Section 1.4

1. Perimeter is the distance around the outside of a figure and is measured in units such as inches, feet, centimeters, meters, etc. Area is the space inside a figure and is measured in square units such as square inches, square feet, square centimeters, square meters, etc. The square units are often written as in², ft², cm², m², etc.

3. Answers may vary.

<table>
<thead>
<tr>
<th>Area:</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 square units</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Perimeter:</td>
</tr>
<tr>
<td>20 units</td>
</tr>
</tbody>
</table>

5. a. perimeter = 4.5 cm + 2.5 cm + 4.5 cm + 2.5 cm = 14 cm

   b. To estimate the area, count the whole squares and add the parts of squares;

   ![Partial Grid]

   area = 11.25 cm². (Answers may vary slightly)

   c. area = length * width

   = 4.5 cm * 2.5 cm

   = 11.25 cm²

   d. The areas are the same. (Estimates within 2 cm² are good)
7. a. We can fit 8 Chang farms in the 1 square mile figure, so \( \frac{1}{8} \) of the figure is shaded.

b. \( A = \text{length} \times \text{width} \)
\[
= \frac{1}{2} \text{ mile} \times \frac{1}{4} \text{ mile}
= \frac{1}{8} \text{ miles}^2
\]
The numerical answers are the same.

c. \( P = \frac{1}{2} + \frac{1}{4} + \frac{1}{2} + \frac{1}{4} \)
\[
= \frac{1}{4} + \frac{1}{2} + \frac{1}{4} + \frac{1}{4}
= \frac{6}{2}
= 3
\]
\[
\text{length} = \frac{1}{2} \text{ mile}
\text{width} = \frac{1}{4} \text{ mile}
\]
\[
= \frac{1}{2} \text{ mile} \times \frac{320 \text{ rods}}{1 \text{ mile}} = 160 \text{ rods}
\]
\[
= \frac{1}{4} \text{ mile} \times \frac{320 \text{ rods}}{1 \text{ mile}} = 80 \text{ rods}
\]
\[
\text{area} = \text{length} \times \text{width}
= 160 \text{ rods} \times 80 \text{ rods}
= 12,800 \text{ rods}^2
\]
\[
\text{perimeter}
= 160 \text{ rods} + 80 \text{ rods} + 160 \text{ rods} + 80 \text{ rods}
= 480 \text{ rods}
\]
ed. 1 mile = 320 rods
\[
\text{length} = \frac{1}{2} \text{ mile}
= \frac{1}{2} \text{ mile} \times \frac{320 \text{ rods}}{1 \text{ mile}} = 160 \text{ rods}
\]
\[
\text{width} = \frac{1}{4} \text{ mile}
= \frac{1}{4} \text{ mile} \times \frac{320 \text{ rods}}{1 \text{ mile}} = 80 \text{ rods}
\]
\[
\text{area} = \text{length} \times \text{width}
= 160 \text{ rods} \times 80 \text{ rods}
= 12,800 \text{ rods}^2
\]
\[
\text{perimeter}
= 160 \text{ rods} + 80 \text{ rods} + 160 \text{ rods} + 80 \text{ rods}
= 480 \text{ rods}
\]

e. 1 acre = 160 square rods = 160 rods\(^2\)
\[
\text{area} = 12800 \text{ rods}^2
= 12800 \text{ rods}^2 \times \frac{1 \text{ acre}}{160 \text{ rods}^2}
= 80 \text{ acres}
\]
f. From part (a) the Chang farm is \( \frac{1}{8} \) of the 1 square mile figure.
\[
\text{1 square mile} = 640 \text{ acres}
\]
\[
\text{area} = \frac{1}{8} \times 640 \text{ acres} = 80 \text{ acres}
\]

9. \[
A = \frac{1}{2} \times b \times h
= \frac{1}{2} \times 4 \times 12.6
= 25.2 \text{ feet}^2
\]
\[
P = 10.4 \text{ feet} + 5 \text{ feet} + 12.6 \text{ feet}
= 28 \text{ feet}
\]

11. a. \( A = 24 \text{ cm}^2 \)

b. \[
A = \frac{1}{2} \times (b_1 + b_2) \times h
= \frac{1}{2} \times (9 + 3) \times 4
= 24 \text{ cm}^2
\]

13. Circumference is the perimeter of a circle and Kevin was running around the perimeter of the circle.

15. Lynn's formula: \[
C = 2 \times \pi \times r
= 2 \times 3.14 \times 8.5
= 53.38 \text{ m}
\]
George's formula: \[
C = \pi \times d
= 3.14 \times 17
= 53.38 \text{ m}
\]
\[
(d = 2 \times r = 2 \times 8.5 = 17 \text{ m})
\]
Both formulas give the same circumference.

Skills and Review 1.4

17. a. Reorder the multiplication: \( 5 \times 7 = 7 \times 5 = 35 \).

b. Most of the facts in the multiplication table are duplicates, if you use the commutative property.

19. a. 6

b. 10

c. 100

d. 9

e. \( \frac{3}{5} \)

21. The digit 7 is in the thousands place so its value is 7000.

23. \[
\frac{5}{2} = \frac{1}{5} \times \frac{1}{5} = \frac{1}{25}
\]
As a decimal: \( \frac{1}{25} = .04 \)

25. \[
\frac{7}{5} = 1.4 \neq 1.25
\]