

14  $\mathcal{E} = \{21, 22, 23, 24, 25, 26, 27, 28, 29, 30\}$

$$A = \{22, 24, 26, 28, 30\}$$

$$B = \{21, 24, 27, 30\}$$

(a) List the members of the set

(i)  $A \cap B$

(ii)  $A'$

.....  
.....  
(2)

$$C = \{23, 25, 29\}$$

(b) Using set notation, find an expression for  $C$  in terms of  $A$  and  $B$ .

.....  
(1)

(Total for Question 14 is 3 marks)

15 (a) Simplify  $(3k^2)^4$

.....  
(2)

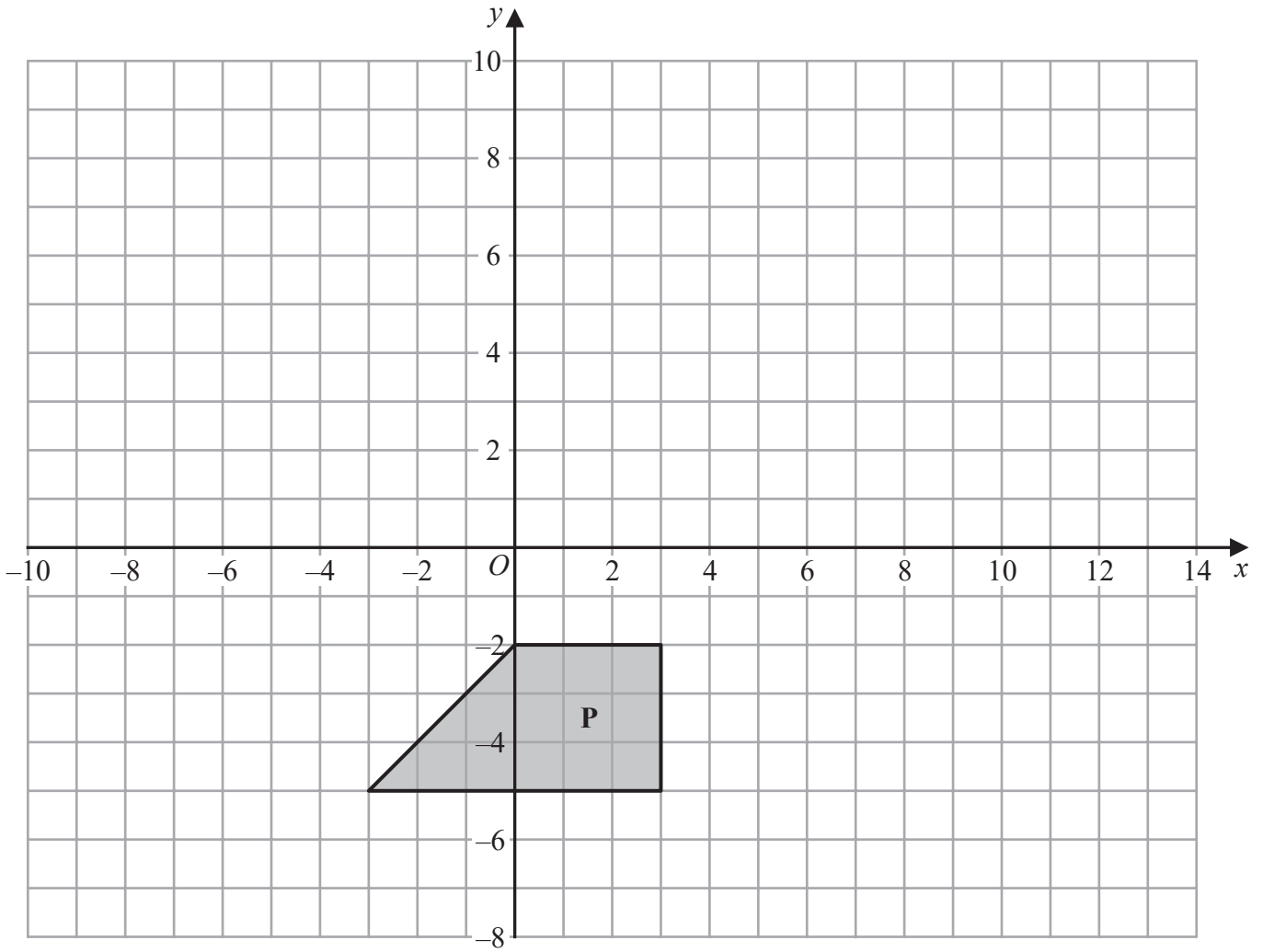
(b) Simplify  $(21m^4n) \div (3n^{-5})$

.....  
(2)

(Total for Question 15 is 4 marks)



16 Here is a shape **P** drawn on a grid of squares.



(a) On the grid, rotate shape **P**  $180^\circ$  about the point  $(-3, 2)$   
Label the new shape **Q**.

(2)

(b) On the grid, translate shape **P** by the vector  $\begin{pmatrix} 10 \\ 8 \end{pmatrix}$   
Label the new shape **R**.

(1)

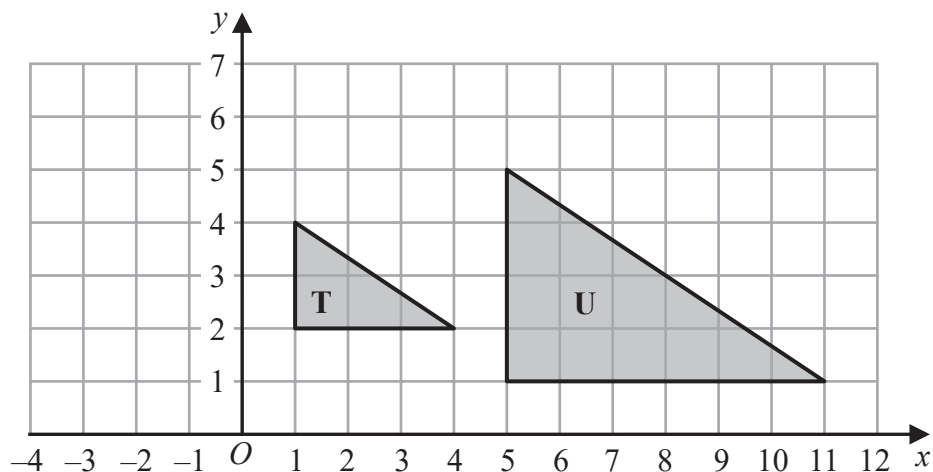
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Here are triangle **T** and triangle **U** drawn on a grid of squares.



(c) Describe fully the single transformation that maps triangle **T** onto triangle **U**.

(3)

(Total for Question 16 is 6 marks)

- 17** On Wednesday, the price of 1 litre of petrol was £1.26  
The price of petrol on Wednesday was 5% more than the price of petrol on the previous Monday.

Calculate the price of 30 litres of petrol on the previous Monday.

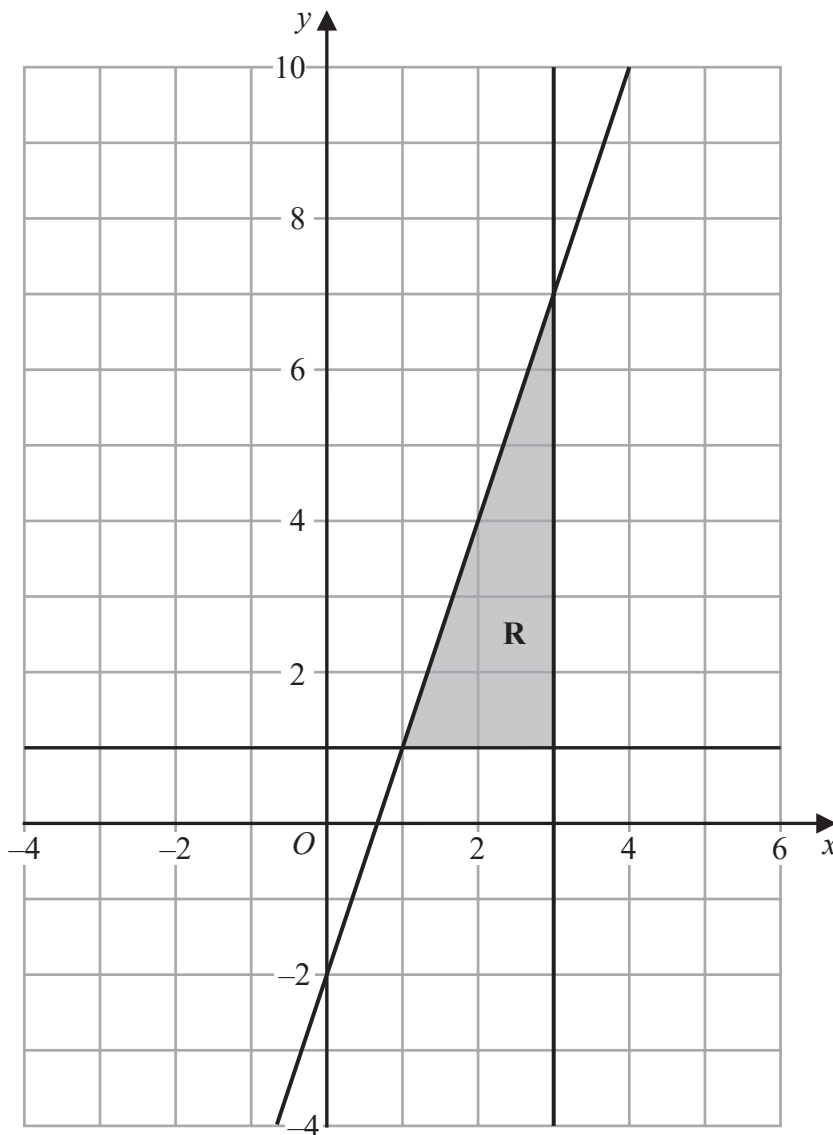
£.....

(Total for Question 17 is 3 marks)



- 18 The shaded region **R**, shown in the diagram below, is bounded by the straight line with equation  $y = 3x - 2$  and by two other straight lines.

Write down the three inequalities that define region **R**.



.....  
.....  
.....

(Total for Question 18 is 3 marks)



19 The table gives the length of the coastline, in kilometres, of each of five oceans.

Ocean	Length of coastline (km)
Arctic	$4.539 \times 10^4$
Atlantic	$1.119 \times 10^5$
Pacific	$1.357 \times 10^5$
Indian	$6.653 \times 10^4$
Southern	$1.797 \times 10^4$

(a) Which ocean has the greatest length of coastline?

.....  
(1)

(b) Calculate the difference between the length of the Atlantic Ocean's coastline and the length of the Southern Ocean's coastline.  
Give your answer in standard form.

..... km  
(2)

(Total for Question 19 is 3 marks)

20 Solve  $x^2 - 21x + 20 = 0$   
Show your working clearly.

.....  
(Total for Question 20 is 3 marks)



- 21 A mathematics teacher at a school asked a group of students how far, in kilometres, each student had travelled to get to school that day.

The table gives information about their answers.

Distance travelled ( $d$ km)	Number of students
$0 < d \leq 2$	$x$
$2 < d \leq 4$	11
$4 < d \leq 6$	8
$6 < d \leq 8$	6
$8 < d \leq 10$	5

The teacher calculated that an estimate for the mean distance travelled by the whole group of students was 4.25 km.

Work out the value of  $x$ .  
Show your working clearly.

$x = \dots\dots\dots$

(Total for Question 21 is 4 marks)

**TOTAL FOR PAPER IS 100 MARKS**

