



Compass direction

Mana Maths

Te reo Māori terms



kāpehu

compass

Open in Te Aka

ahunga

direction

Open in Te Aka

raki

north

Open in Te Aka

rāwhiti

east

Open in Te Aka

Compass Directions and Bearings



Key idea



A **bearing** names a direction as an angle measured **clockwise from north**, written with three digits, e.g. 045° .

The eight bearings



N = 000° E = 090°
S = 180° W = 270°
NE = 045° SE = 135°
SW = 225° NW = 315°

Example



North-east is halfway between north (000°) and east (090°), so its bearing is 045° .

Common mistake

Always measure **clockwise from north** — never from east. Keep three digits: write 045° , not 45° .



Reverse Bearings and Turning



Key idea

A **reverse bearing** points straight back the way you came. Add 180° if the bearing is under 180° ; subtract 180° if it is 180° or more.

Example: reverse

A boat sails on 060° .
 $060^\circ + 180^\circ = 240^\circ$, so the reverse bearing is 240° .

Example: turning past north

A plane on 300° turns 90° clockwise.
 $300^\circ + 90^\circ = 390^\circ$. Subtract 360° : the new bearing is 030° .

Common mistake

A bearing must stay between 000° and 360° . If a turn takes you over 360° , **subtract** 360° .



Start Tasks



1. With , which direction is opposite north?

2. With , which direction is opposite east?

3. With , name the direction halfway between north and east.

4. With , name the direction halfway between south and west.

5. You are facing north. Turn a quarter-turn clockwise. Which direction now?

6. You are facing east. Turn a half-turn. Which direction now?

7. You are facing south. Turn a quarter-turn anticlockwise. Which direction now?

8. You are facing west. Turn a three-quarter turn clockwise. Which direction now?

9. Write the three-figure bearing for north.

Start Tasks – Answers



1. south

4. south-west

7. east

2. west

5. east

8. north

3. north-east

6. west

9. 000°

Start Tasks



10. Write the three-figure bearing for east.

11. Write the three-figure bearing for south-west.

12. Write the three-figure bearing for north-east.

13. Which compass direction matches bearing 180° ?

14. Which compass direction matches bearing 315° ?

15. Which compass direction matches bearing 270° ?

16. The lake is directly east of the hut. In which direction do you walk from the hut to the lake?

17. The park is directly south of the school. In which direction do you walk from the school to the park?

18. The pool is north-west of the library. Which direction is the pool from the library?

Start Tasks – Answers



10. 090°

13. south

16. east

11. 225°

14. north-west

17. south

12. 045°

15. west

18. north-west

Start Tasks



19. How many degrees clockwise is the turn from bearing 090° to bearing 180° ?

20. How many degrees clockwise is the turn from bearing 270° to bearing 000° ?

21. How many degrees clockwise is the turn from north to south-east?

22. Start facing east. Turn 45° clockwise. Which direction now?

23. Start facing south. Turn 90° anticlockwise. Which direction now?

24. Start facing north-west. Turn 90° clockwise. Which direction now?

25. Start facing south-west. Turn 180° . Which direction now?

26. A boat sails on bearing 090° . Is it travelling north, east, south, or west?

27. A hiker walks north, then turns right. Which direction does the hiker face now?

Start Tasks – Answers



19. 90°

22. south-east

25. north-east

20. 90°

23. east

26. east

21. 135°

24. north-east

27. east

Build Tasks



1. Write the three-figure bearing for north-west.

2. Write the three-figure bearing for south-east.

3. Write the three-figure bearing for west.

4. Which compass direction matches bearing 045° ?

5. Which compass direction matches bearing 225° ?

6. Which compass direction matches bearing 135° ?

7. A ship travels from A to B on bearing 060° . What is the reverse bearing from B back to A?

8. A cyclist travels from P to Q on bearing 210° . What is the reverse bearing from Q to P?

9. A plane travels from X to Y on bearing 315° . What is the reverse bearing from Y to X?

Build Tasks – Answers



1. 315°

4. north-east

7. 240°

2. 135°

5. south-west

8. 030°

3. 270°

6. south-east

9. 135°

Build Tasks



10. Through how many degrees clockwise do you turn from bearing 020° to 110° ?

11. Through how many degrees clockwise do you turn from bearing 145° to 235° ?

12. Through how many degrees clockwise do you turn from bearing 300° to 030° ?

13. A cabin is due north of a river. What bearing would you walk from the river to the cabin?

14. A tower is south-west of a stadium. What bearing is the tower from the stadium?

15. A shop is due west of a library. What bearing is the shop from the library?

16. A car leaves town on bearing 090° , then turns 90° clockwise. What new bearing is it on?

17. A walker leaves camp on bearing 180° , then turns 45° anticlockwise. What new bearing is it on?

18. A yacht leaves port on bearing 315° , then turns 90° clockwise. What new bearing is it on?

Build Tasks – Answers



10. 90°

13. 000°

16. 180°

11. 90°

14. 225°

17. 135°

12. 90°

15. 270°

18. 045°

Build Tasks



19. From the hall, the field is east. From the field, the courts are north. What direction are the courts from the hall?

20. From the gate, the office is south. From the office, the shed is west. What direction is the shed from the gate?

21. A boat sails on bearing 135° . Is it travelling NE, SE, SW, or NW?

22. A drone flies on bearing 270° . Which compass direction is that?

23. A ranger walks north-west from camp. Which three-figure bearing matches this?

24. A path has bearing 225° . Which compass direction matches this?

25. A pilot turns from 350° to 080° . How many degrees clockwise is the turn?

26. A hiker walks east to a bridge, then south to a hut. Which compass direction is the hut from the start?

27. Write a bearing that is exactly opposite to 045° .

Build Tasks – Answers



19. north-east

22. west

25. 90°

20. south-west

23. 315°

26. south-east

21. south-east

24. south-west

27. 225°

Push Tasks



1. A rescue boat leaves harbour on bearing 040° . What is the reverse bearing back to harbour?

2. A tram leaves the depot on bearing 225° . What reverse bearing returns to the depot?

3. A plane heads on bearing 305° . What reverse bearing returns to the airport?

4. Start on 090° . Turn 135° clockwise. What is the new bearing?

5. Start on 315° . Turn 90° anticlockwise. What is the new bearing?

6. Start on 180° . Turn 225° clockwise. What is the new bearing?

7. A track has bearing 045° . What reverse bearing labels the return track?

8. A lighthouse is north-east of the harbour. What bearing is that?

9. A campsite is on 225° from the river. Which compass direction is that?

Push Tasks – Answers



1. 220°

4. 225°

7. 225°

2. 045°

5. 225°

8. 045°

3. 125°

6. 045°

9. **south-west**

Push Tasks



10. From the school, the museum is east. From the museum, the stadium is south-east. Which compass direction is the stadium from the school?

13. A drone turns from bearing 340° to 070° . How many degrees clockwise is this turn?

16. A path has bearing 135° . Another path is exactly opposite. What bearing does the opposite path have?

11. From the wharf, a yacht sails north, then north-west. Which general direction is the yacht from the wharf at the end?

14. A truck turns from bearing 210° to 030° . How many degrees clockwise is this turn?

17. Explain in one sentence why reverse bearings differ by 180° .

12. A boat turns from bearing 120° to 300° . How many degrees clockwise is this turn?

15. A bus heads west, then turns left. Which compass direction is it now heading?

18. A helicopter flies on bearing 000° , then turns right through 225° . What new bearing does it follow?

Push Tasks – Answers



10. south-east

13. 90°

16. 315°

11. north-west

14. 180°

17. Because opposite directions form a straight line, so the turn between them is 180°

12. 180°

15. south

18. 225°

Push Tasks



19. A kayaker travels from A to B on bearing 075° . B to C is due south. Which quadrant of the compass best describes the direction from A to C?

22. Which bearing is closer to south-east: 120° or 150° ? Explain briefly.

25. A ship heads on bearing 250° . Which of the four main directions is it closest to?

20. A tram goes east to the station, then north to the park, then west to the gallery. Which compass direction is the gallery from the station?

23. A route goes north-east, then south-east. Is the endpoint north, east, south, or west of the start?

26. A rescue team moves south-west from base camp. What reverse bearing brings them straight back?

21. A survey line is labelled 290° . Is it closer to west or north?

24. A pilot wants to fly due west. Which three-figure bearing should be set?

27. A bearing of 405° is written by mistake. Write the correct equivalent bearing between 000° and 360° .

Push Tasks – Answers



19. north-east

22. 150° , because south-east is 135° and 150° is only 15° away.

25. west

20. north-west

23. east

26. 045°

21. west

24. 270°

27. 045°