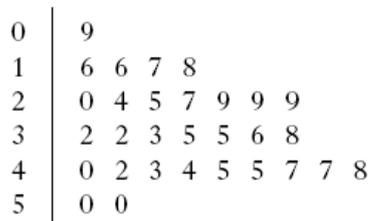


| KU | RE |
|----|----|
| 4  |    |
|    |    |
| 2  |    |
| 1  |    |
|    |    |
| 3  |    |
|    |    |
| 1  |    |
| 1  |    |
|    | 3  |

1. A local council recycles 42 000 tonnes of waste a year.  
 The council aims to increase the amount of waste recycled by 8% each year.  
 How much waste does it expect to recycle in 3 years time?  
 Give your answer to **three significant figures**.

2. In a class, 30 pupils sat a test.  
 The marks are illustrated by the stem and leaf diagram below.

Test Marks

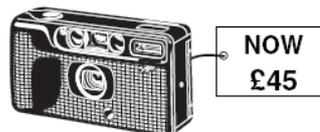


$n = 30$

$1 \mid 6 = 16$

- (a) Write down the median and the modal mark. 2  
 (b) Find the probability that a pupil selected at random scored **at least** 40 marks. 1

3. In a sale, all cameras are reduced by 20%.  
 A camera now costs £45.  
 Calculate the **original** cost of the camera.



4. Aaron saves 50 pence and 20 pence coins in his piggy bank.  
 Let  $x$  be the number of 50 pence coins in his bank.  
 Let  $y$  be the number of 20 pence coins in his bank.



- (a) There are 60 coins in his bank.  
 Write down an equation in  $x$  and  $y$  to illustrate this information. 1  
 (b) The total value of the coins is £17.40.  
 Write down another equation in  $x$  and  $y$  to illustrate this information. 1  
 (c) Hence find **algebraically** the number of 50 pence coins Aaron has in his piggy bank. 3

| KU | RE |
|----|----|
|    | 2  |
|    | 2  |
|    | 5  |
|    | 4  |

5. A circle, centre the origin, is shown.

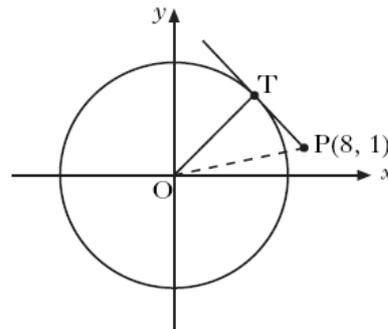
P is the point (8, 1).

- (a) Calculate the length of OP.

The diagram also shows a tangent from P which touches the circle at T.

The radius of the circle is 5 units.

- (b) Calculate the length of PT.



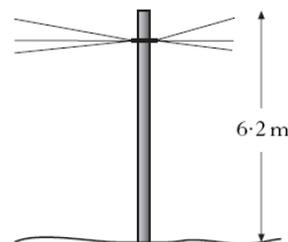
6. The distance,  $d$  kilometres, to the horizon, when viewed from a cliff top, varies directly as the square root of the height,  $h$  metres, of the cliff top above sea level.

From a cliff top 16 metres above sea level, the distance to the horizon is 14 kilometres.

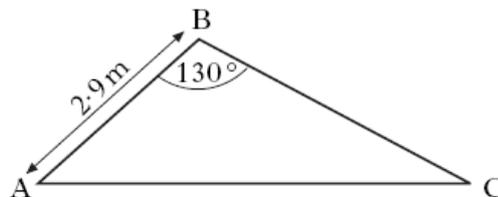
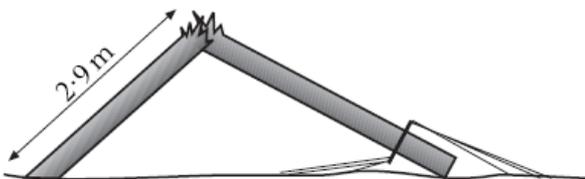
A boat is 20 kilometres from a cliff whose top is 40 metres above sea level. Is the boat beyond the horizon?

**Justify your answer.**

7. A telegraph pole is 6.2 metres high.



The wind blows the pole over into the position as shown below.



AB is 2.9 metres and angle ABC is  $130^\circ$ .

Calculate the length of AC.

4



10. To hire a car costs £25 per day plus a mileage charge.
- The first 200 miles are free with each additional mile charged at 12 pence.

## CAR HIRE

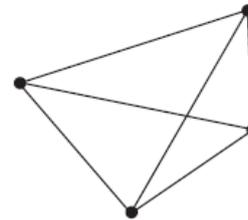
**£25 per day**

- **first 200** miles free
- each additional mile only 12p

- (a) Calculate the cost of hiring a car for 4 days when the mileage is 640 miles.
- (b) A car is hired for  $d$  days and the mileage is  $m$  miles where  $m > 200$ . Write down a formula for the cost £ $C$  of hiring the car.

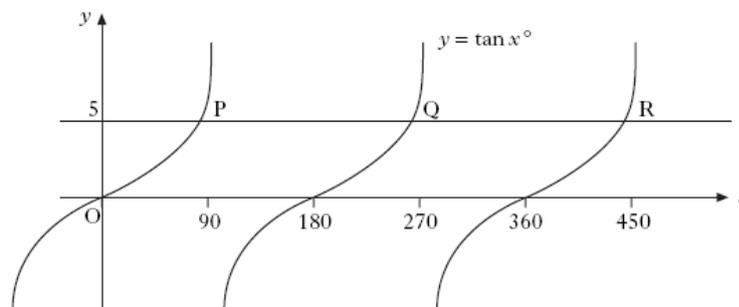
11. The minimum number of roads joining 4 towns to each other is 6 as shown.
- The minimum number of roads,  $r$ , joining  $n$  towns to each other is given by the formula

$$r = \frac{1}{2}n(n-1)$$



- (a) State the minimum number of roads needed to join 7 towns to each other.
- (b) When  $r = 55$ , show that  $n^2 - n - 110 = 0$ .
- (c) Hence find **algebraically** the value of  $n$ .

12. The diagram shows part of the graph of  $y = \tan x^\circ$ . The line  $y = 5$  is drawn and intersects the graph of  $y = \tan x^\circ$  at P and Q.



- (a) Find the  $x$ -coordinates of P and Q.
- (b) Write down the  $x$ -coordinate of the point R, where the line  $y = 5$  next intersects the graph of  $y = \tan x^\circ$

[ END OF QUESTION PAPER ]

**TOTALS**

|           | KU        | RE        |
|-----------|-----------|-----------|
| 1         | 1         |           |
| 3         |           | 3         |
| 1         | 1         |           |
| 2         |           | 2         |
| 3         |           | 3         |
| 3         |           | 3         |
| 1         |           | 1         |
| <b>18</b> | <b>18</b> | <b>33</b> |