

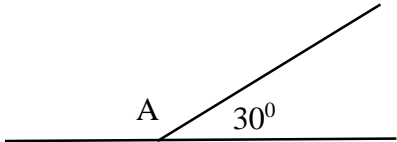
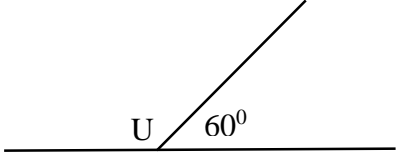
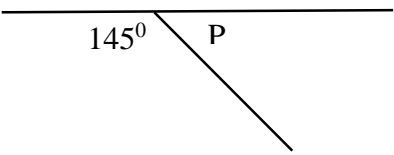
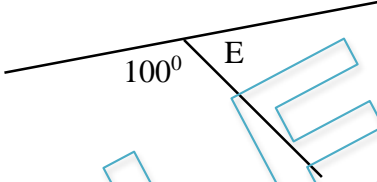
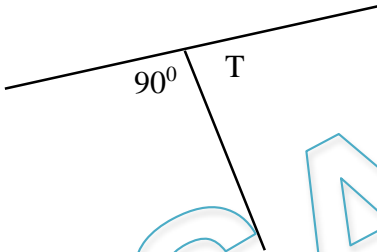
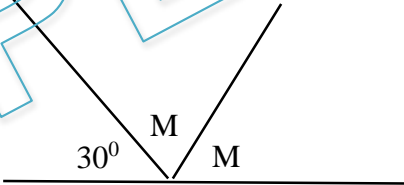
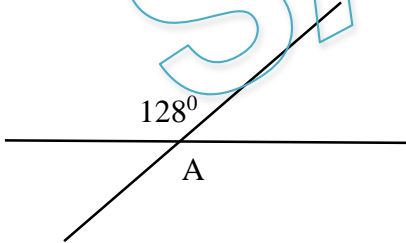
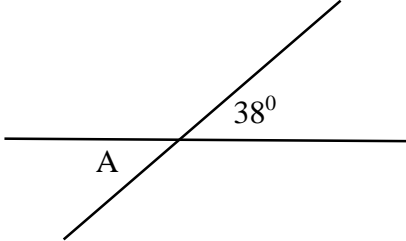
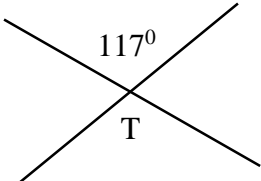
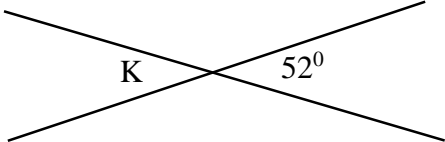
## 10.1 Angles on a Straight Line and Vertically Opposite Angles

### Te Arawa's Captain

Some accounts say that Te Arawa was the largest *waka*<sup>1</sup> that came to *Aotearoa*<sup>2</sup> from *Hawaiki*<sup>3</sup>. It was a *waka hourua*<sup>4</sup> with a *whare*<sup>5</sup> built on it.

To find out what the name of the Te Arawa's captain was, calculate the value of the lettered angles below. The value of the angles will give the puzzle code.

**Note:** Do not measure the angles. They are not drawn to scale.

117 <sup>0</sup>	38 <sup>0</sup>	75 <sup>0</sup>	128 <sup>0</sup>	70 <sup>0</sup>	90 <sup>0</sup>	80 <sup>0</sup>	70 <sup>0</sup>	52 <sup>0</sup>	150 <sup>0</sup>	35 <sup>0</sup>	120 <sup>0</sup>	150 <sup>0</sup>

<sup>1</sup>waka (canoe); <sup>2</sup>Hawaiki (the ancient homeland of the Māori); <sup>3</sup>Aotearoa (New Zealand);

<sup>4</sup>waka hourua (double-hulled canoe); <sup>5</sup>whare (house).

## 10.2 Angles at a Point

### Te Arawa's Builders

Some accounts say that Te Arawa was the largest *waka hourua*<sup>1</sup> that came to *Aotearoa*<sup>2</sup> from *Hawaiki*<sup>3</sup>. A *waka hourua*, capable of carrying a crew as well as over one hundred passengers, is one of the great achievements of ancient Māori society. Building a *waka* was a long process and required the special skills and labour of many people led by a principal *waka* builder.

To find out what the names of Te Arawa's principal builders were, find the value of the lettered angles below. The value of the angles will give the puzzle code.

**Note:** Do not measure the angles. They are not drawn to scale.


90°	75°	80°	100°	135°	70°	120°	160°	150°	80°	72°	70°	50°	80°	135°	80°

75°	80°	100°	70°	160°	120°	110°	70°	90°	100°	160°

<sup>1</sup>*waka hourua* (double-hulled canoe); <sup>2</sup>*Aotearoa* (New Zealand); <sup>3</sup>*Hawaiki* (the ancient homeland of the Māori)

### 10.3 Angles on Parallel Lines

#### The Second Action Te Arawa’s Crew Performed After Landing

According to some accounts, one of the largest *waka hourua*<sup>1</sup>, named Te Arawa, sailed from *Hawaiki*<sup>2</sup> and reached Aotearoa<sup>3</sup> at *Waiariki*<sup>4</sup>. After unloading their waka, the first action they did was to set up a *Tūāhu*<sup>5</sup> to thank the *Hawaikian* gods for their safe journey. What was the second action that Te Arawa’s crew performed?

To find out the answer to the question, find the values of the lettered angles below. The values of the angles will give the puzzle code.

**Note:** Do not measure the angles. They are not drawn to scale.


76°	151°	120°	58°	5°	62°	70°	29°	55°	76°	120°	60°

80°	104°	30°	29°	77°	29°	5°	105°	120°	120°	60°	105°

<sup>1</sup>*waka hourua* (double-hulled canoe); <sup>2</sup>*Hawaiki* (the ancient homeland of the Māori); <sup>3</sup>*Aotearoa* (New Zealand); <sup>4</sup>*Waiariki* (the Bay of Plenty); <sup>5</sup>*Tūāhu* (sacred place).

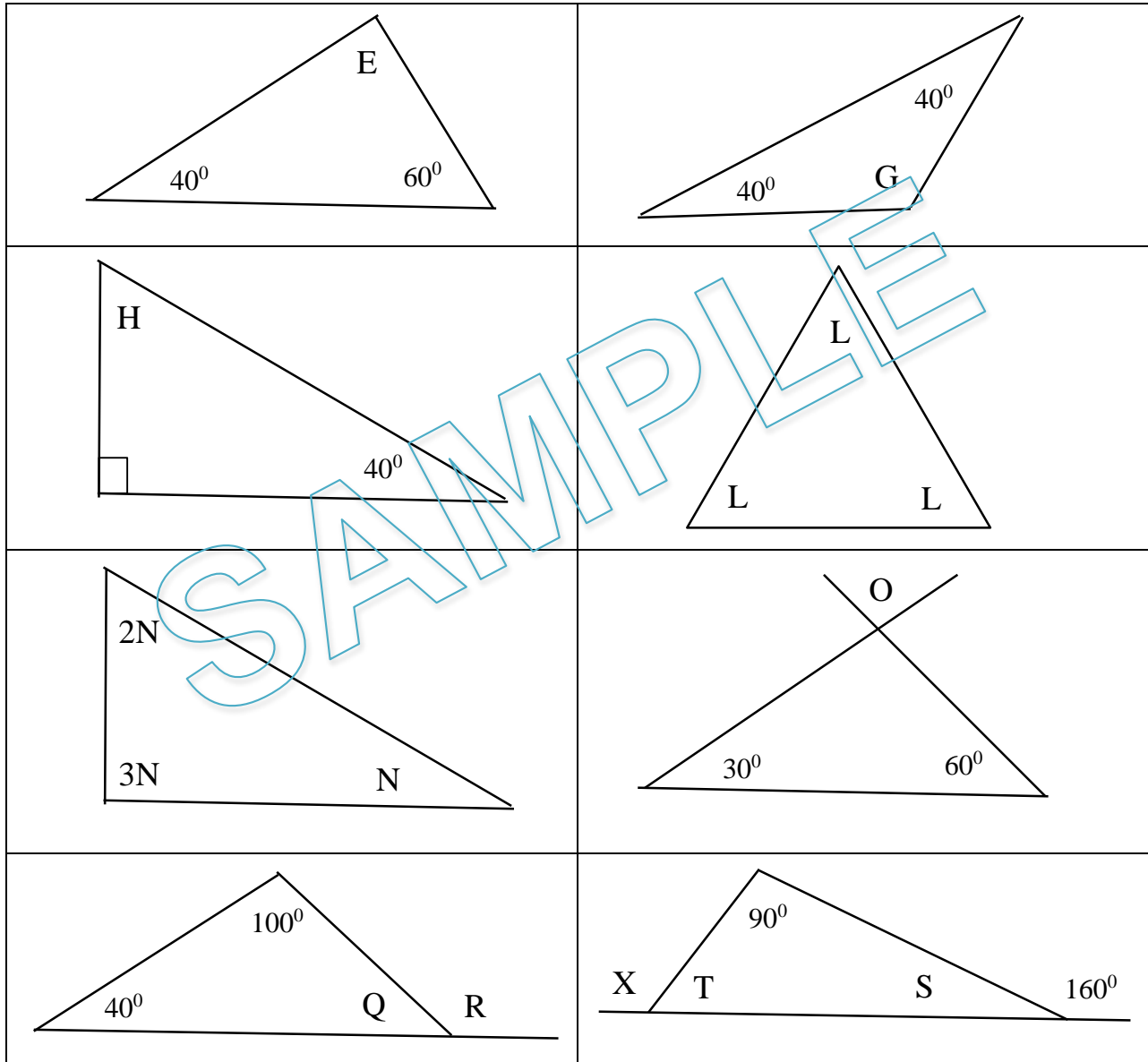
### 10.4 Angles in a Triangle

#### A Little Lake Near Rotorua

Many place names in Aotearoa are associated with the waka Te Arawa people. One account says that when Īhenga – one of the *rangatira*<sup>1</sup> of Te Arawa – went hunting with his two dogs, one of them returned with a kiwi in its mouth and shook water all over him. In this way, Īhenga discovered a little lake near Rotorua.

To find out the name of the little lake discovered by Īhenga, find the values of the lettered angles below. The values of the angles will give the puzzle code.

**Note:** The diagrams are not drawn to scale.



100°	90°	15°	70°	90°	15°	70°	50°	800	15°	30°	80°	110°	70°

600	800	700	700	800	1400

40°	30°	20°	30°	50°	20°	50°

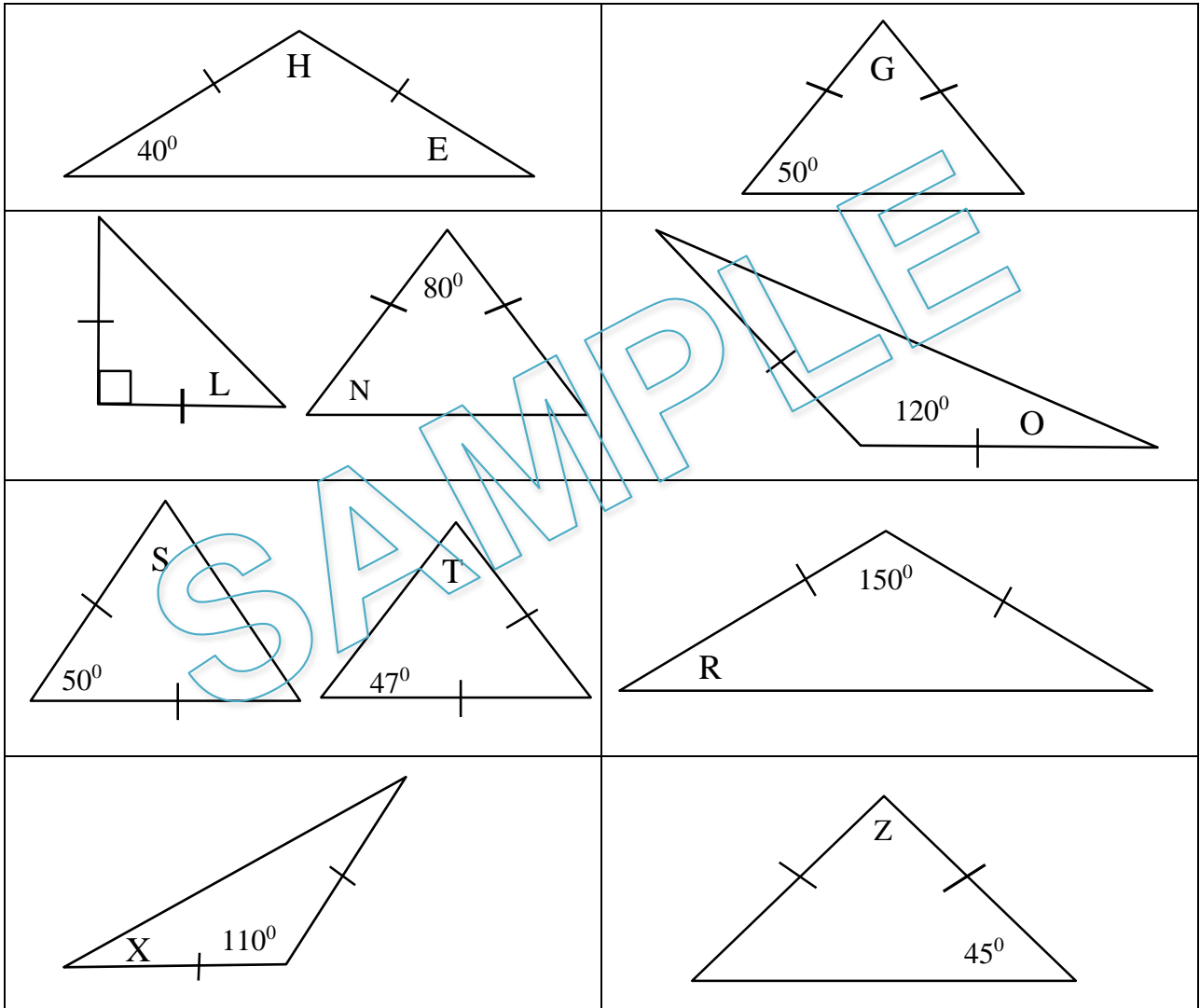
<sup>1</sup>rangatira (chief)

### 10.5 Angles in an Isosceles Triangle

#### The Great Lake Discovered by Ngātoro

Some accounts say that Te Arawa was the largest *waka hourua*<sup>1</sup> that came to *Aotearoa*<sup>2</sup> from *Hawaiki*<sup>3</sup>. Te Arawa people settled and explored their new land. Many place names are associated with their navigator, Ngātoro I Rangī. He found a lake so large, he called it *Te Moana*<sup>4</sup>. To find out the modern name of the great lake which Ngātoro I Rangī called *Te Moana*, calculate the values of the unknown angles below. The answers and the related letters will give the puzzle code.

**Note:** The diagrams are not drawn to scale.



80°	30°	7°	47°	30°	9°	47°	100°	40°	7°	50°	40°	35°	47°

45°	40°	47°	47°	40°	15°	9°	65°	90°	47°	30°	50°

<sup>1</sup>waka hourua (double-hulled canoe); <sup>2</sup>Aotearoa (New Zealand); <sup>3</sup>Hawaiki (the ancient homeland of the Māori); <sup>4</sup>Te Moana (the sea)