FAS-PASS
Maths

# SEA2021 MATHEMATICS SPECIMEN PAPER

**1.** Write the numeral to represent three hundred and five thousand and forty-eight.

| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| 3 | 0 | 5 | 0 | 4 | 8 |

Answer: 305 048

**2**. State the place value of the digit 3 in the numeral 653 581.

| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| 6 | 5 | 3 | 5 | 8 | 1 |

Answer: Thousands

**3.** Round 6 498 to the nearest thousand.

| Thousands | Hundreds | Tens | Ones |
|---|---|---|---|
| 6 | 4 | 9 | 8 |

We look at the digit, 4, which is the hundreds digit and is to the immediate right of the thousands digit. The value of this digit is important in making the decision to round up or down. Since, 4 is less than 5, we round down. The number 4 and all the digits to its right are written as zero. So, 6 498 will now be written as 6 000 to the nearest thousand.

Answer: 6 000

**4.** The scores in a video game are given for four players.

**Players' Scores in a Video Game**

| Player | Score |
|---|---|
| Dev | 46 978 |
| Liz | 49 687 |
| Suri | 48 679 |
| Vidal | 49 876 |

Who scored the highest?

| | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| Dev | 4 | 6 | 9 | 7 | 8 |
| Liz | 4 | 9 | 6 | 8 | 7 |
| Suri | 4 | 8 | 6 | 7 | 9 |
| Vidal | 4 | 9 | 8 | 7 | 6 |

The first digit, the ten thousands digit, is the same for all players. So, we look at the next digit, which is the thousands digit. Liz and Vidal both had 9 thousands and so their scores are higher than the other two scores. We next look at their hundreds , Vidal had 8 hundreds and Liz had 6 hundreds. Hence, we conclude that Vidal had the highest score.

Answer: Vidal

**5.** The items below are on display at Sara's Electronics Store. What fraction of the items are phones?

Number of phones = 8
Number of laptops = 4
Number of desktops = 2
Total number of items on display = 8+ 4 + 2 = 14
Fraction of items that is phones = $\frac{Number\ of\ phones}{Total\ Number\ of\ items} = \frac{8}{14} = \frac{4}{7}$

Answer: $\frac{4}{7}$

**6.** One-fifth of Gail's allowance is $30. Calculate Gail's allowance.

Gail's Allowance can be represented as 1 whole.

| Gail's Allowance |
|---|

To show one-fifth of Gail's allowance, we divide the whole in 5 equal parts. Each part will now represent one fifth of Gail's Allowance. Given that one-fifth of Gail's allowance is $30, we show this information in the model below.

| $30 | | | | |
|---|---|---|---|---|

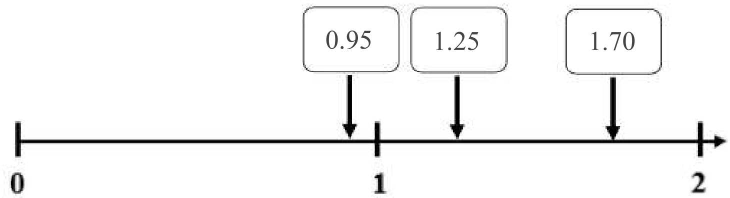
The whole has 5 equal parts, so
1 part = $30
5 parts = $\$30 \times 5 = \$150$
**OR**
One fifth of Gail's Allowance = $30
Five fifths, which is the whole, of Gail's Allowance = $\$30 \times 5 = \$150$

Answer: $150

**7.** Place the numbers below in the correct positions on the number line.

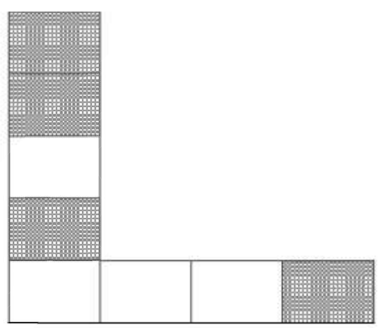
**1.25** **1.70** **0.95**

Answer:




The only number between 0 and 1 is 0.95 and since it is close to 1, we place it on the left of 1 on the number line.
The other two numbers are greater than 1 but less than 2. So, both lie in the interval between 1 and 2. 1.25 is less than 1.70. So 1.25 precedes 1.70 in the interval between 1 and 2.

**8.** Express the shaded area as a decimal which represents part of the whole.



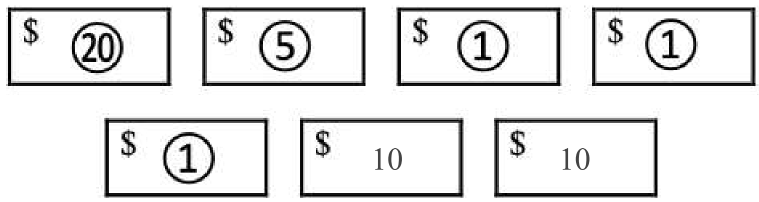
Assuming that all parts of the whole are equal, the shape has 8 rectangles and 4 of these are shaded. The fraction that is shaded is $\frac{4}{8} = \frac{1}{2}$.

To express $\frac{1}{2}$ as a decimal we convert it to tenths:

$$\frac{1}{2} = \frac{5}{10} = 0.5$$

Answer: 0.5

**9.** Natalie has 7 bills in her pocket with a total value of \$48.




Write the missing values in the 2 bills above.

Total value of the seven bills = \$48

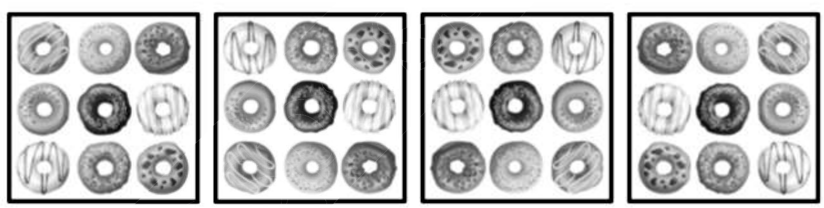
Total value of the five marked bills = \$20 + \$5 + \$1 + \$1 + \$1 = \$28

Total value of the two unmarked bills = $\$48 - 28 = \$20$

The two unmarked bills add up to \$20. Therefore, each one should be $\$20 \div 2 = $\$10.

Answer: \$10 and \$10

**10.** Ms. Tang bought 4 sets of doughnuts. She created a package of treats using $\frac{2}{3}$ of a set. How many packages did she create using all 4 sets?



Ms Tang purchased 4 sets of 9 doughnuts

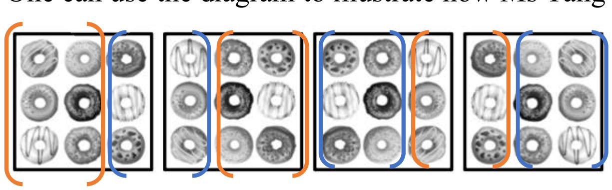
Number of doughnuts purchased = $9 \times 4 = 36$ doughnuts

One package of treats has = $\frac{2}{3} \times 9$ doughnuts = 6 doughnuts

Ms Tang had 36 doughnuts to put in packages of 6.

The number of packages created = $36 \div 6 = 6.$

OR
One can use the diagram to illustrate how Ms Tang can create her packages of treats.



Answer: 6 packages

**11.** Betty's weight is 46 000 grams. What is her weight in kilograms?

1 kilogram = 1000 grams

Betty's weight in kilograms = $\frac{46\ 000}{1000}$ kilograms $= 46$ kilograms

Answer: 46 kilograms

**12.** Ethan started an online Mathematics class at the time shown on the clock. The class lasted 45 minutes.


What time did the Mathematics class end?

Ethan's class started at 10 minutes past 10 and lasted for 45 minutes. To determine the time the class ended, we must add 45 minutes to the time it started.

| | Hours | Minutes |
|---|---|---|
| | 10 | 10 |
| + | | 45 |
| | 10 | 55 |

Answer: 10:55

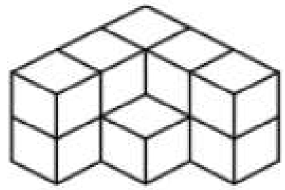
**13.** Convert $2\frac{1}{5}$ hours to minutes.

1 hour = 60 minutes
2 hours = $60 \times 2$ minutes $= 120$ minutes
$\frac{1}{5}$ hour = $60 \div 5 = 12$ minutes
$2\frac{1}{5}$ hours = (120 + 12) minutes
= 132 minutes

OR
We can multiply 60 by $2\frac{1}{5} = 60 \times 2\frac{1}{5} = 60 \times \frac{11}{5} = 132$

Answer: 132 minutes

**14.** The model below is formed by stacking 1 cm cubes. Calculate the volume of the model.



If we look closely at the model form the top view, we notice that there are 5 sets of two cubes stacked vertically and there is one cube that is missing the top layer.

Total number of cubes in stacks of 2 = 2× 5 = 10

Remaining unstacked cube = 1

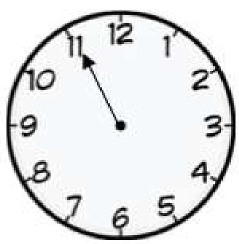
Total number of cubes = 11

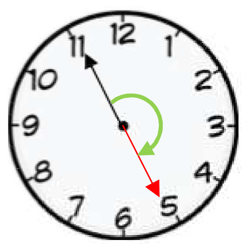
Volume of 1 cube = $1\ cm^3$

Volume of solid = $1cm^3 \times 11 = 11cm^3$

Answer: 11 $cm^3$

**15.** The second hand shown on the clock turned two right angles.
What number did the second hand point to after the turn?



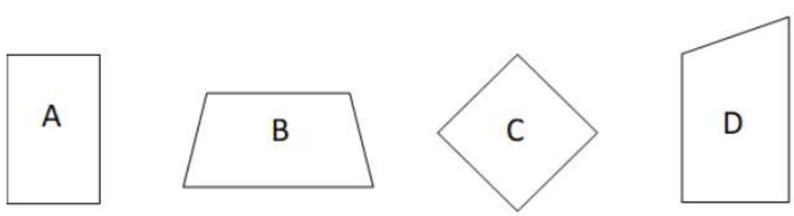

Two quarter turns = 1 half turn

The second hand is on 11 and after a half turn, it will point to the number opposite or 5.

Answer: 5

**16.** Which quadrilateral below has **no** right angles?

We examine

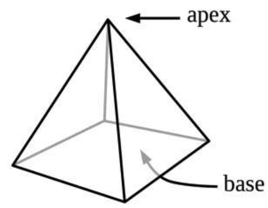



4 right angles | No right angles | 4 right angles | 2 right angles

Answer: B

**17.** Name a solid that has five faces, one of which is a square.

A square-based pyramid has five faces – one square face and 4 triangular faces meeting at a point, called the apex.




Answer: Square-based pyramid

**18.** The table below shows the number of books read by five students in a reading competition. Complete the table to show how many books Varsha read if 73 books were read altogether.

**STANDARD FIVE READ-A-THON**

| Student | Number of books read |
|---|---|
| Jesse | 15 |
| Akeel | 17 |
| Varsha | |
| Mala | 13 |
| Amy | 12 |

The number of books read by Jesse, Akeel, Mala and Amy = 15 + 17 + 13 + 12 = 57
The total number of books read by all 5 students = 73
The number of books read by Varsha = $73 - 57$
= 16

Answer: 16 books

**19.** What is the mode for the following set of test scores?

| | | | | |
|---|---|---|---|---|
| 35 | 46 | 41 | 39 | 37 |
| 47 | 43 | 42 | 38 | 41 |
| 39 | 41 | 43 | 43 | 39 |
| 43 | 36 | 38 | 41 | 45 |

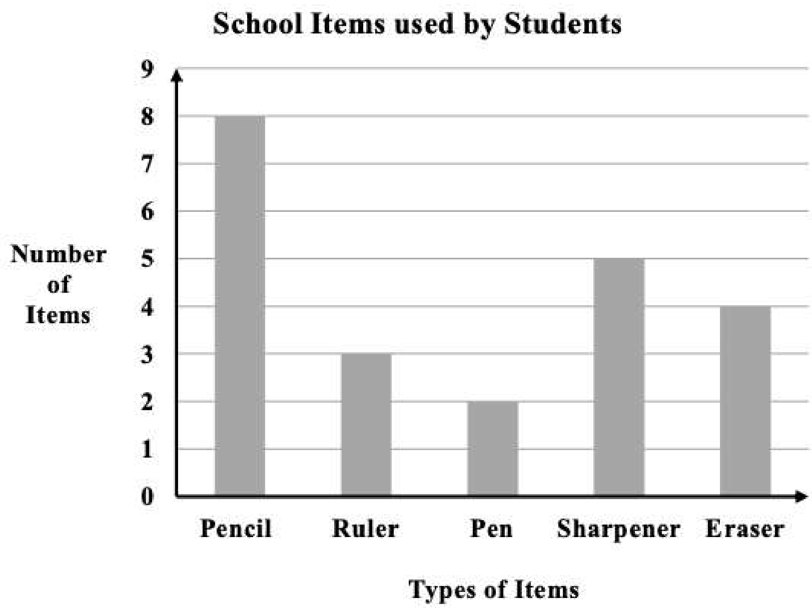
We are looking for the score that occurs the most, so we record the number of times each score occurred using tally marks. We start with the lowest score and end with the highest score.

<table>
<tr><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td><td>40</td><td>41</td><td>42</td><td>43</td><td>44</td><td>45</td><td>46</td><td>47</td></tr>
<tr><td>|</td><td>|</td><td>|</td><td>||</td><td>|||</td><td></td><td>||||</td><td>|</td><td>||||</td><td></td><td>|</td><td>|</td><td>|</td></tr>
</table>

Two scores, 41 and 43 occurred 4 times. All the other scores had less than 4 occurrences. We conclude that there are two modes, 41 and 43.

Answer: 41 and 43

**20.** The bar graph shows the school items used by students.




How many more pencils than pens are used?

Number of pencils used = 8

Number of pens used = 2

The number of pencils is more than the number of pens by = $8 - 2 = 6$

There were 6 more pencils than pens used.

Answer: 6 pencils

**21.** Alan puts three numbers in ascending order. A common fraction belonging to the eighths family is missing. Write the missing fraction.

0.65 $\boxed{\phantom{xx}}$ 80%

$0.65 = \frac{65}{100} = \frac{13}{20}$ and $80\% = \frac{80}{100} = \frac{16}{20}$

Fractions that are between $\frac{13}{20}$ and $\frac{16}{20}$, are $\frac{14}{20}$ and $\frac{15}{20}$.

$\frac{14}{20} = \frac{7}{10}$ and $\frac{15}{20} = \frac{3}{4} = \frac{6}{8}$

Since $\frac{6}{8}$ belongs to the family of eighths, the missing fraction is $\frac{6}{8}$.

OR

All the common fractions belonging to the family of eighths are $\frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{4}{8}, \frac{5}{8}, \frac{6}{8}, \frac{7}{8}$.
We are looking for a decimal fraction between 0.65 and 0.80 (80%).

We cannot choose any of $\frac{1}{8}, \frac{2}{8}, \frac{3}{8}$ or $\frac{4}{8}$ since these are all less than 0.5. Note $\frac{4}{8} = \frac{1}{2} = 0.5.$

Calculating the decimal equivalent of the remaining three fractions, we have

$\frac{5}{8} = \frac{725}{1000} = 0.625.$ $\frac{6}{8} = \frac{75}{100} = 0.75$ $\frac{7}{8} = \frac{875}{1000} = 0.875$

The fraction that is greater than 0.65 but less than 0.80 is $\frac{6}{8} = \frac{75}{100} = 0.75$

Answer: $\frac{6}{8}$

**22.** Mr. Sam uses 12 cups of flour to bake one batch of bread rolls. Each roll can be made from $\frac{1}{4}$ cup of flour. How many bread rolls can be made in five batches?

$\frac{1}{4}$ cup of flour makes 1 bread roll.
Since there are 4 quarter cups in one whole cup,
1 cup of flour will make 4 bread rolls.
12 cups of flour will make $= 4 \times 12$ bread rolls
$= 48$ bread rolls
But, 12 cups flour bake one batch of bread rolls
Therefore, one batch consists of 48 bread rolls
So 5 batches will consist of $= 48 \times 5$ bread rolls
$= 240$ bread rolls

| H | T | O |
|---|---|---|
| | 4 | 8 |
| × | | 5 |
| 2 | 4 | 0 |

Answer: 240 bread rolls

**23.** When 4 times a number is added to 25, the answer is the difference between 50 and 675. What is the number?

Let us first calculate the difference between 50 and 675.

Therefore 4 times a number added to 25 gives 625 as the answer.

We can use a bar model to represent 4 times the number added to 25.

| | H | T | O |
|---|---|---|---|
| | 6 | 7 | 5 |
| − | | 5 | 0 |
| | 6 | 2 | 5 |

| | | | | |
|---|---|---|---|---|
| | | | | 25 |

This entire whole adds up to 625, so if we remove the 25, the orange-coloured part will be equivalent to 600.

The 4 equal parts add up to 600, so one part will be 150.

| | | | |
|---|---|---|---|
| 150 | 150 | 150 | 150 |

| | H | T | O |
|---|---|---|---|
| 4 | 6 | $^{2}0$ | 0 |
| | 1 | 5 | 0 |

Answer: 150

**24.** Which two square numbers sum to 100?

A number multiplied by itself gives a square number, for example

$1 \times 1 = 1, \quad 2 \times 2 = 4, \quad 3 \times 3 = 9, \ldots$

The square numbers that are less than 100 are:

1, 4, 9, 16, 25, **36**, 49, **64**, 81

By observation, two of these numbers add up to 100.

36 + 64 = 100

$(6 \times 6) + (8 \times 8) = 100$

Answer: 36 and 64

**25.** Shane's Computer Store had a sale on mobile devices. What was the total discount given if a customer purchased both items shown below?


Original price of Laptop= $3 675

Discount = $33\frac{1}{3}\%$ of $3 675

$= \frac{33\frac{1}{3}}{100} \times \$3\ 675$

$= \frac{1}{3} \times \$3\ 675$

$= \$1\ 225$

Original price of Tablet= $1 575

Discount = 20% of $1 575

$= \frac{20}{100} \times \$1\ 575$

$= \frac{1}{5} \times \$1\ 575$

$= \$315$

Total discount on both items = $1225 + $315

= $1 540

Answer: $1 540

**26.** On Monday 400 students were present at Mountain View Primary school. By lunchtime, 40% of the students fell ill and returned home. The number of girls who remained was four times the number of boys. How many boys remained after lunch?

Number of students present on Monday morning $= 400$

Number of students who fell ill $= 40\%$ of $400$

$= \frac{40}{100} \times 400 = 160$ students

Number of students who remained in school $= 400 - 160 = 240$

The number of girls who remained was four times the number of boys.

The 240 students who remained in school can be represented as a whole divided into equal parts with 4 parts representing girls and 1 part representing boys.

| | | | | |
|---|---|---|---|---|
| Girls | Girls | Girls | Girls | Boys |

5 parts = 240 students

1 part $= 240 \div 5$ students $= 48$ students

These 48 students will be boys

Answer: 48 boys

**27.** Andrew was asked to solve the problem below.

$$\begin{array}{r} 5\ 0\ 2\ 1 \\ -\ 3\ 9\ 8\ 6 \\ \hline \\ \hline \end{array}$$

He estimated a difference of 2 000 in working out the problem.
Explain why Andrew's estimate may not be reasonable and clearly show your estimate.

Since we require an estimate to the nearest thousand, we can round both numbers to the nearest thousand.

To round 5 021, to the nearest thousand, we consider the hundreds digit (our deciding digit) and note that it is zero. Since 0 is less than 5, we round down to 5 000.

| Th | H | T | 0 |
|---|---|---|---|
| 5 | 0 | 2 | 1 |
| | ↑ | | |

To round 3 986, to the nearest thousand, we consider the hundreds digit (our deciding digit) and note that it is nine. Since 9 is greater than 5, we round up to 4 000.

| Th | H | T | 0 |
|---|---|---|---|
| 3 | 9 | 8 | 6 |
| | ↑ | | |

Andrew's problem is simplified to

| | Th | H | T | 0 |
|---|---|---|---|---|
| | 5 | 0 | 0 | 0 |
| − | 4 | 0 | 0 | 0 |
| | 1 | 0 | 0 | 0 |

Andrew's estimate of 2 000 is unreasonable because a better estimate is 1 000. Andrew may have considered only the thousands digits in the original problem when subtracting and ignored the hundreds digit. He likely subtracted 3 thousand from 5 thousand and obtained 2 thousand.

**28.** Marlon sells a set of 3 mangoes for \$5.00. He wants to buy a television which costs \$3 725.00 but only has \$775.00 in his savings. How many mangoes must he sell to earn the rest of the money he needs?

Cost of television set =\$3 725
Amount of savings. = \$ 775
Amount of money Marlon needs. = \$3 725 − \$775
= \$2 950

| | Th | H | T | 0 |
|---|---|---|---|---|
| | | 16 | | |
| | 2 | $\cancel{6}$ | 12 | |
| | $\cancel{3}$ | $\cancel{7}$ | $\cancel{2}$ | 5 |
| − | | 7 | 7 | 5 |
| | 2 | 9 | 5 | 0 |

He sells a set of 3 mangoes for \$5 and has to raise \$2 950 from the sale of mangoes.

The number of sets of mangoes he must sell to raise \$2 950 = $\frac{2\,950}{5} = 590$

| | Th | H | T | O |
|---|---|---|---|---|
| 5 | 2 | 9 | $^{4}5$ | 0 |
| | | 5 | 9 | 0 |

One set has 3 mangoes
590 sets will have = $590 \times 3$ mangoes
$= 1\ 770$ mangoes

| Th | H | T | O |
|---|---|---|---|
| | 5 | 9 | 0 |
| × | | | 3 |
| 1 | 7 | 7 | 0 |

Answer: 1770 mangoes

**29.** A football game started at 4:10 p.m. and ended at 6:00 p.m. There was a 15 minute break after the first half of the game. How much time was spent on actual play?

The duration of the game, including the 15 minute break can be found by subtracting the start time from the end time.

Duration of game = 1 hour 50 minutes

Duration of break = 15 minutes

Time spent on actual play = 1 hour 50 minutes – 15 minutes

= 1 hour 35 minutes

| | Hours | Minutes |
|---|---|---|
| End Time | 5 | 60 |
| Start Time | ~~6~~ | ~~0~~ |
| – | 4 | 10 |
| | 1 | 50 |

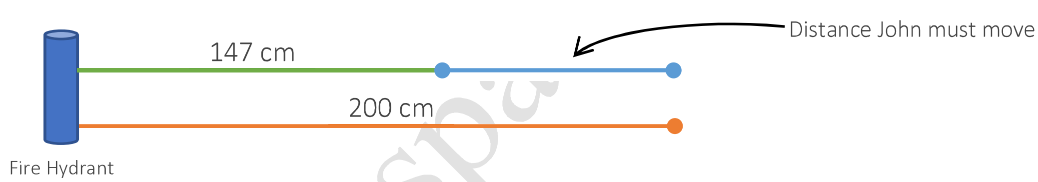
Answer: 1 hour 35 minutes

**30.** Josh parked 147 centimetres away from the fire hydrant. How much further should Josh move if he must park 2 metres away from the fire hydrant?

We can draw a diagram to illustrate the information. First we must express 2 metres in centimetres.

1 metre =100 cm,

2 metres = 200 cm.




Distance John must move = 200 cm – 147 cm = 53 cm

1 metre = 100 cm

53 cm = 53 ÷ 100 metres = 0.53 metres

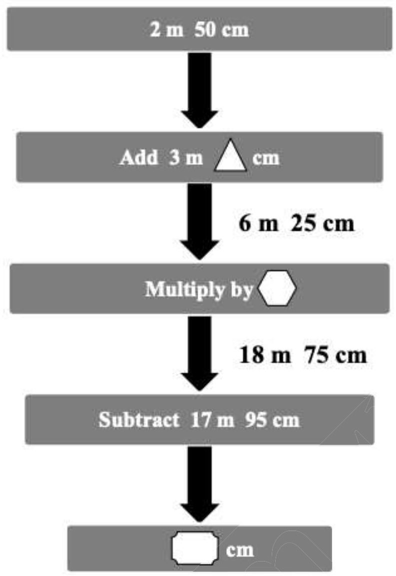
| | ~~H~~ | ~~T~~ | O |
|---|---|---|---|
| | | 9 | |
| | 1 | 10 | 10 |
| | 2 | 0 | 0 |
| – | 1 | 4 | 7 |
| | | 5 | 3 |

Answer: 0.53 m

**31.** The measure 2 m 50 cm is put into the number machine below.

Three numbers △, ⬡ and ▭ are missing.

Write the missing numbers.




The first missing number is represented by a triangle and we can write a number sentence as follows:

2 m 50 cm + △ = 6 m 25 cm

Using the method of *adding on* to get 6m 25 cm, we have:

2m 50 cm + ( 50 cm) = 3m
3m + (3m ) = 6m
6m + (25 cm) = 6m 25 cm

| m | cm |
|---|---|
| | 50 |
| + 3 | |
| | 25 |
| 3 | 75 |

Total added
(50cm + 3m + 25 cm)= 3m 75 cm

△ = 3m 75 cm

Using the method of *reversing the operation*, we have:

2 m 50 cm + △ = 6 m 25 cm

△ = 6m 25 cm – 2m 50 cm

△ = 3 m 75 cm

| m | cm |
|---|---|
| 5 | 125 |
| – 6 | 25 |
| ~~2~~ | ~~50~~ |
| 3 | 75 |

The second missing number is represented by a hexagon and we can write a number sentence as follows:

6 m 25 cm × ⬡ = 18m 75 cm

By observation,

25 cm × 3 = 75 cm

6 m × 3 = 18 m

| | m | cm |
|---|---|---|
| | 6 | 25 |
| × | | 3 |
| | 18 | 75 |

Using the method of reversing the operation

6 m 25 cm × ⬡ = 18m 75 cm

⬡ = 18m 75 cm ÷ 3

| | m | cm |
|---|---|---|
| 3 | 18 | 75 |
| | 6 | 25 |

The third missing number is represented by and we can write a number sentence as follows:

18 m 75 cm – 17m 95 cm = ▭

▭ = 80 cm

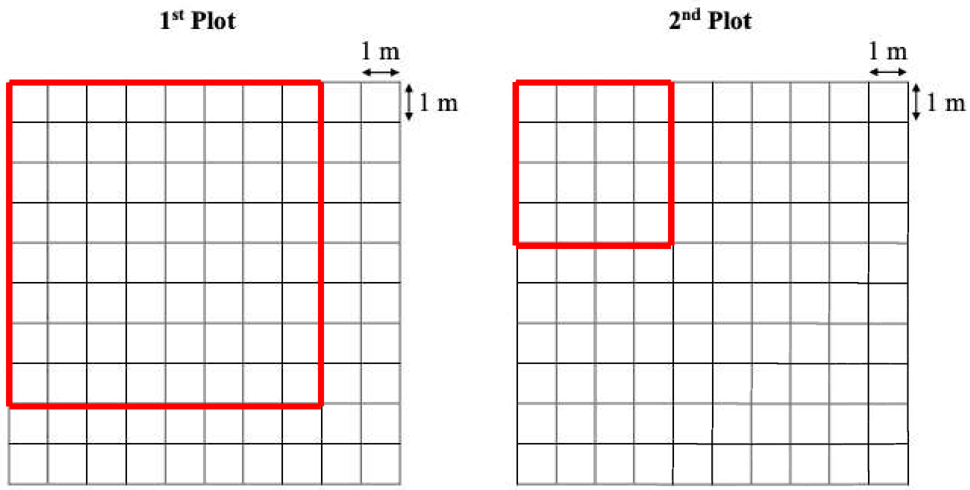
| | m | cm |
|---|---|---|
| | 17 | 175 |
| | 18 | 75 |
| – | ~~17~~ | ~~95~~ |
| | | 80 |

**Answer:** △ = 3 m 75 cm

**Answer:** ⬡ = 3

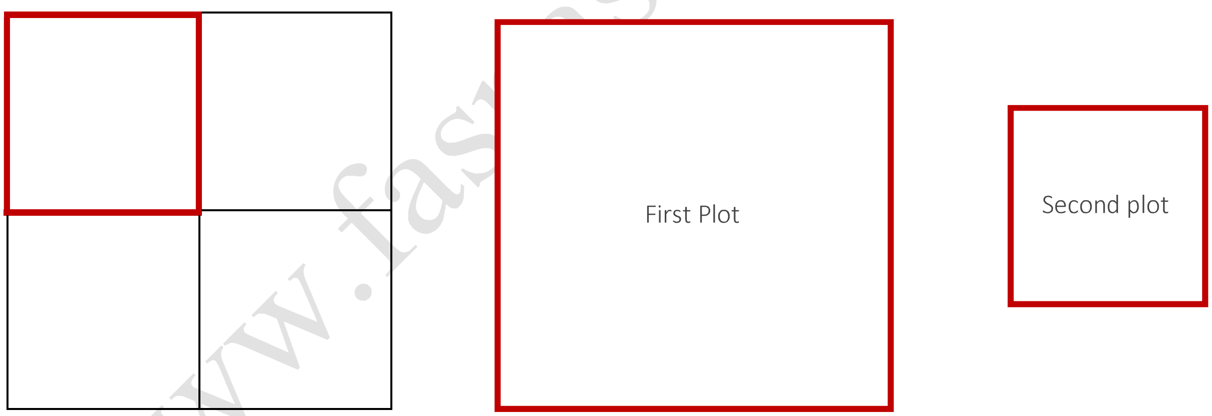
**Answer:** ▭ = 80 cm

**32.** Kareem has 48 m of wire to construct fences around two square plots of land. The area of the first square plot is four times the area of the second square plot.




Shade the areas on the grids above to represent Kareem's two square plots.

If the area of one plot is 4 times the area of the other plot, then we can visualize both plots as shown in the diagram:




The smaller plot will need 4 equal lengths of wire to be completely fenced.

The larger plot will need 8 equal lengths of wire to be completely fenced.

Kareem will have to cut the 48 metres into 12 equal lengths.

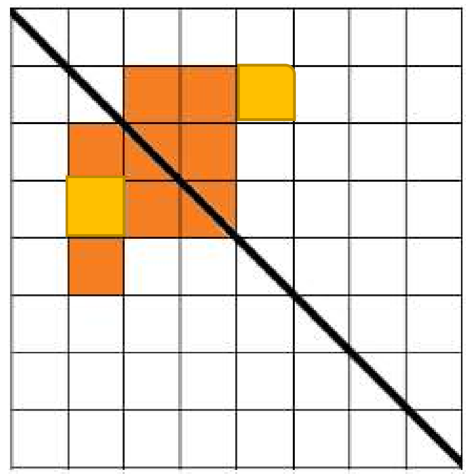
Each length will be = $48 \div 12$ metres = 4 metres

Area of smaller plot = $4m \times 4m = 16m^2$

Area of larger plot = $8m \times 8m = 64m^2$

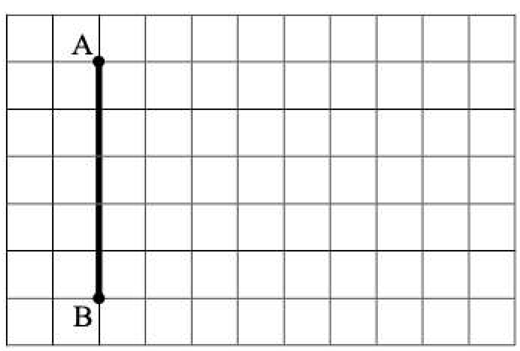
Hence, area of larger plot = $16m^2 \times 4$, which is 4 times the area of the smaller plot

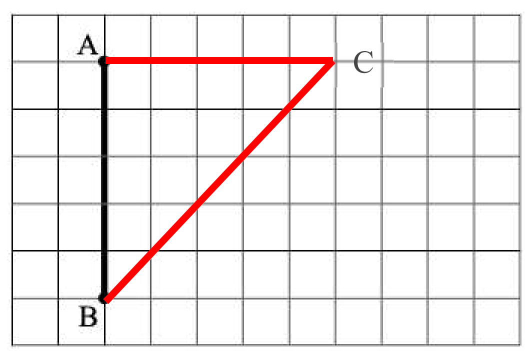
**33.** Complete the symmetrical shape on the grid below using the line of symmetry shown.



The completed shape is symmetrical about the given line because both shapes, on either side of the line are exactly the same. Either one is a mirror image of the other and if the grid is folded about the line of symmetry there will be no overlap.

**34.** Triangle ABC is a right angled isosceles triangle whose angle B is equal to its angle C. Complete the drawing on the grid below to represent triangle ABC.



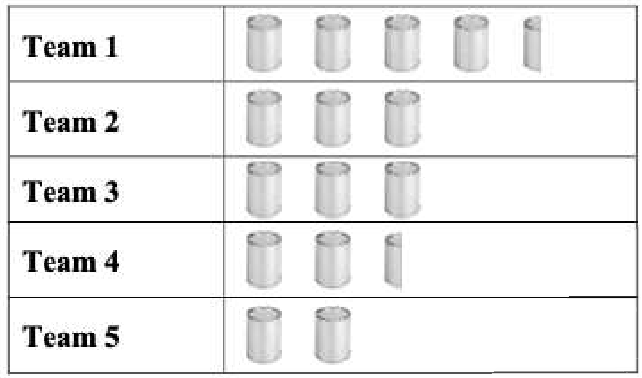




If the angle at B is equal to the angle at C, then the side opposite angle B, is equal to the side opposite angle C.
So, AC = AB
We counted AB to be 5 units in length, so AC will have to be 5 units in length.
Starting at A, we draw AC equal to 5 units and AC at right angles to the line AB. Note that since AB is vertical then AC is horizontal.
Then Join BC to complete the triangle.

Triangle ABC is right-angled at A and isosceles, with angle B equal to angle C and AB = AC.

**35.** The pictograph uses a scale factor to represent the number of cans collected by 5 teams. Altogether, the teams collected 120 cans.

**Number of cans collected**




How many more cans did **Team 1** collect than **Team 4**?

The teams collected a total of 120 cans

The total number of pictures shown in the pictograph is: $4\frac{1}{2} + 3 + 3 + 2\frac{1}{2} + 2 = 15$

15 pictures represent 120 cans

1 picture will represent = (120 ÷ 15) cans

= 8 cans

Team 1's collection is represented by $4\frac{1}{2}$ pictures

The number of cans collected by Team 1 =$( 8 \times 4) + (8 \times \frac{1}{2})$ = 32 + 4 = 36

Team 4's is represented by $2\frac{1}{2}$ pictures

The number of cans collected by Team 4 =$( 8 \times 2) + (8 \times \frac{1}{2})$ = 16 + 4= 20

Team 1 collected $(36 - 20) = 16$ , more cans than Team 4.

Answer: Team 1 collected 16 more cans than Team 4.

**36.** J's Auto sold 5 different types of vehicles. The table below shows the number of vehicles sold by J's Auto during May.

**Vehicles Sold in May**

| Type of Vehicle | Number Sold |
|---|---|
| Sedan | 30 |
| SUV | 20 |
| Truck | 10 |
| Wagon | 25 |
| Sports Car | 5 |

**The owner of J's Auto wanted the mean number of vehicles sold in May to be greater. How may Sports Cars should he have sold in May to increase the mean number of vehicles sold to 20?**

The total number of vehicles sold in May = 30 + 20 + 10 + 25 + 5 = 90
The number of types of vehicles = 5
The mean number of vehicles by type sold in May

$$= \frac{Total\ number\ of\ vehicles\ sold}{Number\ of\ types\ of\ vehicles}$$
$$= \frac{90}{5}$$
$$= 18$$

To increase the mean to 20 for the month of May, the company will have to sell a total of
$= 20 \times 5$ vehicles
= 100 vehicles

The company sold 90 vehicles in May so they were short by : (100 – 90) vehicles
The company needed to sell 10 more vehicles.

The number of Sports Cars sold in May = 5
Since, the increase is to be in the number of Sports Cars, then this number should have been
5 + 10 = 15

If the company had sold 15 Sport cars in May their mean number of cars would have been 20.

Answer: 15 Sports cars

**37.** The sum of every five numbers in the number pattern below forms a new number pattern.

3, 9, 15, 21, 27, **...**

Write the first three numbers in the new pattern and describe the pattern.

The number pattern has terms that are increasing by 6.

The sum of the first 5 terms = 3 + 9 + 15 + 21 + 27 = 75
So, 75 is the first term in the new pattern

The second set of five terms in the sequence will be
27+6 = 33
33+6 = 39
39+6 = 45
45+6 = 51
51+6 = 57
The sum of these 5 terms = 225
So, 225 is the second term in the new pattern

The third set of five terms in the sequence will be
57+6 = 63
63+6 = 69
69+6 = 75
75+6 = 81
81+6 = 87
The sum of these 5 terms = 375
So, 375 is the third term in the new pattern

The new pattern is

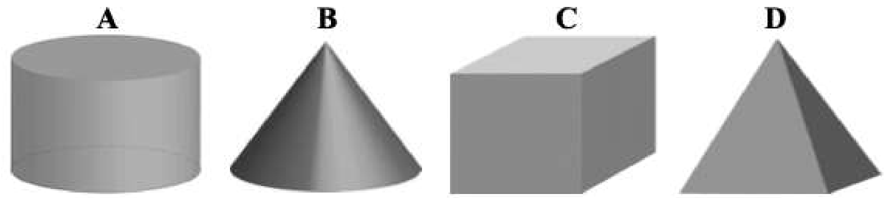
75, 225, 375,...

The numbers in the new pattern increase by 150:
75 +150 = 225
225+150 = 375

OR
Each term in the new pattern is a multiple of 75 by the set of odd numbers.
First term: $1 \times 75 = 75$
Second term: $3 \times 75 = 225$
Third term: $5 \times 75 = 375$

Answer: In the new pattern, each term increases by 150 or is a multiple of 75 by the set of odd numbers.

**38.** The average mass of the four solids A, B, C, and D shown below is 1.5 kilograms.




The average mass of solids A and B is 1.6 kilograms. The mass of solid C is three times the mass of solid D. What is the mass of solid C and solid D, in terms of grams?

The average mass of the four solids = 1.5 Kg
The total mass of the four solids = $1.5 \times 4$ Kg
= 6 Kg

The average mass of the two solids, A and B = 1.6 Kg
The total mass of the two solids, A and B = $1.6 \times 2$ Kg
= 3.2 Kg

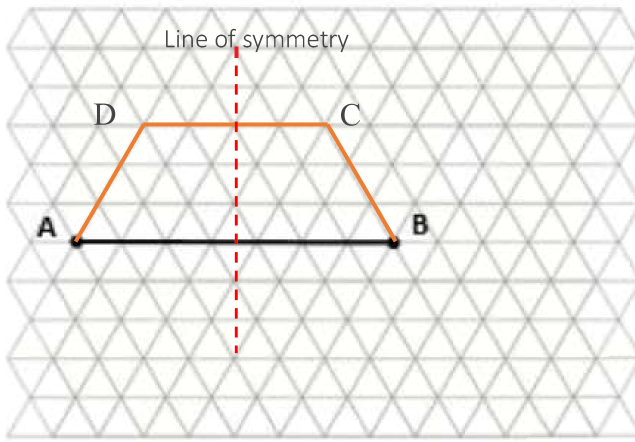
The mass of
(A + B) + (C +D) = 6 Kg
(A + B) = 3.2 Kg
(C + D) = (6 – 3.2) kg
= 2.8 Kg
The mass of solid C is 3 times the mass of solid D
Hence, the 2.8 Kg has to be shared into 4 equal parts so that one share has 3 parts (C)and the other (D) has 1 part.
4 parts = 2.8 Kg
1 part = $2.8 \div 4$ Kg
= 0.7 Kg
Therefore, mass of D = 0.7 kg
Mass of C = $0.7 \times 3$ Kg. = 2.1 Kg

Converting Kilograms to grams
Mass of D = 0.7 kg = $0.7 \times 1\,000$ grams = 700 grams
Mass of C = 2.1 kg = $2.1 \times 1\,000$ grams = 2 100 grams

<table>
<tr><td colspan="5">A + B + C + D = 6</td></tr>
<tr><td>A + B = 3.2</td><td colspan="4">C + D =2.8</td></tr>
<tr><td>3.2</td><td>0.7</td><td>0.7</td><td>0.7</td><td>0.7</td></tr>
<tr><td></td><td colspan="3">C = 2.1</td><td>D= 0.7</td></tr>
</table>

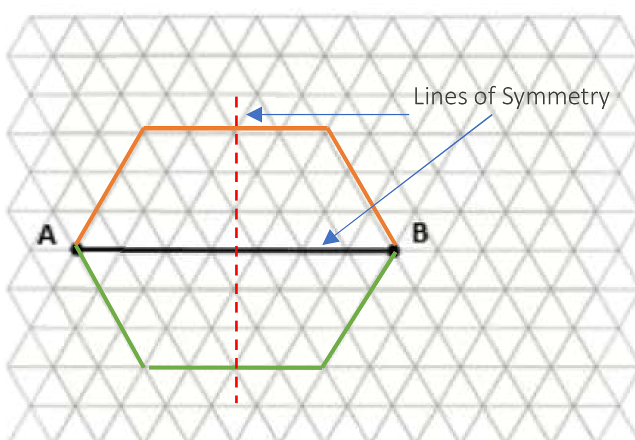
Answer: Mass of D = 700 g , Mass of C = 2 100 g

**39.** On the grid paper below draw the quadrilateral with one pair of parallel sides, one line of symmetry and the straight line that joins the points A and B as its base.




The quadrilateral drawn has one pair of parallel sides, base AB is parallel to CD. It has one line of symmetry. We chose to draw DC in the position shown on the diagram. However, there are many lines that could have been drawn to satisfy the given requirements, even on the opposite side of AB.

Complete the drawing using the straight line that joins the points A and B as a line of symmetry and describe the completed plane shape in terms of its angles, sides and lines of symmetry.




Answer: The plane shape is a hexagon which is composed of 6 sides and 6 angles. It has 2 lines of symmetry, AB and the dotted vertical line shown in red.

**40.** Five students ran 60 m sprint races at Sea View Primary School. The times students took to complete the sprint races are shown in the table below.

**Times taken to complete 60 metres Sprint Races**

| Student | Time in Seconds | | | | | |
|---|---|---|---|---|---|---|
| | 1st Sprint | 2nd Sprint | 3rd Sprint | 4th Sprint | 5th Sprint | Average |
| **Troy** | 10.4 | 10.3 | 10.2 | 10.1 | 10.0 | **10.2** |
| **Andy** | 15.0 | 12.9 | 12.5 | 10.5 | 9.1 | **12.0** |
| **Jessie** | 9.4 | 9.6 | 9.8 | 10.0 | 10.2 | **9.8** |
| **Stacy** | 9.6 | 11.2 | 9.4 | 11.0 | 9.3 | **10.1** |
| **Chris** | 9.5 | 10.1 | 10.3 | 10.5 | 10.6 | **10.2** |

Based on the information given in the table above, **state three reasons** why an average is not a good measure to select a student to represent the school in a 60 m sprint race **and select** a student to represent the school giving your reason.

It must be noted that in evaluating sprint times the lower the score the faster the sprinter and therefore the lower scores are better scores.

Three reasons why an average score is not a good measure to select a student to represent the school in a sprint race:

1. An average score does not take into consideration the student's trend in performance over time. For example, Jessie has the best average (shortest time) but his sprint time is actually increasing with every sprint. Andy has the highest mean but his time is improving in each race. Chris has the same average as Troy but Chris's scores are on a downward trend while Troy's scores are on an upward trend.

2. Averages are affected by a few or even one very large and very low scores and may not represent a typical performance. For example, Troy and Stacey have almost the same average but Stacey's performance fluctuates between very high and very low scores while Troy's scores are all close to his average score.

3. The mean is only a good choice when all the scores deviate closely from the mean value. When this is not so, the mean score can be misleading.

Both Andy and Troy show improvement in their time. However, Andy's performance is rapidly improving and his last sprint clocked the shortest time of all of all five sprint times of the five students. This trend points to an even shorter time in future sprints and lower than that expected of any of the other students.