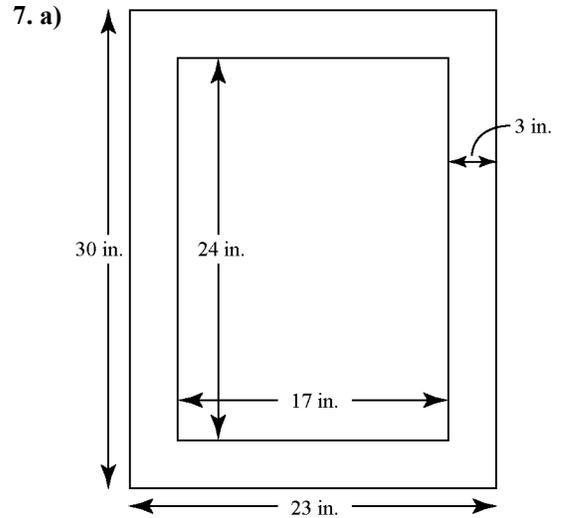


Skill Check, pages 164 to 165

1. a) Examples: Figure A: 1500 in.^2 ; Figure B: 675 ft^2
b) 11 ft^2 c) 79 yd^2
2. 432 ft^2
3. Examples: a) 40 m^2 b) 3500 cm^2 c) 2700 mm^2
4. a) 40.3 m^2 b) 3468 cm^2 c) 3217 mm^2 , 31.27 cm^2
5. 1000 cm^2
6. 9 times the area
7. a) 1818 in.^2 b) 847 cm^2

Test Yourself, pages 166 to 167

1. D
2. B
3. C
4. B
5. A
6. D



- b) 690 in.^2
8. a) \$658.50 (assuming you can buy half a square foot)
b) 180 tiles

