National 4 Relationships Revision 1

1.   Complete the table below for $y = 3x - 1$.

x	1	2	3
y			

Draw the line $y = 3x - 1$.   **(3)**
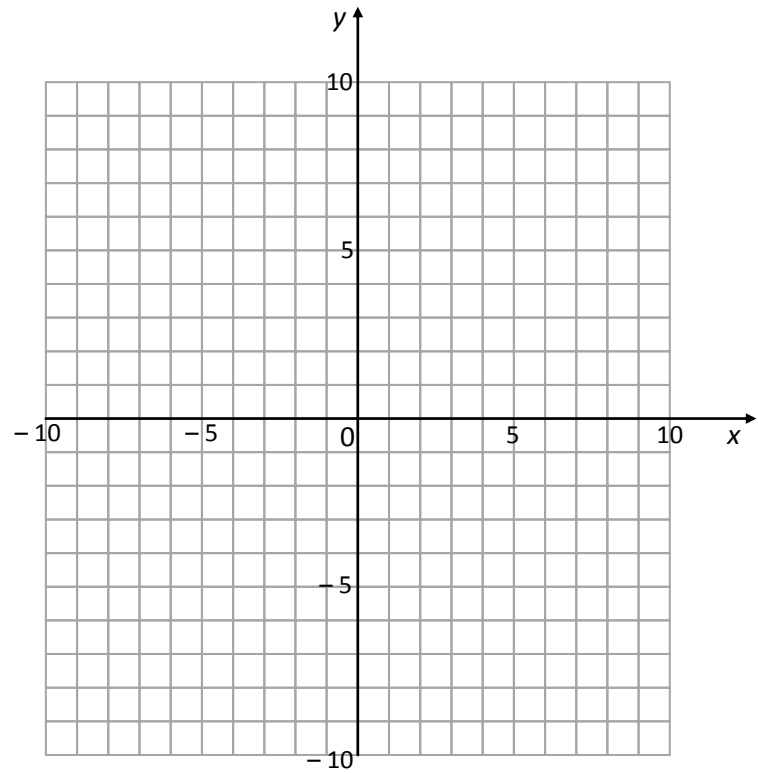
2. Complete the table below for $y = \dfrac{1}{2}x + 2$

x	2	4	6
y			

Draw the line $y = \dfrac{1}{2}x + 2$. **(3)**
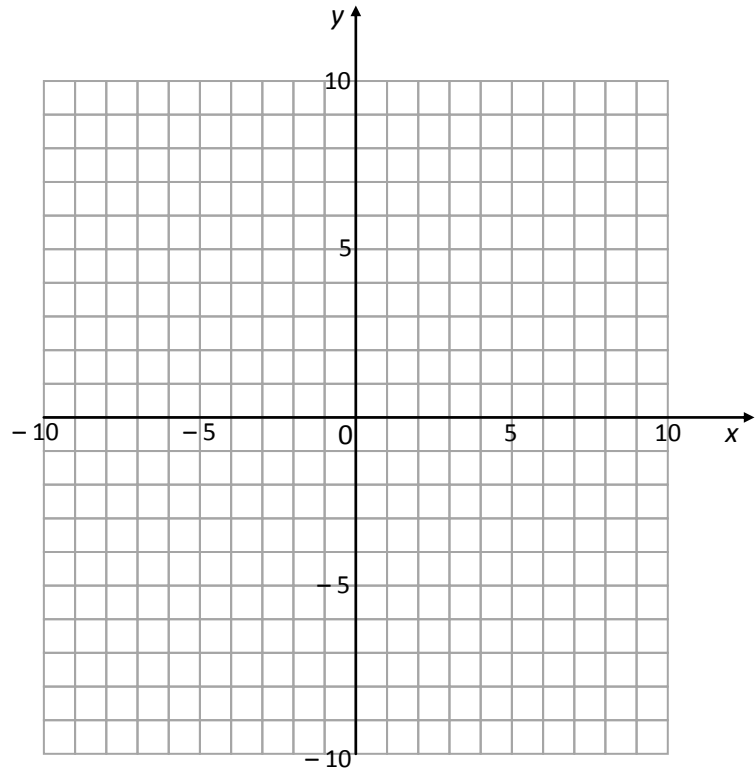
3. Complete the table below for $y = 3x - 2$

x	1	2	3
y			

Draw the line $y = 3x - 2$ **(3)**
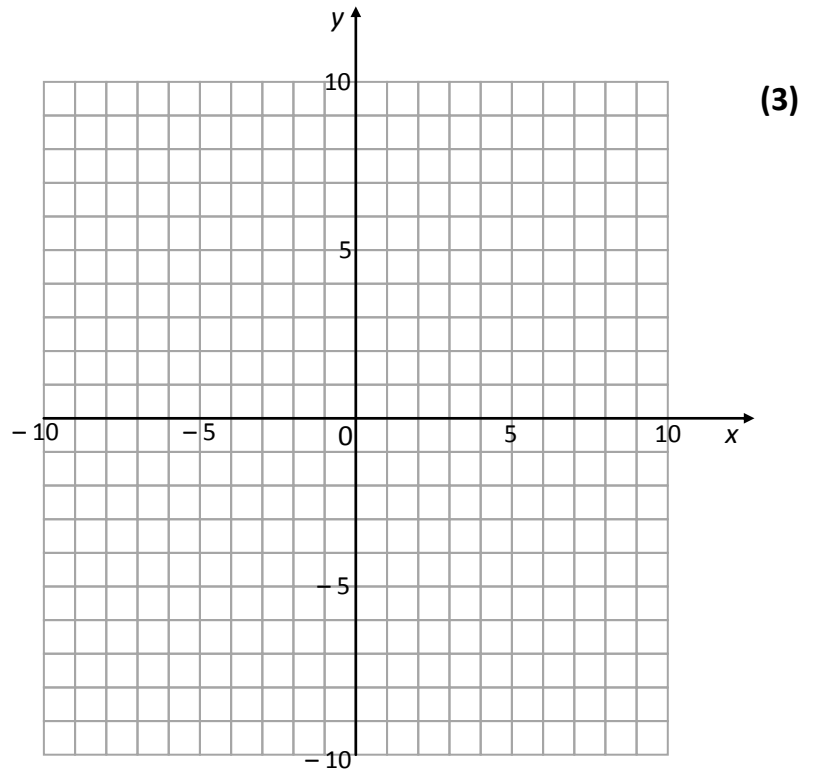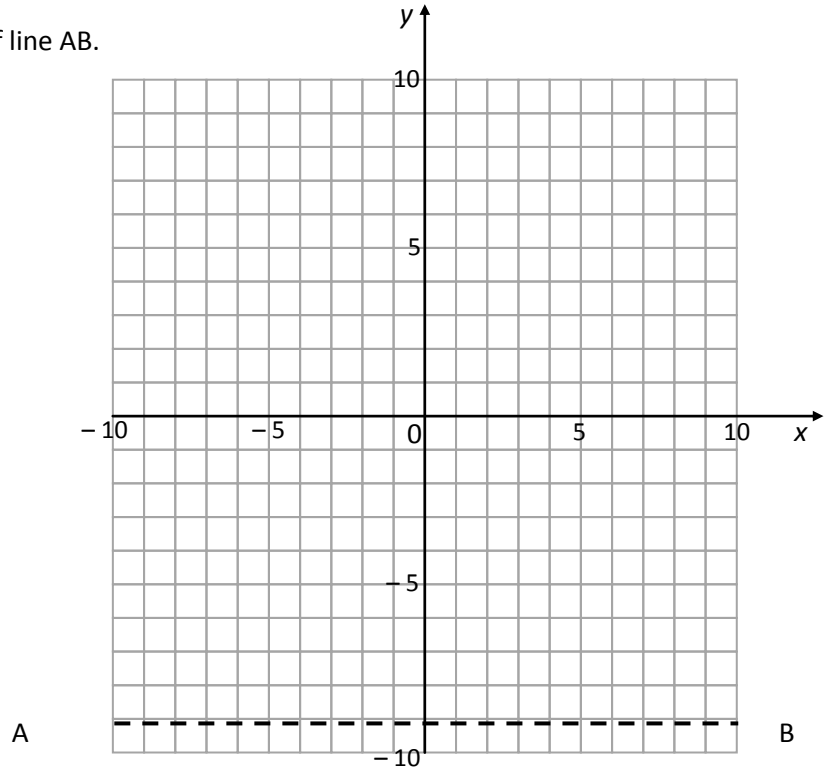

4. Line GH is shown on the grid below.

Write down the equation of line GH. **(1)**
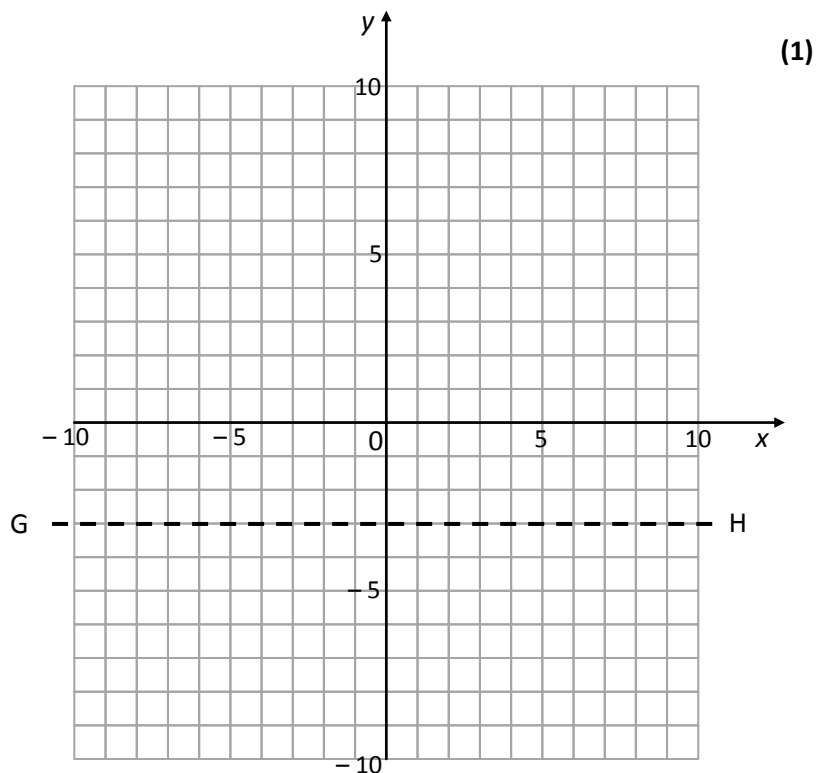
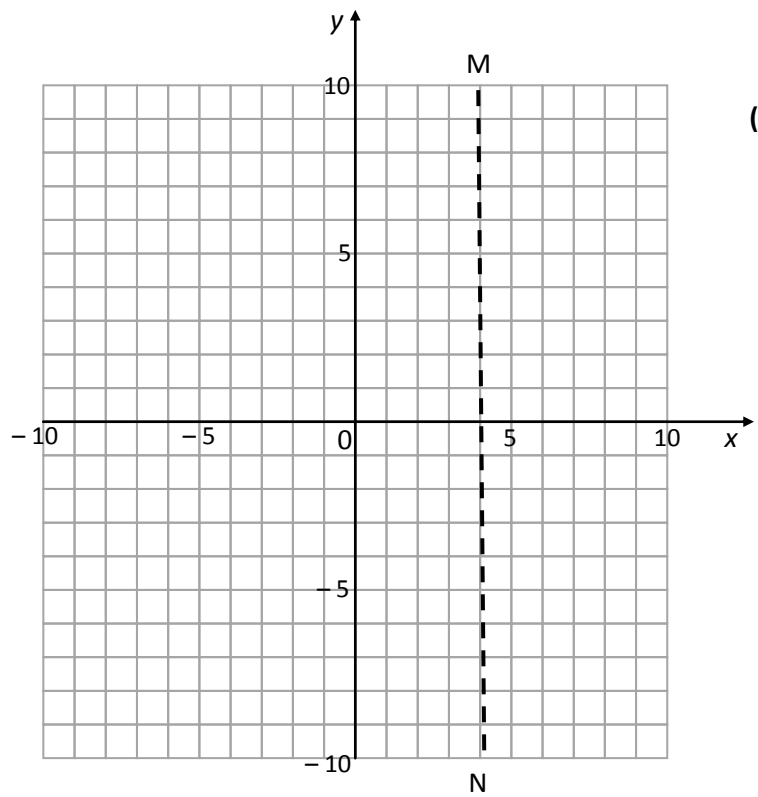**5.** Line AB is shown on the grid below.

Write down the equation of line AB. **(1)**

6. Line MN is shown on the grid below.

Write down the equation of line MN. **(1)**

7. Solve the following equation:

$$5x + 9 = -11$$ **(2)**

8. Solve the following equation:

$$4y - 3 = 13$$ **(2)**

9. Solve the following equation:

$$8k + 3 = -21$$ **(2)**

10. The formula for find the circumference of a circle is $C = \pi D$.

Change the subject of the formula to *D.* **(1)**

11. A formula used in Physics to find wavelength is $v = f\lambda$.

Change the subject of the formula to *f*. **(1)**

12. To find the Force in a moving object we use the formula F= ma

Change the subject of the formula to *a*. **(1)**

13. Change the subject of the formula

$$p = 4m - 3 \qquad \text{to } m.$$ **(2)**

14. Change the subject of the formula

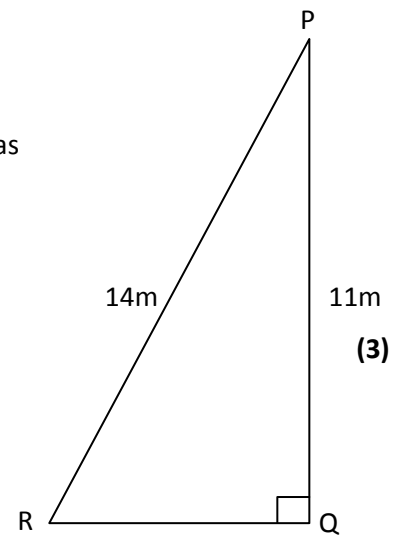$$y = 2x - 3 \qquad \text{to } x.$$ **(2)**

15. Change the subject of the formula

$$v = u + 6t \qquad \text{to } t.$$ **(2)**

16. A piece of lawn in my garden is in the shape of a right – angled triangle as

shown by triangle PQR in the diagram.

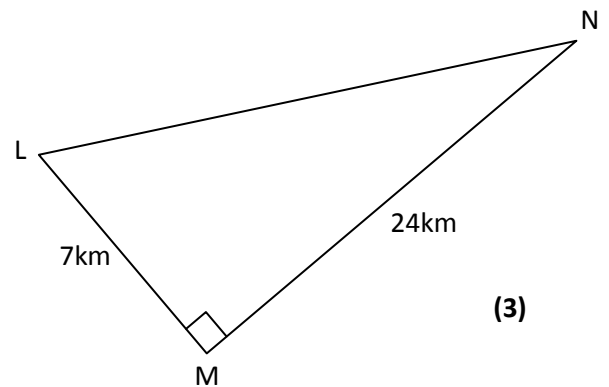The distance PR is 14 metres and PQ is 11 metres.

Calculate the length RQ (in metres).

(3)

P

14m

11m

R

Q

17. Triangle LMN represents a road network. It is a right-angled triangle.

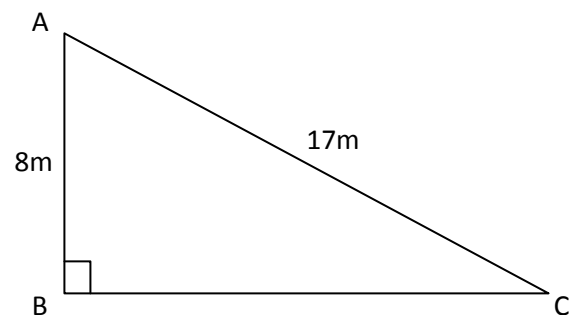The distance from L to M is 7 kilometres and from M to N

is 24 kilometres.

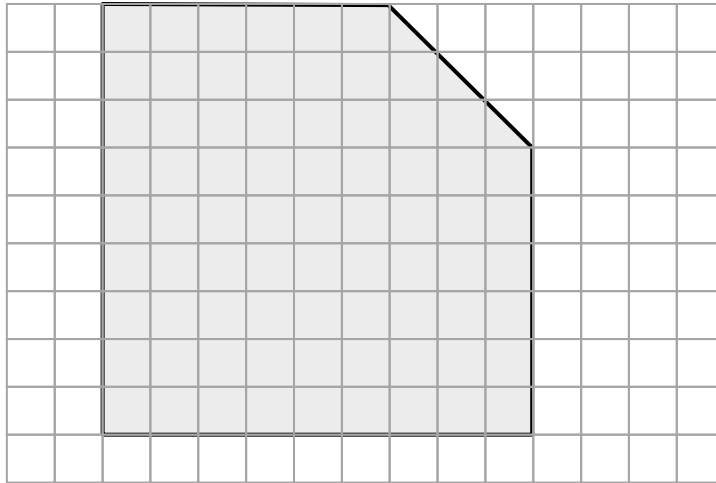Calculate the distance from L to N (in kilometres).

(3)

N

L

24km

7km

M

18. Triangle ABC is a right-angled triangle as shown in the diagram below.

AB is 8 metres long and AC is 17 metres long.

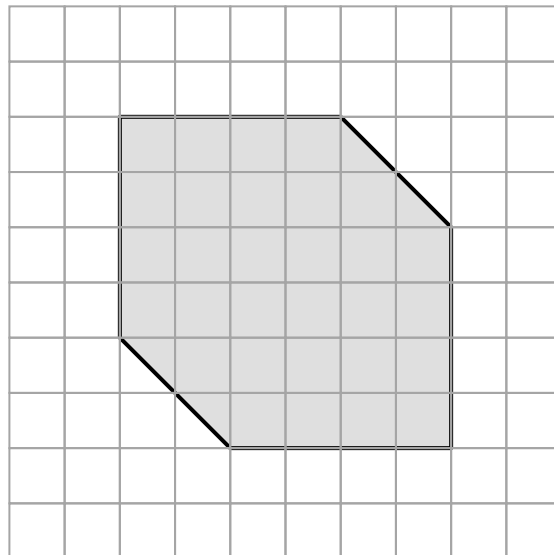Calculate the length of BC (in metres).

A

17m

8m

B

C

19. Draw a reduction of the given shape using a scale factor of $\frac{2}{3}$. **(2)**

20. Draw an enlargement of the given shape using a scale factor of $\frac{3}{2}$. **(2)**

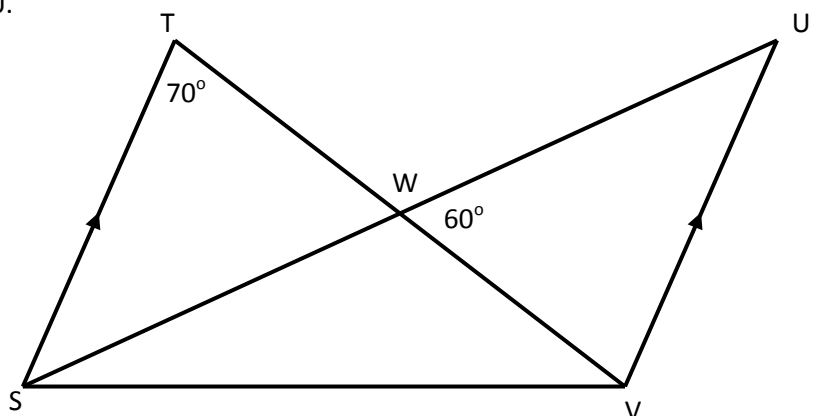**21.** In the diagram below, lines ST and VU are parallel.

W is the point of intersection of TV and SU.

Angle STV is 70° and angle UWV is 60°.

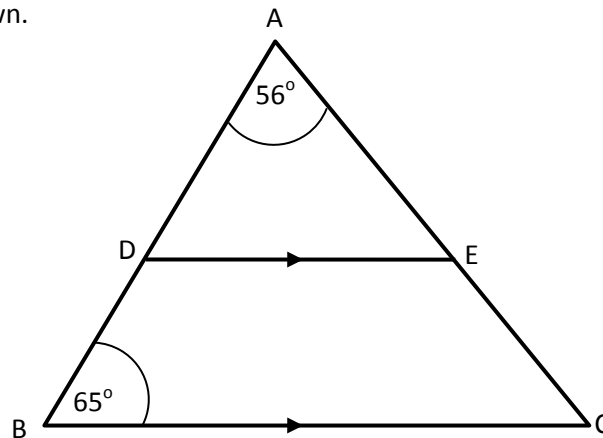Calculate the size of angle SUV.

All working must be shown.

(#2.1 and 1)

22. In the diagram below, lines DE and BC are parallel.

Point D lies on the line AB and the point E on the line AC.

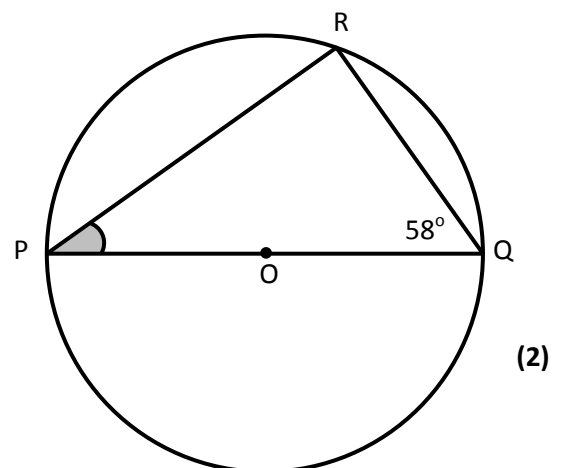Angle ABC is 65° and angle DAE is 56°.

Calculate the size of angle AED.

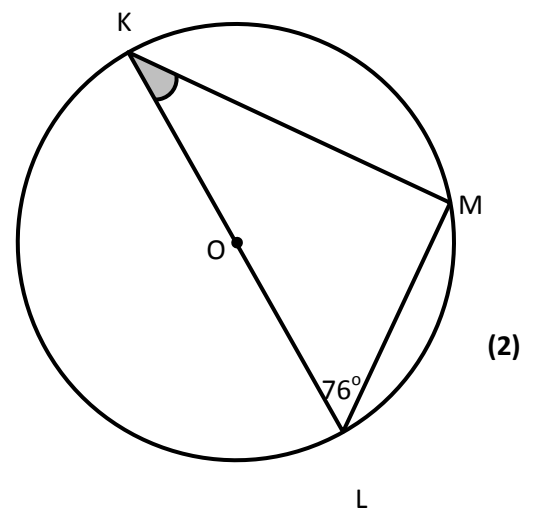All working must be shown.   **(#2.1 and 1)**

23. PQ is the diameter of a circle, centre O.

R is a point on the circumference of the circle.

Angle PQR is 58°.

Calculate the size of the shaded angle QPR.   **(2)**
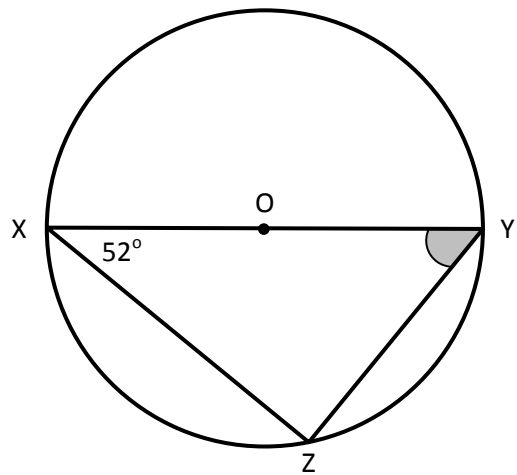

24. KL is the diameter of a circle, centre O.

M is a point on the circumference of the circle.

Angle KLM is 76°.

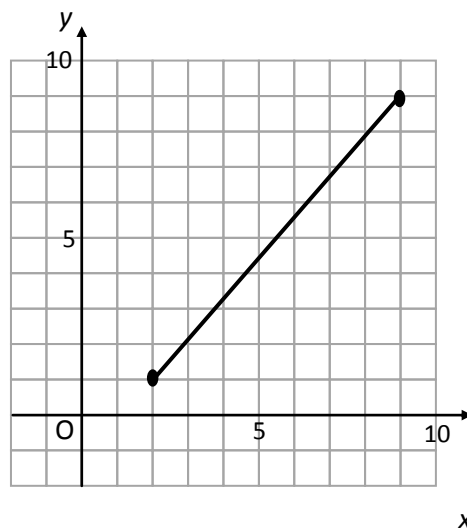Calculate the size of the shaded angle MKL.   **(2)**

25. XY is the diameter of a circle, centre O.

Z is a point on the circumference of the circle.

Angle ZXY is 52°.

Calculate the size of the shaded angle ZYX.

(2)

26. On the grid, the end points of the line are
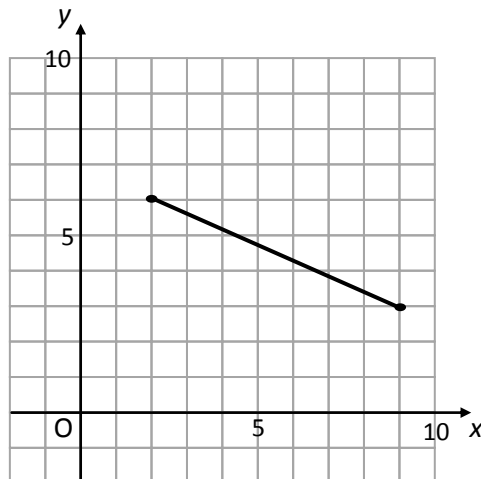
(2, 1) and (9, 9).

Calculate the length of the line.

(#2.1 and 2)

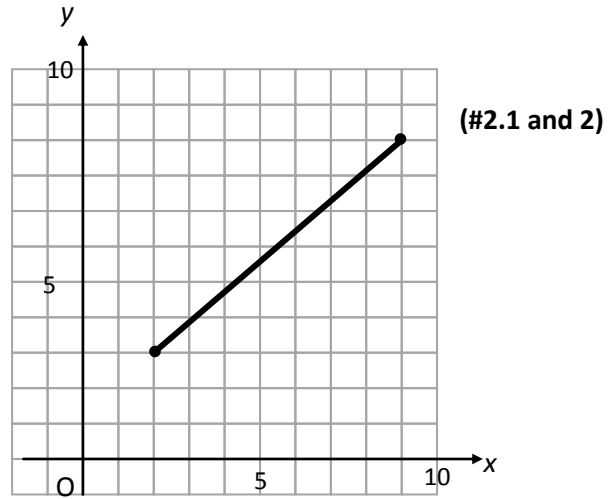**27.** On the grid shown, the end points are (2, 6) and (9, 3).

Calculate the length of the line.

(#2.1 and 2)

28. On the grid shown, the end points of a line are (2, 3) and (9, 8).

Calculate the length of the line.

(#2.1 and 2)

29. Calculate the length of side *x* in the right-angled triangle below. **(3)**

x mm

15cm

68°
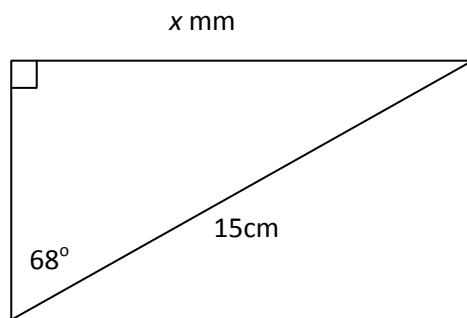
30. Calculate the length of the side marked *x* in the right-angled triangle below. **(3)**

xcm

72°

12cm
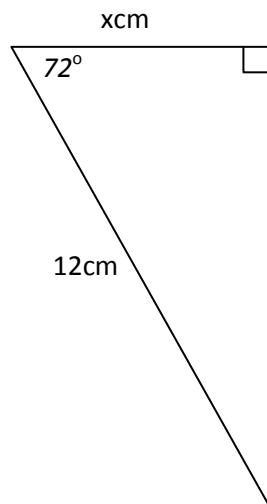
31.   Calculate the length of side *x* in the right-angled triangle below.   **(3)**
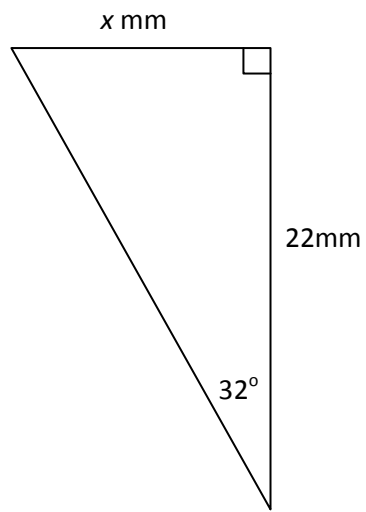
32. The results below show the length of a spring when a force is applied.

Force (F)	1	2	3	4	5	6
Length (l)	3·0	3·8	5·4	6·0	6·8	8·2

(a) Draw a scattergraph of the information on the grid provided. **(2)**
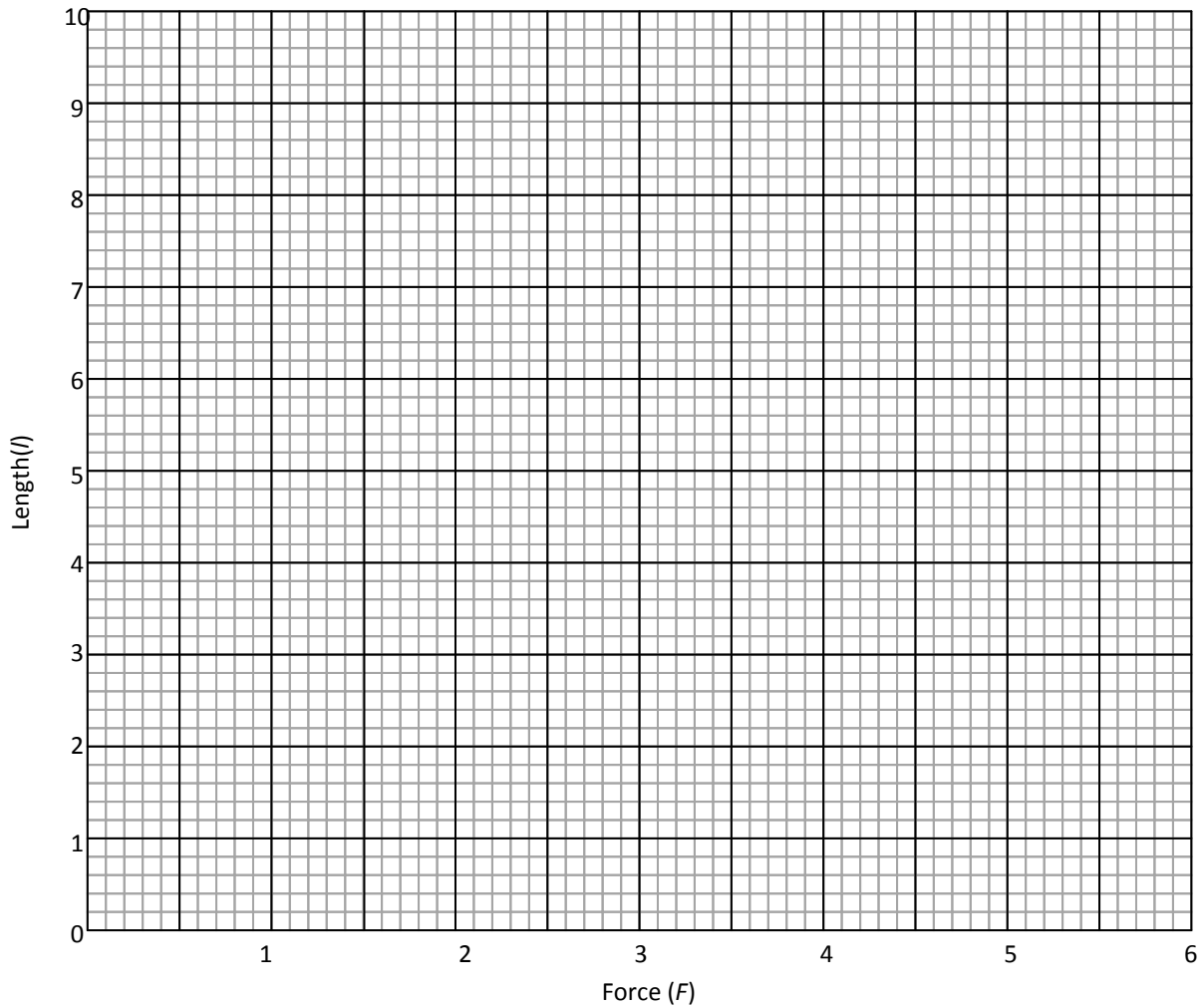
(b) Draw the best fitting line on the graph. **(1)**

(c) Use your graph to estimate the length of the spring when a force of 3·5 is applied. **(1)**

(d) It is estimated that the length of the spring should be 6·6 when a force of 4·5 is applied to it.

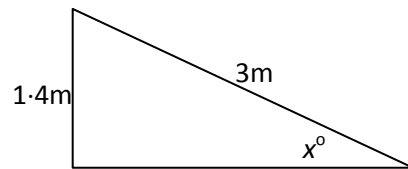**33.** A child's chute is 3 metres long and one end of it is 1·4 metres from the ground.

(a) Use the diagram below to help you calculate
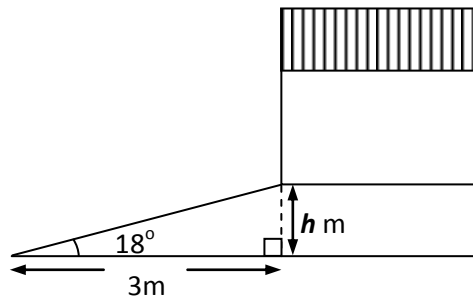
the angle, x^o, which the chute makes with the ground? **(2)**

1·4m

3m

x^o

(b) To be safe the angle that the chute makes with the ground should be between 27° and 28°.

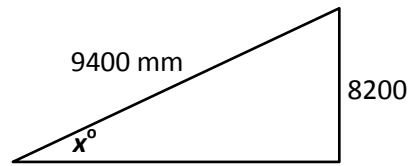Is this chute safe? (Justify your answer) **(#2.2)**

34. A driveway leading up to a garage is 3 metres long and at an angle of 18° to the horizontal.

(a) Calculate the height, **h** metres, which the ramp rises. **(2)**

18°

h m

3m

(b) For the driveway to pass regulations it rise by no more than 1 metre.

Would this driveway pass regulations? (Justify your answer) **(#2.2)**

35. The diagram shows a ramp which has been manufactured for a shop entrance.

9400 mm

8200

x^o

(a) Calculate the size of angle x^o. **(2)**

(b) For the ramp to be safe for wheelchair users the angle x should be between 5º and 7º.

Is this ramp suitable for wheelchair users? (Justify your answer) **(#2.2)**

36. The following table shows the speed of a car accelerating from rest.

Time (secs)	0	2	6	8	12	16
Speed (mph)	0	12	70	90	100	120

(a) Draw a scattergraph of the information on the grid provided. **(2)**
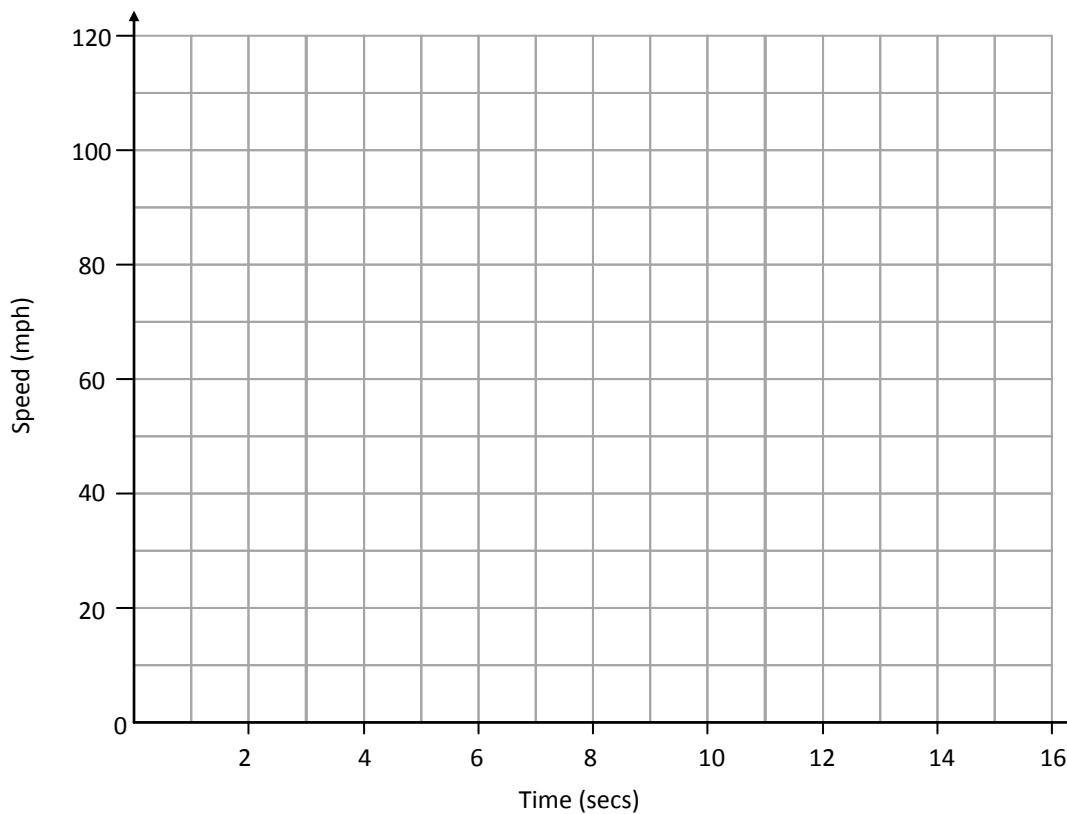
(b) Draw a best fitting line on the grid for this scattergraph. **(1)**

(c) Use your graph to estimate the speed after 14 seconds. **(1)**

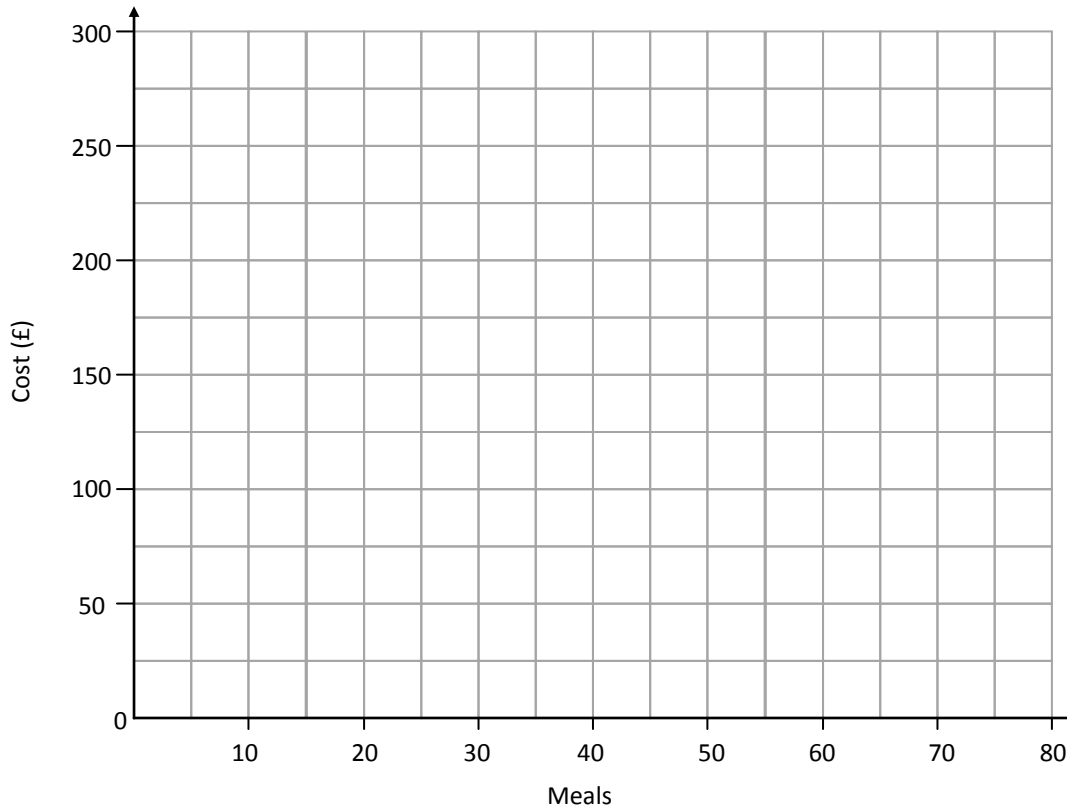**(d)** A car travelling at a speed of 70 mph was estimated to have been accelerating for 10 seconds.

Is this a reasonable estimate? **(#2.2)**

37. A restaurant manager finds that the cost of running his restaurant depends on the number of meals served.

(a) Draw a scattergraph of the information on this grid. **(2)**

Number of meals	10	20	30	40	50	60
Cost in £	125	175	175	225	225	275

(b) Draw the best fitting line on the grid provided. **(1)**

(c) Use your graph to estimate the cost of running the restaurant when 45 meals are served. **(1)**

(d) The restaurant owner estimates the cost of running the restaurant when 75 meals were served would be £300.

Is this a reasonable estimate? **(#2.2)**