Grade 7 Math, Explained

Unit 20 · Bearing and Scale Drawing

HARDER PRACTICE QUESTIONS

Full marks 35

Write your answers on separate paper. Show your working. North is straight up on every drawing, and every bearing is written with three figures. For a drawing, use a ruler and a protractor, and write the scale under it. Unless a question names its source, the places and measurements on this sheet are made up for the problems.

1 Spot the errors [4]

Apekshya wrote these four. Each one is wrong. Correct it, and say what went wrong.

i. A place to the north-west has a bearing of 045°, because it is 45° from north.

ii. The scale 1 cm = 2 m can be written as 1 : 2.

iii. On a map drawn at 1 : 50 000, two villages 4 cm apart are 200 m apart.

iv. A ground drawn at 1 cm = 5 m comes out bigger than the same ground drawn at 1 cm = 2 m.

2 Turning on a ridge [4]

Lhakpa stands on a ridge with a compass.

i. She faces a bearing of 070° and turns 125° clockwise. On what bearing does she face now?

ii. Next she faces 300° and turns 90° clockwise. On what bearing does she face now?

iii. Then she faces 040° and turns 100° counter-clockwise. On what bearing does she face now?

iv. A temple is on a bearing of 050° from her, and a tower on 310°. What is the smaller angle between the two directions?

3 Bearings on squared paper [4]

Draw an X-axis and a Y-axis on squared paper, one unit a square. Stand at the origin O; north is up the Y-axis.

i. Write the bearing from O of $A(4, 4)$, $B(-3, 0)$, $C(5, -5)$ and $D(0, -2)$.

ii. Write two points with whole-number coordinates whose bearing from O is 315°.

iii. Is the bearing of $P(3, 4)$ from O more or less than 045°? Give a reason without measuring.

iv. Find the distance OP.

4 One scale, two ways [4]

i. Write the scale 1 cm = 5 km as a ratio.

ii. A map is drawn at 1 : 25 000. What does 1 cm on it stand for? Two schools are 7.2 cm apart on the map. How far apart are they?

iii. A road 3.5 km long is drawn on the same map. How long is it on the map?

iv. A football ground 100 m long is drawn 4 cm long. Write the scale as a ratio.

5 A room on a plan [4]

On a plan of a house drawn at 1 : 50, a rectangular room measures 8 cm by 6 cm.

i. Find the real length and breadth of the room.

ii. Find the area of the room on the plan, and its real floor area in square centimeters and in square meters.

iii. Shishir says: “Every length is 50 times the plan’s, so the floor is 50 times the area on the plan.” Is he right? How many times is it?

iv. Find the length of the room’s diagonal on the plan, and the real diagonal. Is the diagonal 50 times as long, like the sides?

6 Back on Poon Hill [4]

From Poon Hill, the unit's table gives these bearings and straight-line distances: Dhaulagiri 330°, about 38 km; Annapurna I 030°, about 25 km; Annapurna South 041°, about 17 km; Machhapuchhre 067°, about 28 km.

i. At a scale of 1 cm = 4 km, how long is the line to each peak?
ii. Find the angle at Poon Hill between the lines to Dhaulagiri and to Annapurna I.
iii. Find the angle between the lines to Annapurna South and to Machhapuchhre.
iv. A half-circle protractor reaches only 180°. How do you draw the line to Dhaulagiri with one? A trekker faces Dhaulagiri and turns clockwise until she faces Machhapuchhre: how far does she turn?

7 Choose the scale [4]

A school ground is a rectangle 80 m long and 60 m wide. It is to be drawn on a sheet 15 cm by 10 cm.

i. Which of these scales gives the biggest drawing that fits on the sheet: 1 cm = 4 m, 1 cm = 8 m or 1 cm = 10 m? Give the size of the drawing for each.
ii. Write the scale you chose as a ratio.
iii. Find the length of the ground's diagonal on your drawing, and the real length it stands for.
iv. A student walks from one corner to the opposite corner straight across the ground, instead of along two sides. How much shorter is his walk?

8 Think: a clock as a compass [4]

Hang a clock on a wall with its 12 straight up, as north. A hand's bearing is then the angle it has turned clockwise from 12.

i. Find the bearing of the minute hand at 20 minutes past the hour, and at 45 minutes past.
ii. Find the bearing of the hour hand at exactly 4 o'clock, and at exactly 9 o'clock.
iii. At half past 4, the hour hand is halfway between 4 and 5. Find the bearing of each hand, and the angle between them.
iv. Chiring says: "At a quarter past 3, both hands point east, on 090°." Is he right? Give a reason, and find the angle between the hands.

9 Make your own [3]

i. Write a bearing between 180° and 270°, and say in words where it lies among the eight directions.
ii. Write a scale both ways, as 1 cm = … and as a ratio, and find what 7 cm on it stands for.
iii. Write the bearings of two places from a point O so that the lines to them make a right angle, one of the bearings more than 270°.