1. Write in figures the number fifteen thousand and thirty six.	2. Write, in words, the number 32 768
3. Write down the value of the figure 3 in the following numbers. Your answer should be in the form of a whole number or a fraction: (a) 3 872 (b) 11.3825 (c) 0.137	4. 349×7
5. Subtract 5 076 from 6 081	6. 32×20×300
7. $2.7 + 5.31 - 0.08$	8. 734×58

9. Write the following fractions in ascending order of size:

$$\frac{3}{5}, \quad \frac{2}{3}, \quad \frac{13}{20}, \quad \frac{5}{8}$$

10. (a) Change $^3/_8$ into a decimal.

    (b) Change 0.84 into a fraction in its simplest form.

    (c) Change $\frac{7}{40}$ into a percentage.

11. Write down a number that is half-way between -18 and -2

12. Divide 0.7 by 100

13. $3.462 \div 0.3$	14. Work out $(0.02)^2$
15. Work out: $\frac{3}{5} + \frac{2}{3} - \frac{1}{25}$	16. Calculate $3\frac{2}{5} \div 2\frac{1}{2}$, leaving your answer as a mixed fraction.
17. Multiply $3\frac{4}{5}$ by 7.	18. Find the difference between -19 and -8

19. Freddie chooses a number. He divides it by 3 and then adds 10 to the result. His answer is 25. What number did he start with?

20. A play starts at 7.30 pm. It lasts for 2 hours and 40 minutes. What time does it finish?

21. Tina is carrying out a survey.
She wants to find out what are the favourite colours of the 20 students in her class.
She asks each student and records her results in a tally chart.

   (a) Design a tally chart that Tina can use to collect this data. You need at least 5 different categories.

   (b) Make up 20 results for this class and use them to complete your tally chart.
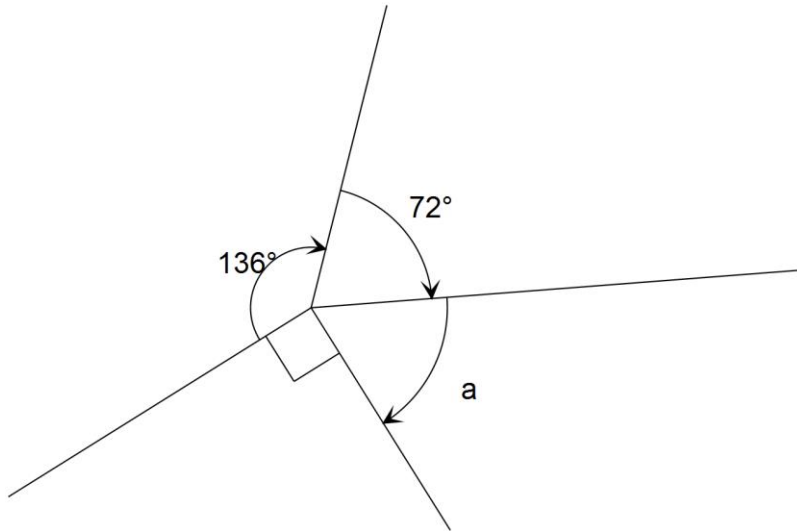
   (c) Which colour is the mode for these made-up results?

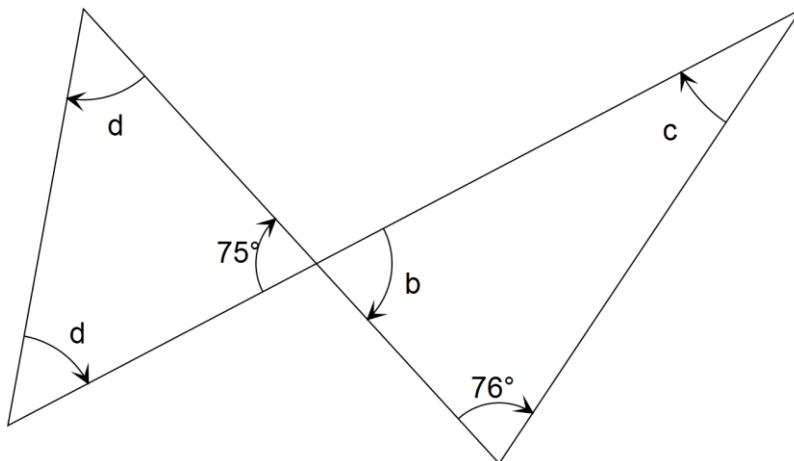   (d) Why is it impossible to calculate the mean for these results?

22. Calculate the size of each angle indicated by a letter in these diagrams.

The diagrams are not to scale.
Angles marked with the same letter are equal in size.

72°

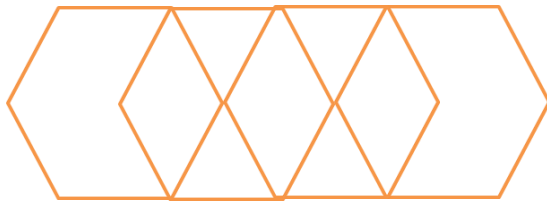136°

a

a = _____

d

c

75°

b

d

76°

b = _____   c = _____   d = _____

23.   This diagram contains 3 hexagons, 1 rhombus and no triangles.

How many hexagons, rhombuses and triangles are there in this diagram?

There are _____ hexagons, _____ rhombuses and _____ triangles.
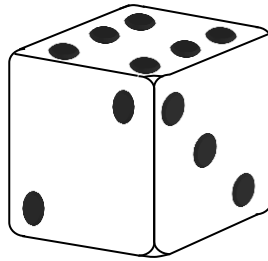
24. Write down the next term of each sequence.

   (a)   17,   25,   33,   41, ...
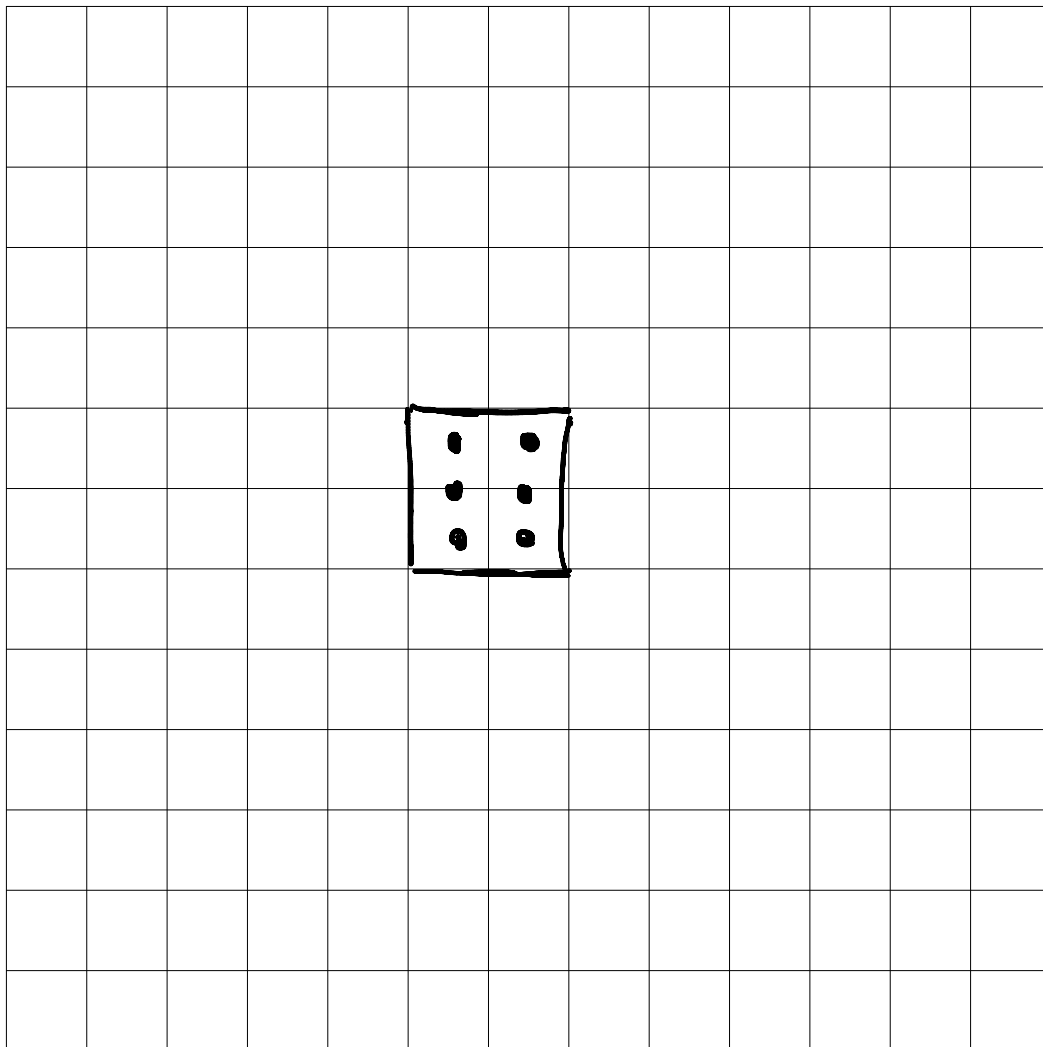
   (b)   26,   17,   10,   5,   2, ...

   (c)   12.3, 13.5, 14.7, 15.9, ...

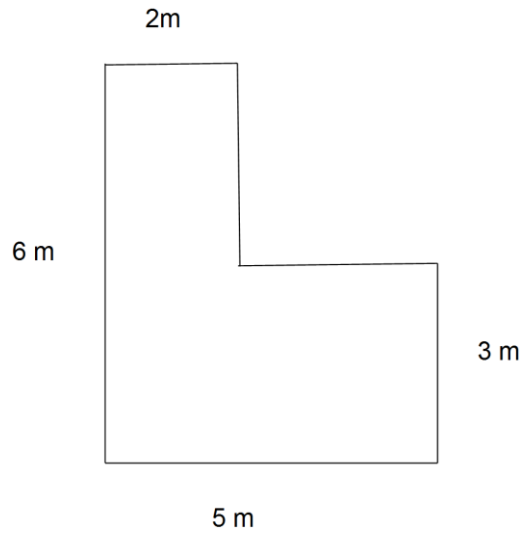   (d)   8,   12,   18,   27,   40.5, 60.75, ...

25. Joanna is making an ordinary six-sided dice.
The numbers on opposite faces of an ordinary dice always add up to 7.

Draw a net for the dice on the grid below. Show the correct number of spots on each face. One of the faces has been drawn on the grid for you.

26. A living room is in the shape of a letter L as shown in the diagram.

2m

6 m

3 m

5 m

(a) Find the area of the floor. Remember to state the correct units.

The floor is to have carpet laid down.

The carpet costs £30 per m^2.
Underlay costs £1.50 per m^2.
The carpet fitter has quoted £95 to fit the carpet.

(b) Work out the total cost of carpeting the living room.

27. Ada buys a 1.5 kg bag of Kattochunks cat food for her cat.
Each day, the cat eats 30 grams of cat food for breakfast and
60 grams for dinner.

Ada thinks that there is enough food in the bag to feed her cat for
more than two weeks.

Is she correct? Show your working clearly.
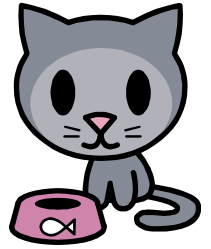
28. Given that $82 \times 15 = 1230$ find the value of

a) 8.2×1.5

b) $1230 \div 1.5$

c) 164×7.5
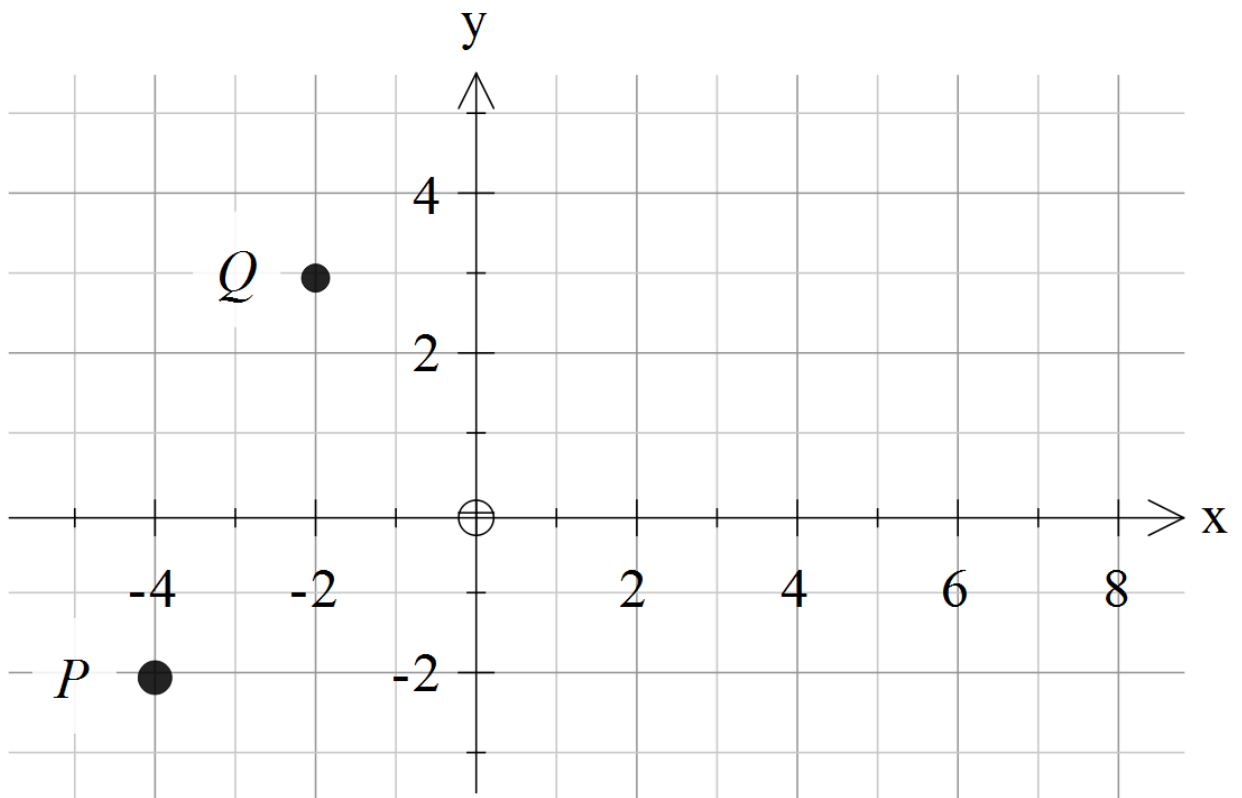
29. P and Q are points on the grid.

(a) Write down the coordinates of P.

(b) What are the coordinates of Q?

(c) Plot and label two points R and S on the grid so that joining the points P, Q, R and S in order will give a parallelogram.

30. The Smith family are planning a holiday to Paris.

They want to hire a car for 10 days and need to decide between Paris Auto Hire and Tower Car Hire.

(a) Which company should the family choose? Show your working clearly.

Paris Auto Hire		
First 7 days	€32.50 per day	
Extra days	€28	per day

Tower Car Hire

€37 per day

Special offer

Hire the car for more than 7 days and get 15% off the total cost.

The following graph shows average day and night temperatures in Paris.

Average temperatures in Paris
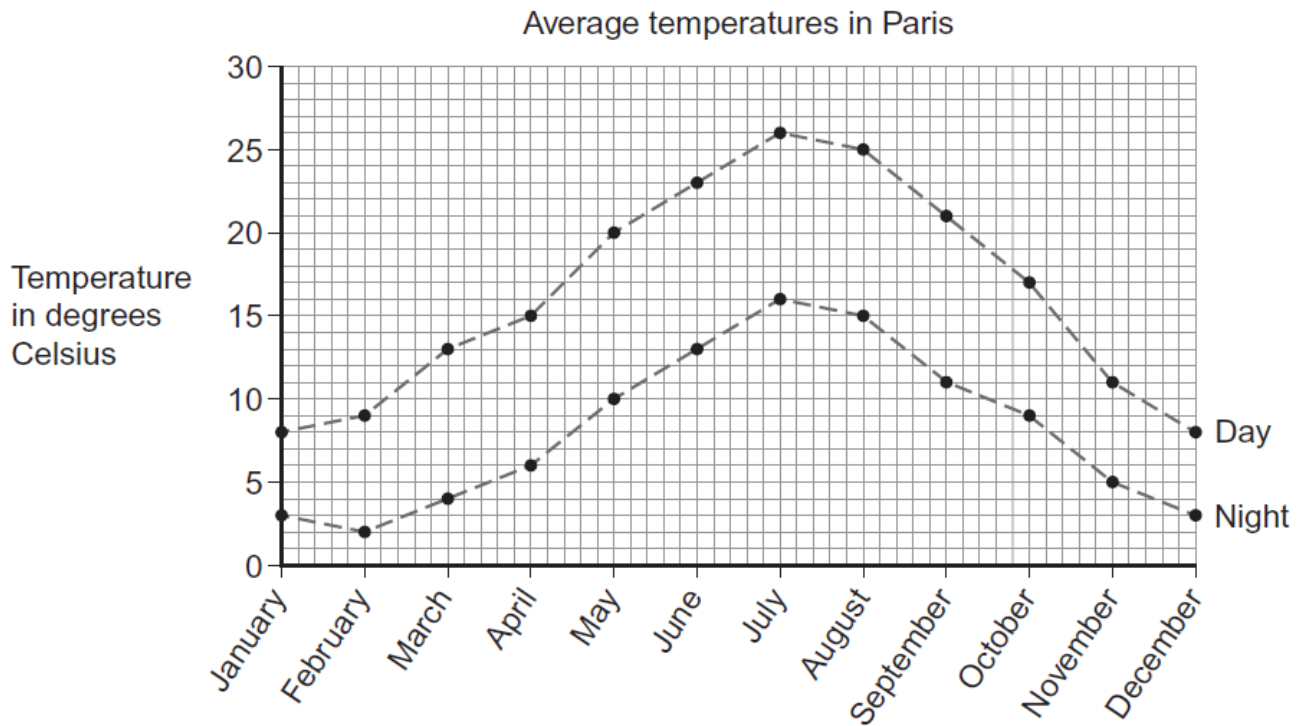
(b) The Smith family would prefer to visit Paris when the average day-time temperature is above 18 degrees Celsius and no more than 22 degrees Celsius. Which are the best months for them to travel?

(c) They decide to travel in August. What is the difference between average day and night temperatures for this month?

(d) Which two months have the smallest range of temperatures?

31.   Two bottles are on a shelf.

Not to scale

A   *B*
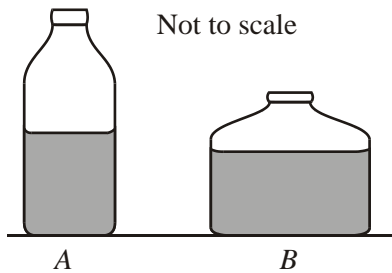
The 3 litre bottle, *A*, is 55% full of water.
The 2.5 litre bottle, *B*, is three-quarters full of water.
Which bottle contains more water?
You **must** show all your working.

32.   An *integer* is a whole number.
The date "11th December 2013" is unusual because, when written numerically, the
day, month and last digits of the year become a set of consecutive integers. In this
case, the date is written 11.12.13 and the integers are 11, 12 and 13.

What age will a person born on 11.12.13 be if they are still alive the next time a
set of consecutive integers occurs? Give the age in years.

Note: a year like 2109 would be written as 09 but for this question treat it as 9.
Use a similar approach for single digit month numbers e.g. August, which we
write as 08, should be treated as 8.

33. Mrs Loster lives in Manchester. She needs to travel to a business meeting in London tomorrow morning. She looks up the train timetable on-line and sees the following information.

Return from **Manchester Piccadilly to London Euston** change journey

	Out Tuesday 07 Jan 2014 Manchester Piccadilly MAN to London Euston EUS				Return Tuesday 07 Jan 2014 London Euston EUS to Manchester Piccadilly MAN			
	<Earlier			Later >	<Earlier			Later >
Depart	MAN 07:35	MAN 07:55	MAN 08:15	MAN 08:35	EUS 17:20	EUS 17:40	EUS 18:00	EUS 18:20
Arrive	EUS 09:52	EUS 10:06	EUS 10:24	EUS 10:43	MAN 19:28	MAN 19:49	MAN 20:07	MAN 20:28
Duration	2h 17m	2h 11m	2h 9m	2h 8m	2h 8m	2h 9m	2h 7m	2h 8m
Changes	0 ⓘ	0 ⓘ	0 ⓘ	0 ⓘ	0 ⓘ	0 ⓘ	0 ⓘ	0 ⓘ
			Cheapest	Cheapest				Cheapest
Cheapest Standard Single	£108.50	£108.50	£67.00	£67.00	£108.50	£108.50	£108.50	£34.00
Cheapest First Class Single	£202.00	£202.00	£134.50	£134.50	£170.00	£170.00	£134.50	£65.00
▸View all single tickets								
Anytime Return Travel any time of day, return within 1 month. £308.00	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
First Anytime Return Travel any time of day, return within 1 month. £441.00	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙

Her meeting is at 10:30 and she knows the place she needs to go to is about 15 minutes by taxi from London Euston.

The meeting is due to finish at 5.30 pm.

She knows that she will be tired at the end of the day and decides to travel First Class on the return journey.

She plans to travel as cheaply as she sensibly can while achieving all of the above.

(a) Which train should she catch on the outward part of her journey?

(b) Which train should she catch on the return part of her journey?

(c) How much will her total rail fare be?

Alcuin of York was born in 735.

He was a monk who gained an important position as teacher and adviser at the court of Charlemagne, King of the Franks.

He wrote a book titled "Problems to Sharpen the Young" which contains 56 puzzles for young students.

The next three puzzles are taken from his book.

34. The Puzzle of the Cloaks

I have material which is 100 feet long and 80 feet wide. From it, I wish to make cloaks from portions in such a way that each portion is five feet in length and four feet wide. How many cloaks can be made from the material?

35. The Puzzle of the Dog Chasing a Hare.

A dog smells a hare which is in a field, 150 feet away. It chases after the hare, advancing nine feet per leap, while in the same time the hare makes a seven foot leap.

How many feet and how many leaps does the dog take in pursuing the fleeing hare until it is caught?

Number of feet: _____   Number of leaps: _____

36.   The puzzle of the dish that weighs 600 shillings.

I have a dish that has the weight of 600 shillings.
In it, there is gold, silver, brass and tin.
It has three times as much silver as gold, three times as much brass as silver, and three times as much tin as brass.   How much does each type of metal weigh?

Gold: _____ shillings   Silver: _____ shillings

Brass: _____ shillings   Tin: _____ shillings

37. A coach has to pick a 5-a-side football team.
She has seven players to choose from.
There are three boys: Asif, Ben, Colin and Damian.
The girls are: Emma, Fiona and Gabi.

The rules of the competition state that there must be at least two girls on the team.
The coach decides that Damian must play as he is by far the best player.

(a) List all the possible teams that the coach could pick. You can use the first
letter of each name instead of writing the names out in full.

(b) Assume that each of the possible teams is just as likely to be chosen.
Work out the probability that Fiona and Asif are both in the team.

38. A perfect number is a positive integer that is equal to the sum of its positive factors, excluding the integer itself.
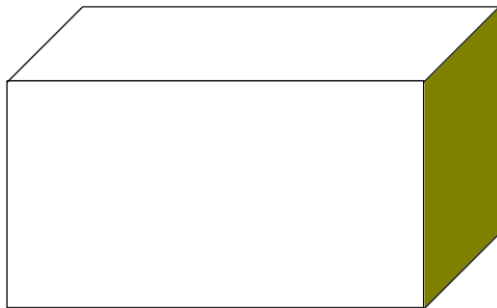
For example, 28 has factors 1, 2, 4, 7, 14 and itself.
Since $1 + 2 + 4 + 7 + 14 = 28$, we say that 28 is a perfect number.

Find the smallest perfect number.

39. The area of the shaded face of this cuboid is a quarter of the area of each of the two visible unshaded faces.
The total surface area of the cuboid is 72 cm^2. What is the area of one of the visible unshaded faces of the cuboid?

40. On the number line below, P is half-way between ⅓ and ½, while Q is two-thirds of the way between ½ and ⅔.
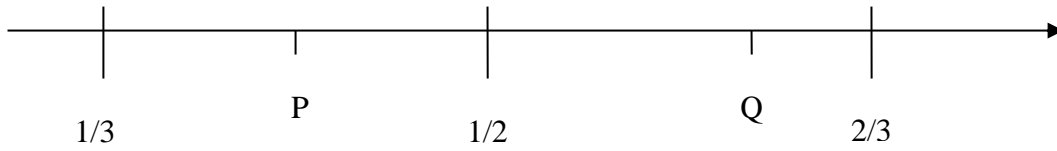
(a) Find P.

ANSWER: _____

(b) Find Q.

ANSWER: _____

41. p * q means $5 \times p - 3 \times q$

For example, 7 * 4 is equivalent to $5 \times 7 - 3 \times 4 = 23$.

Find the value of

(a)   5 * 6

(b) $(7*2) - (3*1)$

(c)   Show that $(2*2)*2$ is not equivalent to $2*(2*2)$.