FAS-PASS
Maths

SEA YEAR 2022
Section 1

1. Write the numeral for thirty-five thousand and ninety-six.

Solution:

Thirty five thousand	3 5 0 0 0
Ninety six	+ 9 6
	3 5 0 9 6

Answer: 35 096

2. The number 875 is increased by 625. What is the new number?

Solution:

875 increased by 625 =	8 7 5
	+ 6 2 5
	1 5 0 0 (new number)

Answer: 1 500

3. Divide 372 by 12.

Solution:

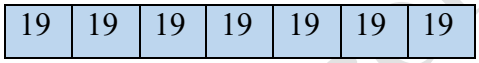
$$
\begin{array}{r}
31 \\
12\overline{)372} \\
-36 \\
\hline
12 \\
-12 \\
\hline
0
\end{array}
$$

Answer: 31

By Fayad W. Ali and Shereen A. Khan.

4. $\frac{1}{7}$ of $\square = 19$

$\square =$

Solution	Alternative Solution
$\frac{1}{7}$ of $\square = 19$ $\square = 19 \times 7$ $= 133$	One-seventh of a whole is 19  The whole is $19 \times 7 = 133$

Answer: 133

5. Circle the number that is NOT a square number.

9 12 16 25

Solution:

$3^2 = 9$

$4^2 = 16$

$5^2 = 25$

(12 is not a square number since no whole number multiplied by itself will give 12 OR we can say the square root of 12 is not a whole number as is the case with 9, 16 and 25)

9 12 16 25

By Fayad W. Ali and Shereen A. Khan.

6. Calculate $\frac{11}{12}-\frac{2}{3}$.

Solution:

Express $\frac{2}{3}$ in twelfths:

$\times 4$

$\frac{2}{3}=\frac{8}{12}$

$\times 4$

$$\frac{11}{12}-\frac{2}{3}=\frac{11}{12}-\frac{8}{12}$$

$$=\frac{3}{12}$$

Answer: $\frac{1}{4}$ in its lowest terms

7. Calculate $\frac{6}{7}\times 84$.

Solution:

$$\frac{6}{\cancel{7}_{1}}\times \cancel{84}^{12}=6\times 12$$

$$=72$$

Answer: 72

8. Convert $\frac{47}{5}$ to a mixed number.

Solution:

$5\overline{)47}$

9 rem 2

$$\therefore \frac{47}{5}=9 \text{ and } \frac{2}{5}$$

$$=9\frac{2}{5}$$

Answer: $9\frac{2}{5}$

Each whole is made up of five fifths

The number wholes in 47 fifths is 47 ÷ 5.

By Fayad W. Ali and Shereen A. Khan.

9. The maximum score on a spelling test was 50. Anika scored 60%. What was Anika's score on the test?

Solution:

Anika's score is 60% of 50 $= \frac{60}{100} \times 50$

$= 30$

Answer: 30

10. Sam bought two of the bottled water shown below. How much change did he receive from $10.00?

$4.25

Solution:

Cost of 1 bottle of water $= \$4.25$

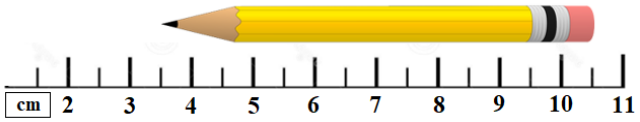
$\therefore$ Cost of 2 bottles of water $= \$4.25 \times 2$
$= \$8.50$

Change from $10.00 is $10.00 – $8.50
$= \$1.50$

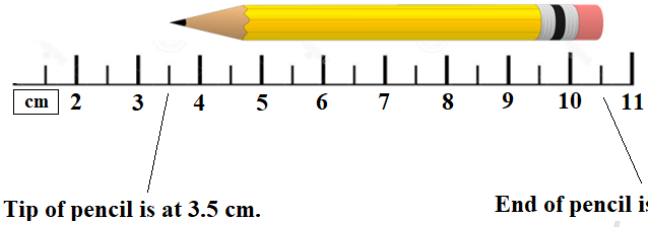
$$\begin{array}{r} 10.\ 00 \\ -\ \ 8.\ 50 \\ \hline 1.50 \end{array}$$

Answer: $1.50

11. What is the length of the pencil, in centimetres?



Solution:



$$\therefore \text{Length of pencil} = \begin{array}{r} 10.5 \text{ cm} \\ -\ 3.5 \text{ cm} \\ \hline 7.0 \text{ cm} \end{array}$$

Answer: 7.0 cm

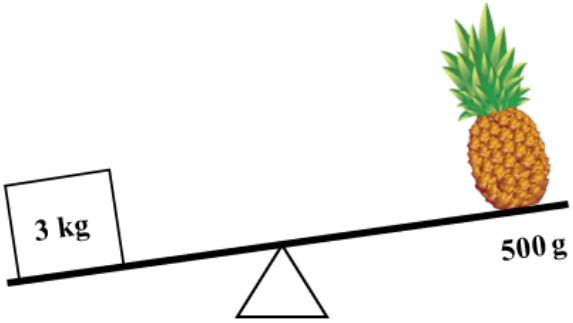
12. Write the time shown on the clock.

Solution:

The minute hand points to 1, which indicates 5 minutes after the hour.
The hour hand is a little beyond 10.
The time is therefore 5 minutes after 10 o'clock **OR** 5 minutes past 10 o'clock or 10:05. (We cannot say whether it is a.m. or p.m on the analogue clock)

Answer: 5 minutes after 10 o'clock or 5 minutes past 10 o'clock or 10:05

13. How many pineapples of the same mass will balance the scale?

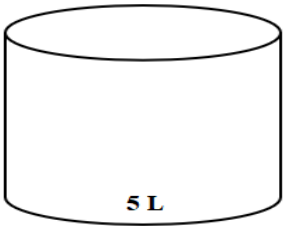


Solution:
1 pineapple weighs 500 g.
To balance the scale, the pineapples must weigh exactly 3 kg $= 3 \times 1000$ g

Hence, the number of pineapples required $= \dfrac{3 \times 1000}{500}$
$= 6$

Answer: 6

14. An empty container and a full carton of milk are shown below.



Container

250 ml
Carton

How many cartons of milk will fill the container?

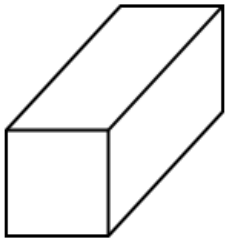
Solution:

The volume of the container $= 5$ L $= 5 \times 1000$ ml $= 5000$ ml
Volume of one carton $= 250$ ml
Number of cartons of milk required to fill the empty container will be

$$\frac{Volume\ of\ the\ container}{Volume\ of\ 1\ carton} = \frac{5000}{250} = 20$$

Answer: 20 cartons

15. The cross-section of the prism shown below is a square.



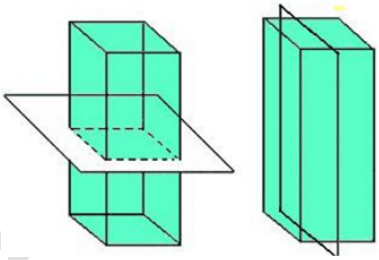
What is the name of the prism?

Solution:

Answer: A cuboid OR a square prism.

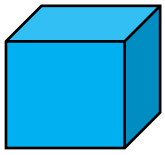
Explanation
Prisms have a pair parallel congruent polygonal faces and are named by the shape of their cross-sections. Cross sections can be vertical, horizontal or even slanted. Cuboids can be of three types.

Type 1: All the faces are rectangles. Both the horizontal and vertical cross-sections are rectangular.



This cuboid is a rectangular prism because it has a rectangular cross section no matter how it stands.

Type 2: All faces are squares: A cube is a special case of a cuboid in which all the faces are squares. Both the horizontal and the vertical cross-sections are squares.

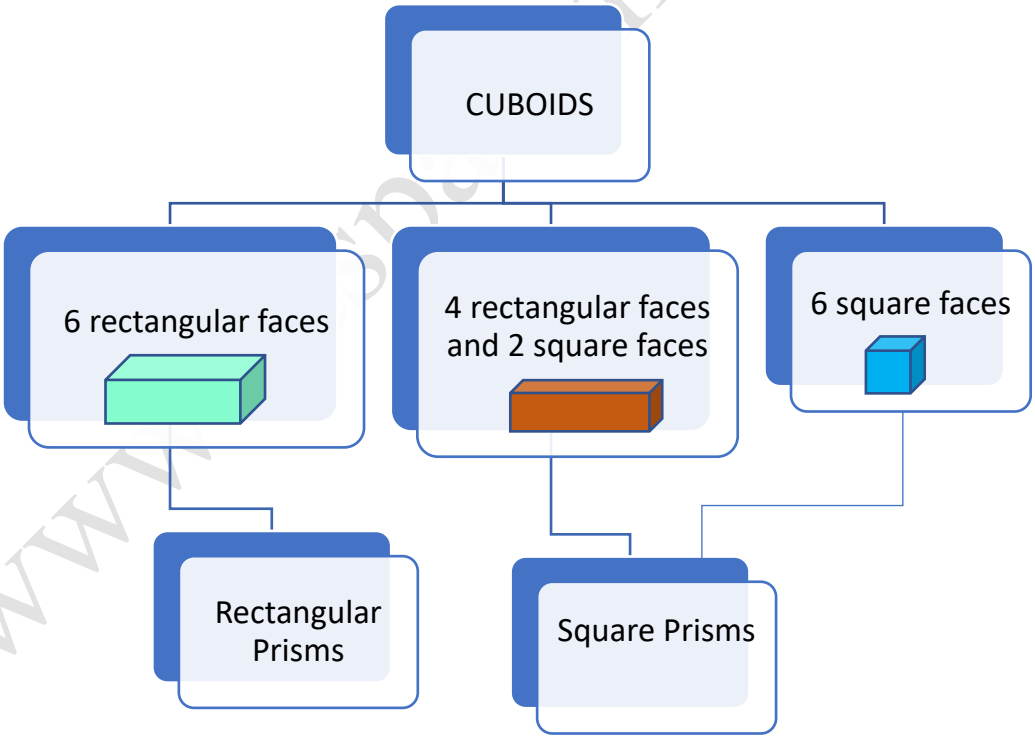


A cube is a square prism because it has a square cross section no matter how it stands. It should be noted thant not all square prisms are cubes.

Type 3: Four faces are rectangles and two are squares. The horizontal cross section is rectangular and the vertical cross section is square. If we adhere to the convention of naming prisms by the shape of their parallel cross sections then this would result in two possible names - a rectangular prism or a square prism.

To resolve this problem, a rectangular prism is defined as having 6 rectangular faces. Since this prism has 4 rectangular faces, it does not meet such criteria. In this respect, a square prism is the preferred name. It is the square cross section that identifies this prism as a square prism.

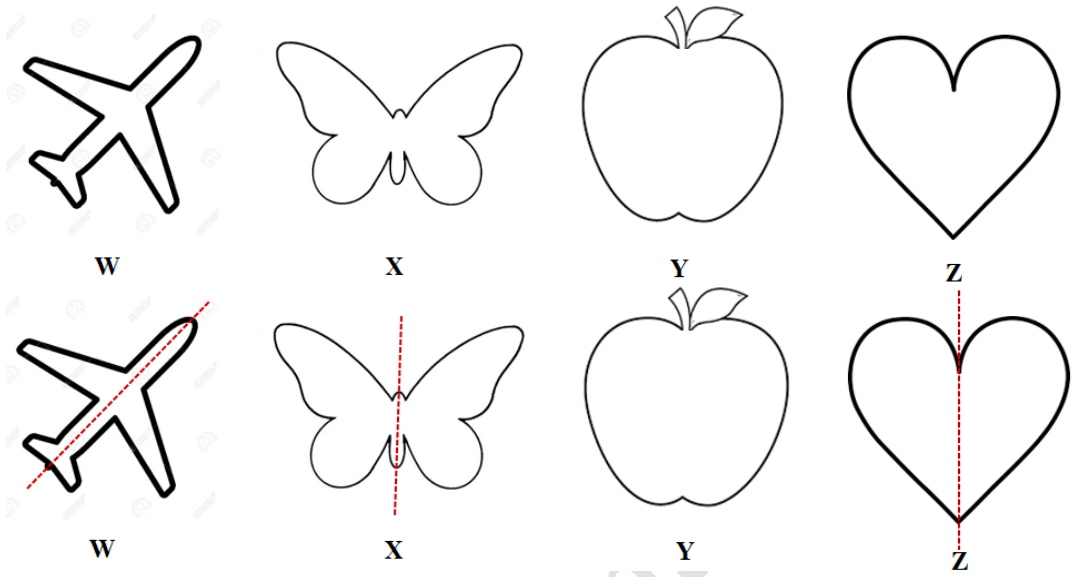
To summarise these points, the following diagram is presented.



It should be emphasized that all cubes are square prisms but not all square prisms are cubes.

By Fayad W. Ali and Shereen A. Khan.

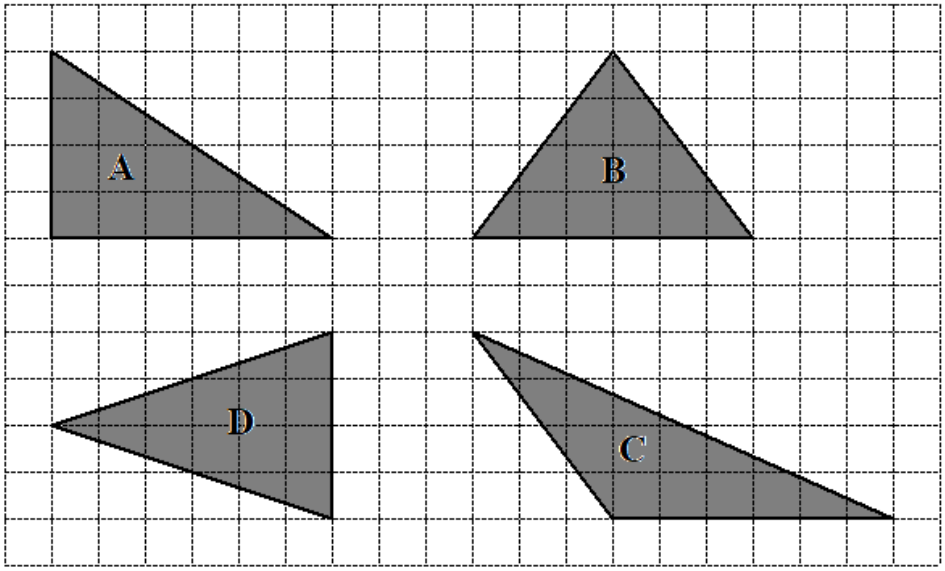
16. Which of the shapes shown below is NOT symmetrical?



Solution:
In the shapes W, X and Z we could draw a line of symmetry, shown dotted. If the figure is folded along this line, there will be no overlap and hence it is a line of symmetry. Such a line cannot be drawn in figure Y. Hence, Y is not symmetrical.

Answer: Y

17. Which triangle below has an angle that is greater than a right angle?



Solution:

In triangle A, one angle is 90° (right angle) and the other two angles are acute (less than 90^0).
In triangle B, all three angles are acute (less than 90^0).
In triangle D, all three angles are acute (less than 90^0).
In triangle C, two angles are acute (less than 90^0).and one is greater than a right angle or 90^0. Such an angle is called obtuse

Answer: C

18. The tally chart below shows the months in which the students in a class were born.

The Months in which students were born

Month	Tally
January	𝍸 |
April	𝍸 𝍸
July	𝍸 𝍸
September	𝍸

Which month represents the mode?

Solution:

Month	Tally	No. of students
January	𝍸 |	6
April	𝍸 𝍸	9
July	𝍸 𝍸	10
September	𝍸	5

More children were born in July than in any of the other months mentioned. Hence, the month which represents the mode or the modal month is July.

Answer: July

19. The table below shows Maddie's marks on her end of term tests.

Maddie's Marks

Subject	Mathematics	Language Arts	Social Studies	Science
Marks obtained	80	91	82	53

What was Maddie's mean mark?

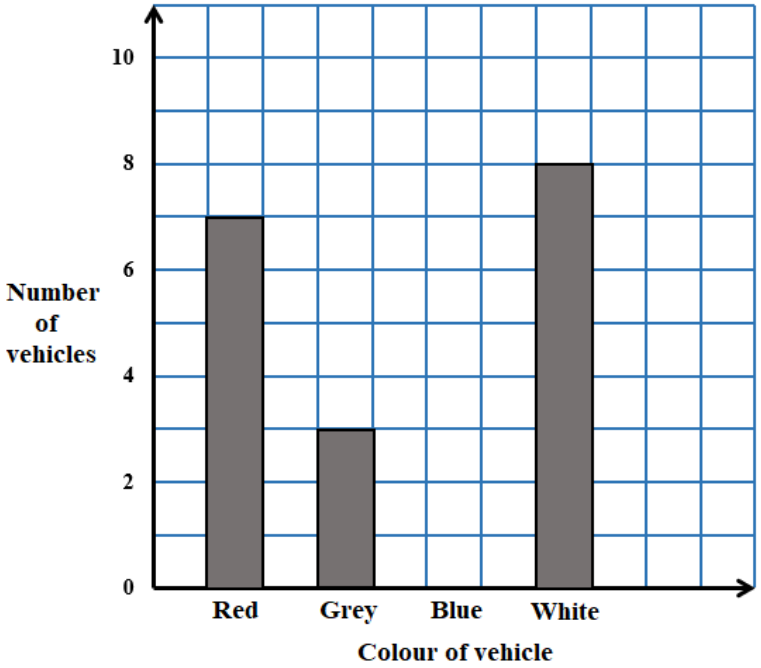
Solution:

$$\text{The mean mark} = \frac{\text{Sum of the marks in all the subjects}}{\text{Number of subjects}}$$
$$= \frac{80+91+82+53}{4}$$
$$= \frac{306}{4}$$
$$= 76.5$$

Answer: 76.5

20. The incomplete bar graph below shows the colour of the vehicles in a car park.

The colour of the vehicles at the Car Park



Solution:

If there are 24 vehicles in the car park, how many of the vehicles are blue?

From the chart we see:

$$\begin{aligned} \text{Number of red vehicles} &= 7 \\ \text{Number of grey vehicles} &= 3 \; + \\ \text{Number of white vehicle} &= 8 \\ \hline & 18 \end{aligned}$$

$$\begin{aligned} \text{Hence, the number of blue vehicles} &= 24 - 18 \\ &= 6 \end{aligned}$$

Answer: 6

21. Write the following numbers in ascending order.

135.9 319.5 53.91 95.31

Solution:

There are two numbers in the hundreds, 319.5 and 135.9.
$319.5 > 135.9$ or $135.9 < 319.3$
The other two numbers are both less than a hundred and are 95.31 and 53.91.
$95.31 > 53.91$ or $53.91 < 95.31$
Hence, the numbers in ascending order are 53.91, 95.31, 135.9, 319.5

Answer: 53.91, 95.31, 135.9, 319.5

22. Write the correct number in each shape below to complete the number sentences.

$199 \times 75 = (199 + \triangle) \times 75 - 75$

$199 \times 75 = \square \times 75 - 75$

Solution:

Consider 199 as the multiplier and 75 as the number to be multiplied (multiplicand). An easy way to multiply a number by 199 is to multiply the number by 200 and subtract the number.

So, $199 \times 75 = (200 \times 75) - (1 \times 75)$

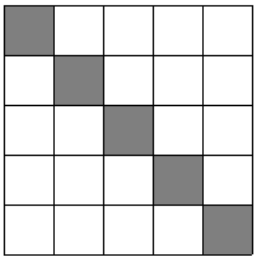
$199 \times 75 = (199 + 1) \times 75 - (1 \times 75)$

$199 \times 75 = (199 + 1) \times 75 - 75$

Answer: $199 \times 75 = (199 + \boxed{1}) \times 75 - 75$

$199 \times 75 = \boxed{200} \times 75 - 75$

23. The shaded fraction of the square represents 16 students in a class.



What is the **total** number of students in the class?

Solution:
There are 5 shaded squares in a total of 25 squares.

$\therefore \frac{5}{25}$ of the class represents 16 students.

$\frac{1}{5}$ of the class $= 16$ students.

16	16	16	16	16

$\therefore$ Total number of students in the class $= \frac{16}{\frac{1}{5}}$ OR 16×5

$= 80$

Answer: 80 students

24. Anil's age is a factor of 48. Seven years ago, his age was a multiple of 5. What is Anil's age now?

Solution:

The factors of 48 are 1, 2, 3, 4, 6, 8, 12, 16, 24 and 48.
Seven years ago, Anil's age was a multiple of 5, so Anil is more than 7 years old.
The factors greater than 7 are {8, 12, 16, 24 and 48}.
Seven years ago, Anil's age could have been:

$$8 - 7 = 1, 12 - 7 = 5, 16 - 7 = 9, 24 - 7 = 17 \; and \; 48 - 7 = 41$$

The only $(\text{factor} - 7)$ that is a multiple of 5 is 12. Hence, Anil was 5 years old seven years ago and is now 5 + 7 = 12 years old.

Answer: 12 years

25. Mr. Grant bought 48 m of wire. He used $\frac{13}{16}$ of the wire to make basket frames. He cut the remaining wire into equal lengths to make basket handles. Each basket handle was made with $\frac{3}{4}$ m of wire.
How many basket handles did he make?

Solution:

Length of wire used to make basket frames $= \frac{13}{16} \times 48 \text{ m}$
$= 39 \text{ m}$

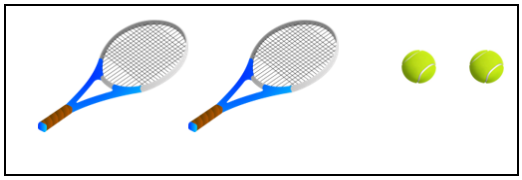
Remaining length of wire $= (48 - 39) \text{ m}$
$= 9 \text{ m}$

Length of wire used to make 1 basket handle $= \frac{3}{4} \text{ m}$

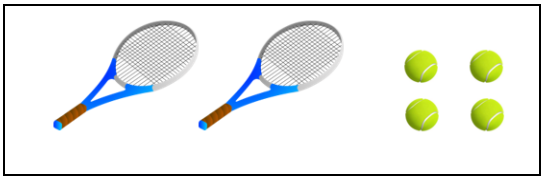
Hence, the number of basket hands that can be made $= \frac{9}{\frac{3}{4}}$
$= \frac{9}{1} \times \frac{4}{3}$
$= 12$

Answer: 12 basket handles

26. The costs of rackets and balls are shown below.



$184.00



$224.00

Calculate the cost of 1 racket.

Solution:

$$\begin{array}{rl} & 4 \text{ balls} + 2 \text{ rackets cost } \$224 \\ - & 2 \text{ balls} + 2 \text{ rackets cost } \$184 \\ \hline & 2 \text{ balls} \qquad\qquad \text{cost } \$\ 40 \end{array}$$

1 ball costs $\dfrac{\$40}{2} = \$20$

If 2 balls $+2$ rackets cost \$184, then 2 rackets cost $\$184 - \$40 = \$144$.

Hence, 1 racket costs $\dfrac{\$144}{2} = \$72.$

Answer: \$72

27. A vendor received a total of \$125.00 from the sale of snow cones and ice cream cones. The cost of a snow cone is \$5.00 and the cost of an ice cream cone is \$10.00. He sold 7 **more** snow cones than ice cream cones.

Calculate the **total** number of snow cones sold.

Solution:

The cost of 7 snow cones $= \$5 \times 7$
$= \$35$

Hence, an equal number of snow cones and ice creams cost $\$125 - \$35 = \$90$

The cost of 1 snow cone $+$ cost of 1 ice cream cone $= \$5 + \$10 = \$15$

Hence, the \$90 was earned from selling (\$90 ÷ \$15) or 6 sets of ice creams and snow cones

So, the number of ice creams sold = 6
And, the number of snow cones sold $= 6 + 7 = 13$

Answer: 13 snow cones (the word is spelt sno-cones)

28. Corey's weekly allowance was \$60.00. He received $\frac{1}{8}$ of a weekly allowance for each of the three additional chores he completed.
Calculate Corey's **total** allowance for the week.

Solution:

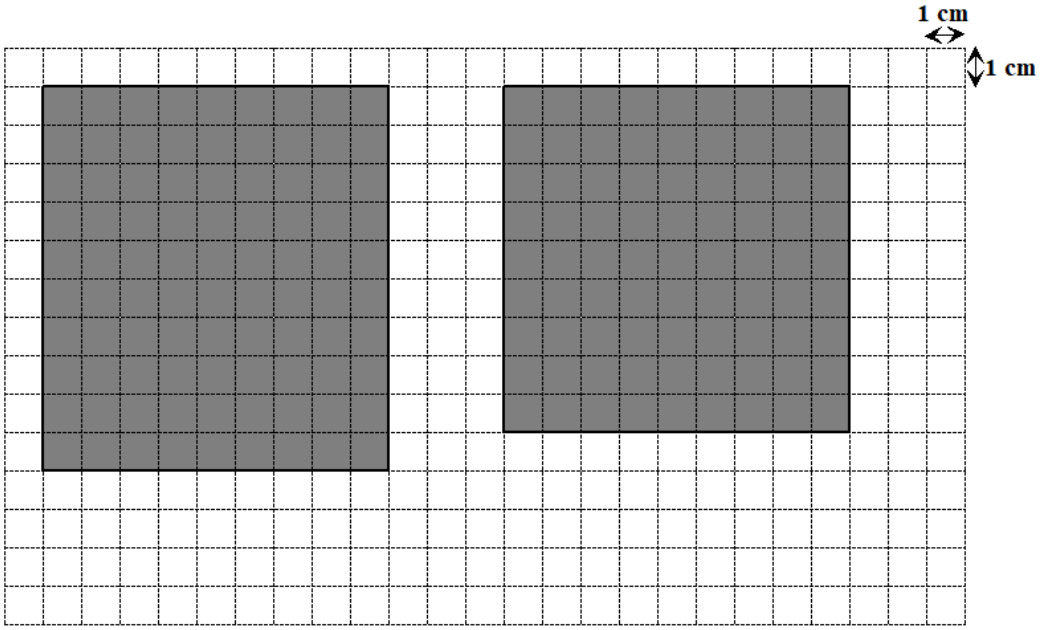
Additional allowance for each additional chore $= \$60 \div 8$
$= \$7.50$

Additional allowance for the three chores $= \$7.50 \times 3$
$= \$22.50$

Hence, Corey's total allowance for the week $= \$60.00 + \$22.50$
$= \$82.50$

Answer: \$82.50

29. A square and a rectangle are drawn in the 1 cm grid below.



What is the **difference** in their perimeters?

Solution:

Length of the square $= 9 \times 1$
$= 9 \text{ cm}$

$\therefore$ Perimeter of the square $= (9 \times 4) \text{ cm}$
$= 36 \text{ cm}$

Length of the rectangle $= 10 \times 1$
$= 10 \text{ cm}$

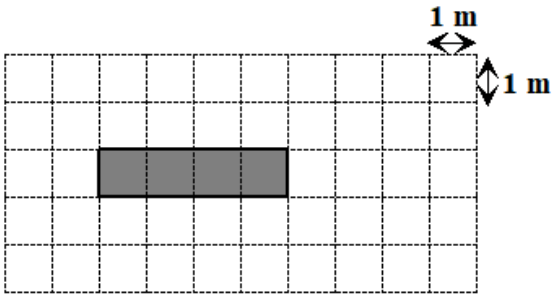
Width of the rectangle $= 9 \times 1$
$= 9 \text{ cm}$

$\therefore$ Perimeter of the rectangle $= 2(10 + 9)$
$= 38 \text{ cm}$

Hence, the difference in their perimeters $= (38 - 36) \text{ cm}$
$= 2 \text{ cm}$

Answer: 2 cm

30. The shaded rectangle on the 1 m grid below represents a flower bed. The flower bed is $\frac{1}{9}$ of the area of the square park.



On the grid below, draw the square park and shade its area.

Solution:

Area of rectangular flower bed $= 4\text{ m} \times 1\text{ m}$

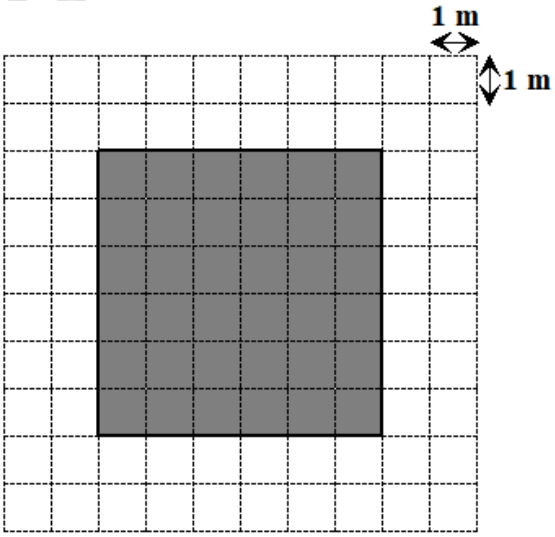
$= 4\text{ m}^2$

$\therefore$ Area of square park $= 4 \times 9$

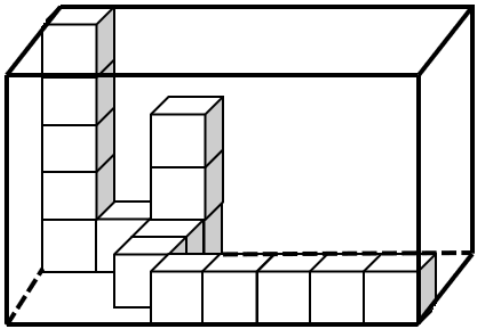
$= 36\text{ m}^2$

$36 = 6 \times 6$

Hence, the park is a square of side 6 m.



31. Small identical cubes are placed inside a cuboid as shown below.



How many **more** of these cubes are needed to fill the cuboid completely?

Solution:

To complete the length of the cuboid we need 8 cubes.
To complete the width of the cuboid we need 4 cubes.
To complete the height of the cuboid we need 5 cubes.
Hence, to fill the cuboid we need $8 \times 5 \times 4 = 160$ cubes.

The cuboid now has $5 + 1 + 3 + 2 + 5 = 16$ cubes.

$\therefore$ To fill the cuboid requires $(160 - 16) = 144$ more cubes.

Answer: 144 cubes

(The word 'completely' is redundant in the question)

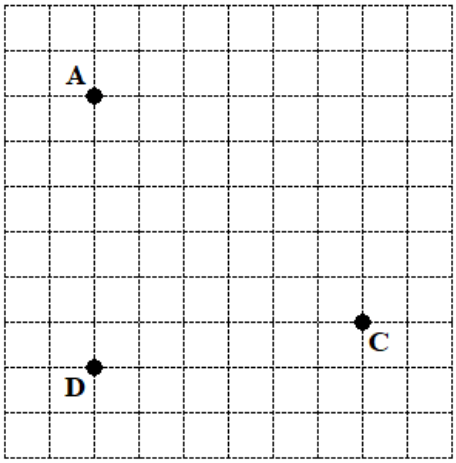
32. The time on a clock is correct at 8:00 a.m. The clock loses 5 minutes every hour. What time would the clock show when the correct time is 3:00 p.m.?

Solution:

The clock loses 5 minutes every hour.
From the correct time of 8:00 a.m. to 3:00 p.m., the difference in time is 7 hours.
Hence, the clock is expected to lose $5 \times 7 = 35$ minutes,
So, the clock will show 35 minutes less than the correct time of 3:00 p.m.
The clock will show $3:00 - 35$ minutes $= 2:25$ p.m.

Answer: 2:25 p.m.

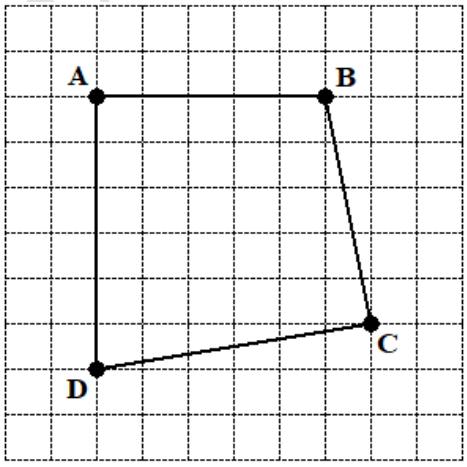
33. On the grid below, label the position of the point B such that the quadrilateral ABCD has one right angle. Draw lines to form the quadrilateral ABCD.



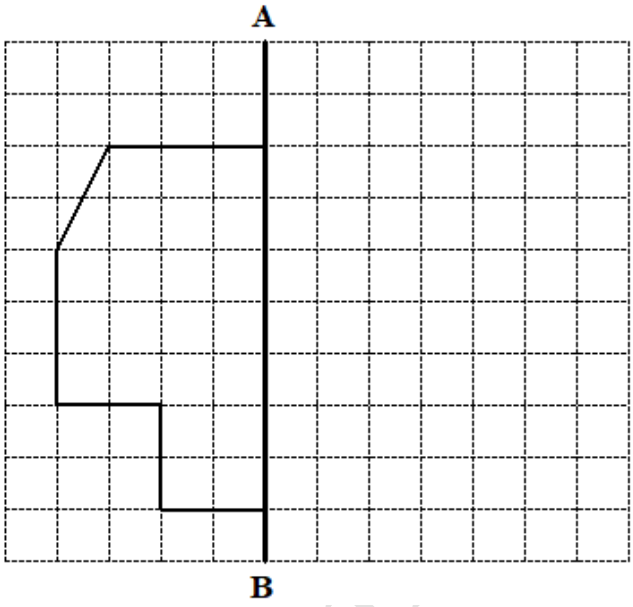
Solution:

Angle CDA is not a right angle. To form one right angle, we draw a horizontal at A The angle DAB will be a right angle. At any point on this horizontal line can be the position of B, except the point vertically above C, since in this special case there would be two right angles in the quadrilateral.

One such position of B is chosen and for this B, the quadrilateral ABCD is drawn.

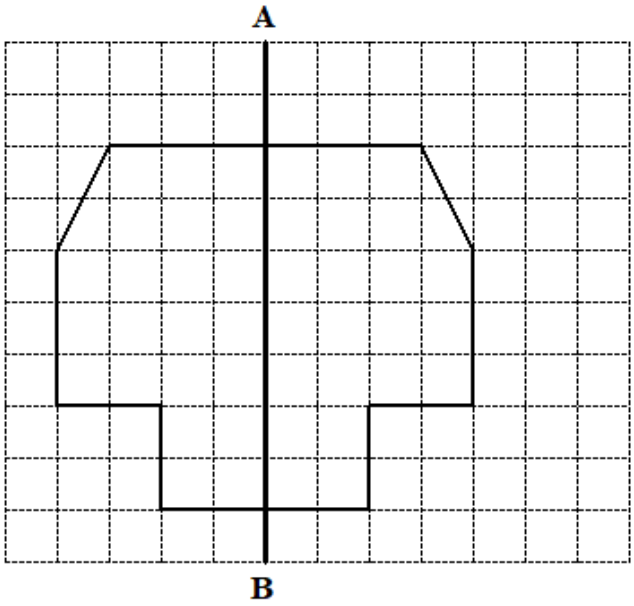


34. An incomplete symmetrical shape is shown on the grid below. Using AB as the line of symmetry, complete the shape.



Solution:

The shape on the left of AB is reflected in AB to form the complete shape shown.



35. The mean of four numbers was 80. When one number was removed the mean remained 80.

Explain how this was possible.

Solution;
The mean of four numbers is 80.
Hence, the total of the four numbers $= 80 \times 4$
$= 320$

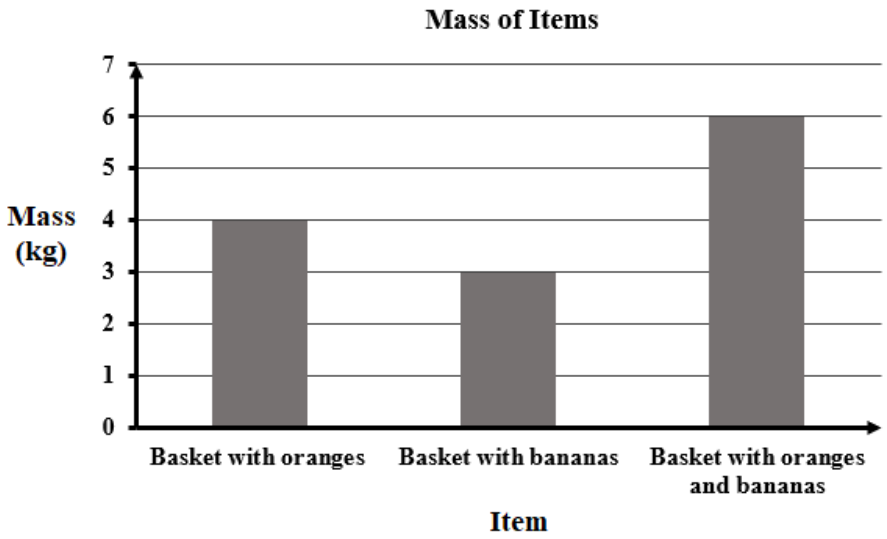
One number is removed. The new mean is 80.
So, the new total $= 80 \times 3$
$= 240$

Hence, the number removed is $320 - 240 = 80$ and which is the same as the original mean.

We can deduce that if the mean of a set of numbers is *N* and if *N* is one of the numbers and it is removed, then the mean of the remaining numbers will be unchanged.
The following example illustrates this principle.

1st	2nd	3rd	4th	Sum	Mean
70	90	80	80	320	80
70	90	80		240	80
70	90			160	80

36. A basket with oranges was weighed. The same basket was weighed with bananas. Finally, the basket was weighed with the oranges and the bananas. The graph below shows the mass of the items.



What is the mass of the basket?

Solution	Alternative Solution
Let the mass of the basket be B kg. Let the mass of oranges be R kg. Let the mass of bananas be N kg. So $B + R = 4\,\text{kg}$ $B + N = 3\,\text{kg}$ $B + R + N = 6\,\text{kg}$ $B + B + R + N = 4 + 3$ $= 7\,\text{kg}$ $\therefore B = 7 - 6$ $= 1\,\text{kg}$	Basket + oranges + bananas weigh = 6 kg Basket + bananas weigh = 4 kg Therefore, oranges weigh = (6– 4) kg = 2 kg Basket + Oranges weigh = 3 kg Therefore, the basket weighs = (3–2) kg = 1 kg

Answer: 1 kg

37. Indira had 90 pens. She kept $\frac{1}{3}$ for herself and gave $\frac{1}{4}$ of the remainder to Keone. She shared the remaining pens between Alison and Yvette such that Alison received 9 **more** pens than Yvette.

How many pens did Alison receive?

Solution:

Indira has 90 pens.

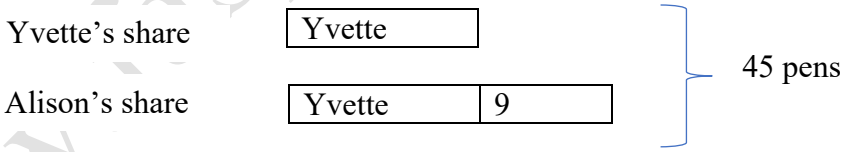
Indira keeps $\frac{1}{3}(90) = 30$ pens

Remainder $= 90 - 30$
$= 60$ pens

$\frac{1}{4}$ of 60 is given to Keone $= 15$ pens

Remainder is now $60 - 15 = 45$ pens.

Alison and Yvette share 45 pens.
Alison receives 9 pens more than Yvette.



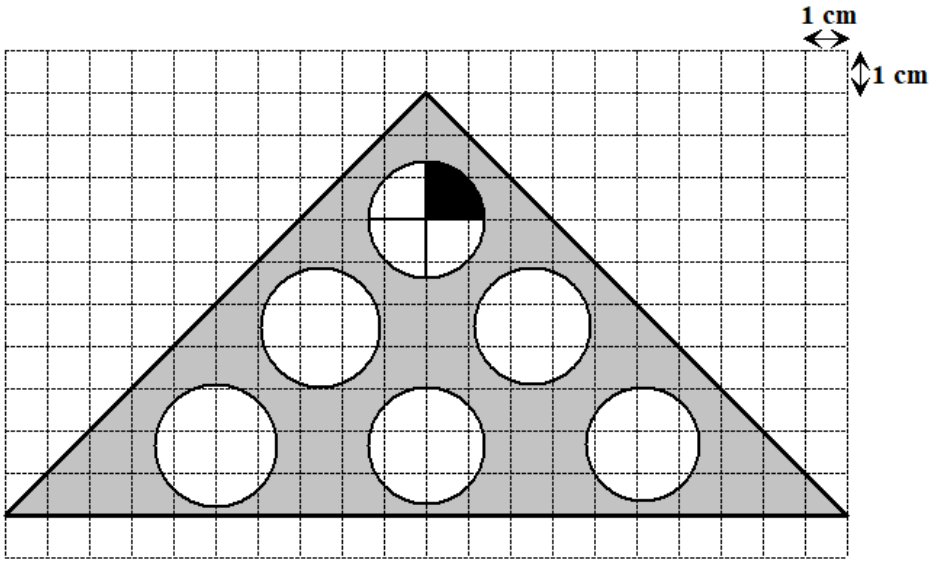
Twice Yvette's share + 9 = 45
Twice Yvette's share = 45 – 9 =36
Yvette's share = 36 ÷ 2 = 18

∴ Yvette receives = 18 pens.

∴ Alison receives $18 + 9 = 27$ pens.

Answer: 27 pens

38. An isosceles triangle is drawn on the 1 cm grid below. Six identical circles partially cover the triangle. Each circle is divided into four equal parts. The area of the shaded fraction shown in the circle is 2 cm^2.



What area of the triangle is **not** covered by the circles?

Solution:

Area of $\frac{1}{4}$ of the the circle $= 2 \text{ cm}^2$

Area of each circle $= 2 \times 4$
$= 8 \text{ cm}^2$

Area of all six circles $= 8 \times 6$
$= 48 \text{ cm}^2$

Base of the rectangle $= 20 \text{ cm}$

Height of the rectangle $= 10 \text{ cm}$

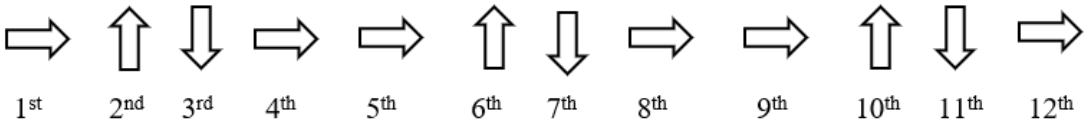
Area of the triangle $= \frac{20 \times 10}{2}$
$= 100 \text{ cm}^2$

The triangle is one-half the area of the rectangle whose dimensions are 20 units by 10 units

$\therefore$ Area of the triangle not covered by the circles $= 100 - 48$
$= 52 \text{ cm}^2$

Answer: 52 cm^2

39. The incomplete pattern below shows the position of its elements.



a) Explain the pattern rule.

Answer: The arrow points to the right, then it points up, then it points down and then to the right again. These four terms are repeated.

Right, Up, Down, Right

b) Draw the 19^{th} element.

Solution	Alternative Solution
The 19^{th} element will be the same as the $19-4=15^{th}$ and which would be the same as the $15-4=11^{th}$ and the $11-4=7^{th}$ and the $7-4=3^{rd}$ element. The 19^{th} element is ⇩	After every 4 terms, the pattern unit repeats. $(19 \div 4) = 4R3$ After 19 terms, the pattern would have completed four repetitions and will be in term 3 of the fifth repetition. The third term is the down arrow, ⇩

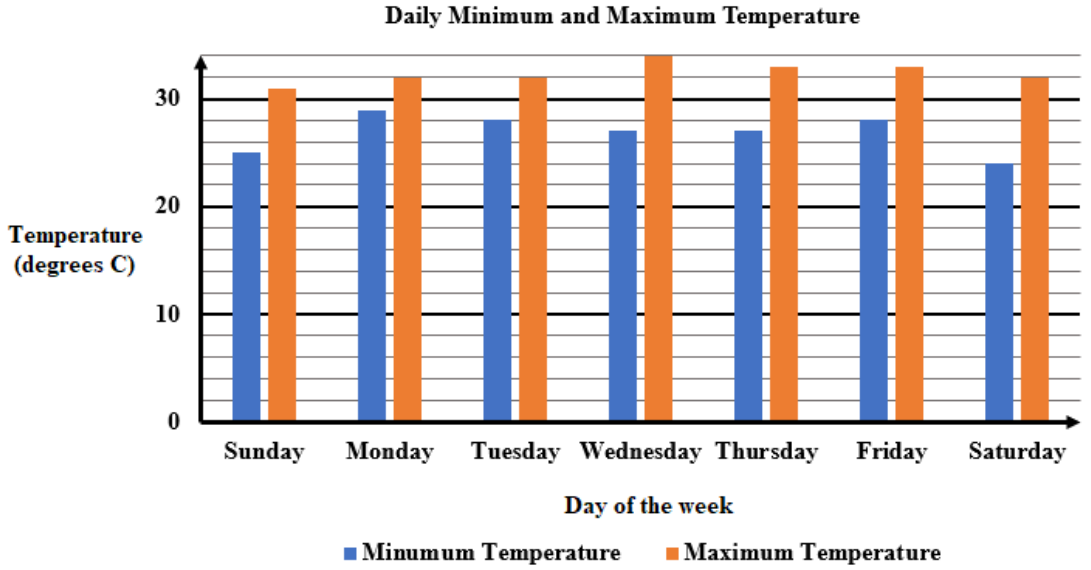
c) State the position at which the pattern begins repeating for the fifth time.

The pattern makes four changes and then begins to repeat.
So, the beginning of a new pattern is at:

1^{st}, $1+4=5^{th}$, $5+4=9^{th}$, $9+4=13^{th}$, $13+4=17^{th}$.

Answer: So, in the 17^{th} position, the pattern begins its 5^{th} cycle.

40. The bar graph below shows the daily minimum and maximum temperatures recorded for one week.



Solution:

The following information was extracted from the graph:

Day	Maximum Temperature	Minimum Temperature	Difference
Sunday	31	25	6
Monday	32	29	3
Tuesday	32	28	4
Wednesday	34	27	7
Thursday	33	27	6
Friday	33	28	5
Saturday	32	24	8

a) What is the difference between the minimum and maximum temperature on the hottest day?
The hottest day was Wednesday since the temperature of 34^0 C was highest on that day
As seen in the table created above, the difference between the maximum and minimum temperature $= 7$ °C

Answer: 7 degrees C

b) On which days is the difference between the minimum and maximum temperatures the same?

Solution:

On Sunday and on Thursday, the difference between the maximum and minimum temperatures is the same. As seen in the table created above, both were 6 °C.

Answer: Sunday and Thursday

c) On which day is the difference between the minimum and maximum temperatures the largest?

Solution:

On Sunday, the difference in temperature is the largest and was 8 °C as shown on the table.

Answer: Saturday