9-6 key

1 **a** 25 **b** 36 **c** 21 **d** $1\frac{2}{3}$ **e** 60

2 **a** 10 **b** 78 **c** 36 **d** 65 **e** $6\frac{1}{2}$

3 **a** 250 **b** 48 **c** 28 **d** 2.4 **e** 264

4 **a** 51 **b** 3.4 **c** 75 **d** $\frac{4}{5}$ **e** 80

5 **a** 12 **b** $2\sqrt{7}$ **c** 10 **d** 0.5 **e** 34 **f** $5\sqrt{7}$ **g** 72 **h** 45 **i** $12\sqrt{7}$

6 (20, 48, ?) belongs to the (5, 12, 13) Family. $4 \times 5 = 20$, $4 \times 12 = 48$, $4 \times 13 = 52$; the diagonal is 52.

7 If the base of the isos △ is 16, the height forms a rt △ with sides (8, 15, ?). This is the (8, 15, 17) family △ so the side of the △ is 17. Perimeter = 17 + 17 + 16 = 50 dm.

8 The rt △s belong to the (3, 4, 5) family. (?, 12, 15) = 3 (3, 4, 5) so the rt △ is (9, 12, 15). The opp rt △ (formed by drawing an alt to the base of the trapezoid) is ≅ to the first rt △. Bases of the △s are ≅ and = 9. The upper base is 35 – 2(9) = 17.

9 **a** Divide by 8.

$$\frac{16}{8} = 2, \frac{8\sqrt{5}}{8} = \sqrt{5}$$

$$2^2 + (\sqrt{5})^2 = x^2$$

$$\sqrt{4+5} = x$$

$$3 = x$$

Multiply by 8,

$x = 3 \cdot 8 = 24$

b Divide by 100,

$$\frac{700}{100} = 7, \frac{200}{100} = 2$$

$$2^2 + p^2 = 7^2$$

$$4 + p^2 = 49$$

$$p = \sqrt{49 - 4}$$

$$p = \sqrt{45} = 3\sqrt{5}$$

Multiply by 100,

$p = 300\sqrt{5}$

10 UD = 15, using reduced △ and Pythagorean triple concepts.

$$8^2 + 15^2 = (QD)^2$$

$$64 + 225 = (QD)^2$$

$$289 = (QD)^2$$

$$17 = QD$$

11 CB = 11 – 3 = 8,

BA = 11 – (–4) = 15

$CA^2 = 8^2 + 15^2$

(8, 15, 17) is a Pythagorean triple, so CA = 17.

P = 17 + 8 + 15 = 40

$A = \frac{1}{2}(8)(15) = 60$

12 In a rhombus the diagonals are ⊥ bis of one another, so

$\overline{RP} \cong \overline{PO}$, RP + PO = 48 $\quad \overline{HP} \cong \overline{PM}$, HP + PM = 14

RP = 24, PO = 24 $\quad$ HP = 7, PM = 7

$RP^2 + PM^2 = RM^2$ and RP = 24, PM = 7

(7, 24, 25) is a Pythagorean triple so RM = 25.

All the sides of a rhombus are ≅, so P = 4(25) = 100.

13 For Mary, $d = rt$, $d = (10)(1\frac{1}{2}) = 15$

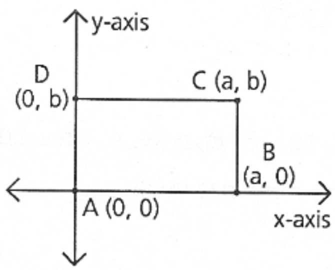
For Larry, $d = rt$, $d = (16)(1\frac{1}{2}) = 24$

Then divide 15 and 24 by 3

$$\begin{aligned} \text{and } 5^2 + 8^2 &= x^2 \\ 25 + 64 &= x^2 \\ \sqrt{89} &= x \end{aligned}$$

Now multiply by 3, $3\sqrt{89} \approx 28$ km apart

14



Given ▭ ABCD, prove $\overline{AC} \cong \overline{BD}$.

$AC = \sqrt{(0-a)^2 + (0-b)^2} = \sqrt{a^2 + b^2}$

$BD = \sqrt{(a-0)^2 + (0-b)^2} = \sqrt{a^2 + b^2}$

$AC = BD$, $\therefore \overline{AC} \cong \overline{BD}$.

15 **a** Divide 42 and 150 by 6. The $\triangle$ belongs to the (7, 24, 25) family. Missing side is 6(24) or 144.

b Multiply by 8. The $\triangle$ belongs to the (3, 4, 5) family. Missing side is $\frac{(3)}{8}$ or $\frac{3}{8}$.

c
$$\begin{aligned} \sqrt{4^2} + \sqrt{3^2} &= x^2 \\ 4 + 3 &= x^2 \\ x &= \sqrt{7} \end{aligned}$$

16 **a** In the 1st $\triangle$, $15^2 + y^2 = 17^2$

(8, 15, 17) is a Pythagorean triple, so $y = 8$.

In the 2nd $\triangle$,

$6^2 + y^2 = z^2$

$6^2 + 8^2 = z^2$

$(2 \cdot 3)^2 + (2 \cdot 4)^2 = z^2$ and (3, 4, 5) is a Pythagorean Triple, so $z = 5 \cdot 2 = 10$.

In the 3rd $\triangle$,

$z^2 + w^2 = 26^2$

$10^2 + w^2 = 26^2$

$(5 \cdot 2)^2 + w^2 = (13 \cdot 2)^2$

(5, 12, 13) is a Pythagorean triple, so $w = 12 \cdot 2 = 24$

In the 4th $\triangle$,

$w^2 + x^2 = 25^2$

(7, 24, 25) is a Pythagorean triple, $x = 7$.

b The 2 lines are ∥ by corr ∠s ≅ ∥ lines. If a line is ∥ to 1 side of a $\triangle$ and intersects the other 2 sides, it divides them proportionally, so $\frac{12}{3} = \frac{y}{5}$

$3y = 60$, $y = 20$

The large $\triangle$ belongs to the (3, 4, 5) family since (15, ?, 25) = 5(3, 4, 5); so the missing leg is 20.

17 **a** $PQ = \sqrt{(-1-(-4))^2 + 4^2} = \sqrt{9 + 16} = 5$

$RS = \sqrt{(11-8)^2 + (-4)^2} = \sqrt{9 + 16} = 5$

$QR = 9$, $PS = 15$; $QR \neq PS$

$\overline{QR} \parallel \overline{PS}$, $PQ = RS$, $\therefore$ PQRS is an isos trap.

b $h = 4$

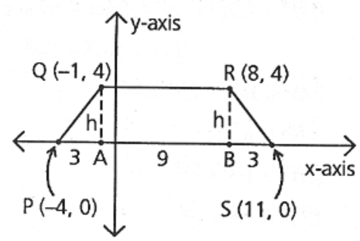
$A = \frac{h}{2}(b_1 + b_2)$

$= \frac{4}{2}(9 + 15) = 48$

c $PR^2 = 4^2 + 12^2 = 160$

$PR = \sqrt{4 \cdot 4 \cdot 10}$

$= 4\sqrt{10}$



18 Find the hypotenuse of each $\triangle$ formed by connecting the path of the submarine.

$$\begin{aligned} 1^2 + 1^2 &= c^2 \\ 1 + 1 &= c^2 \\ c &= \sqrt{2} \end{aligned}$$

There are 20 small $\triangle$s with one km left over. So $20\sqrt{2} + 1$ =dist from starting pt.

$20(1.4142) + 1 \approx 28 + 1$ approximately 29 km