

Sample Exam 3 - Solutions

Session 3

Total: 75 marks

SECTION I

1. State the value of the underlined digit in the number below. [1]

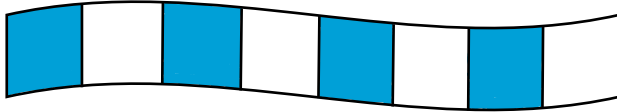
3 4 2 3 5

$$\begin{aligned} 3 \text{ of tens of thousands} &= 3 \times 10\,000 \\ &= 30\,000 \end{aligned}$$

Answer _____ 30 000 _____

2. What percentage of the shape below is unshaded?

[1]



There are 8 strips in all.

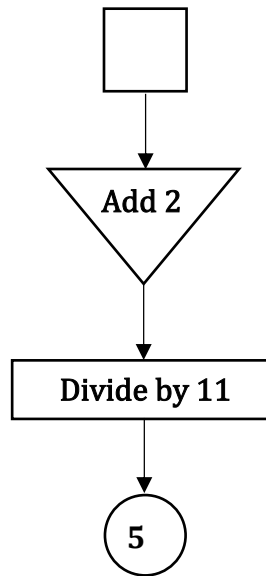
4 of the strips are unshaded.

Assuming that the size of the strips (shaded and unshaded are equal),

$$\begin{aligned}
 \text{Percentage of shape that is unshaded} &= \frac{4}{8} \times 100 \\
 &= \frac{1}{2} \times 100 \\
 &= 50\%
 \end{aligned}$$

Answer 50 %

3. What number must be placed in the box to give the result shown? [1]



Using the reverse process and starting from the result of 5, we get:

[Multiply by 11]

$$5 \times 11 = 55$$

[Subtract 2]

$$55 - 2 = 53$$

Answer _____ **53** _____

4. Write the numeral that represents four hundred and eleven thousand, three hundred and six. [1]

Four hundred and eleven thousand, three hundred and six = 411 306

Answer _____ 411 306 _____

5. Write $\frac{19}{3}$ as a mixed number. [1]

3 thirds = 1 whole

19 thirds = $19 \div 3$ wholes

$$\begin{array}{r} 6 \\ 3 \overline{) 19} \\ \underline{- 18} \\ 1 \text{ remainder} \end{array}$$

Therefore, $\frac{19}{3} = 6$ wholes and $\frac{1}{3}$

$= 6\frac{1}{3}$ as a mixed number

Answer _____ $6\frac{1}{3}$ _____

6. Arrange the numbers below in descending order.

[1]

4237

4723

4327

4273

All four numbers have their thousands digit as 4, so we cannot distinguish the largest by looking at the 4.

Looking at the hundreds digit in the order stated, we see, 2, 7, 3, 2. Of these, 7 is the largest, then 3. Hence, 4723 is the largest and 4327 is the second largest number.

We remain with 4237 and 4273 and observe that their tens digits are 3 and 7 respectively. Since 7 is larger than 3, 4273 is larger than 4237.

The numbers, in descending order, that is, largest number first will be, 4723, 4327, 4273, 4237

Answer 4723, 4327, 4273, 4237

7. Add 3.67 and 2.25

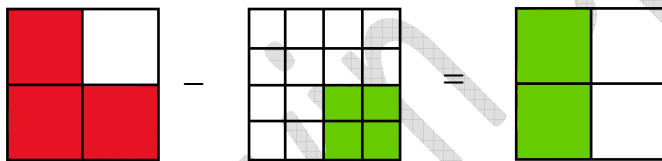
[1]

$$\begin{array}{r} 3.67 \\ + 2.25 \\ \hline 5.92 \end{array}$$

Answer _____ 5.92 _____

8. Shade the fraction of the first shape to complete the statement below.

[1]



We observe that one quarter of the second square is shaded.

To obtain one half, we need three quarters of the first square.

Checking:

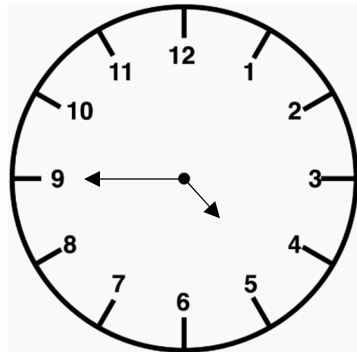
$$\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$$

$$= \frac{1}{2}$$



9. What is the time shown on the clock below?

[1]



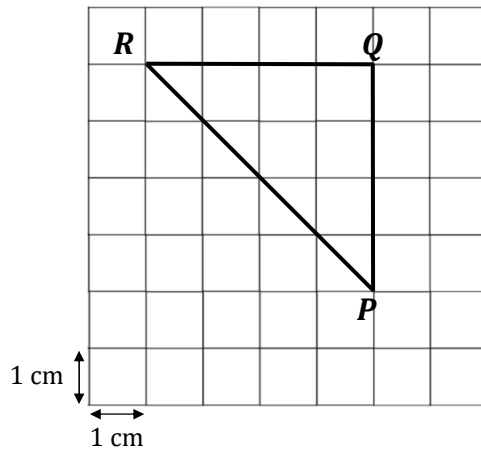
The minute hand points to 9, which indicates 15 minutes to the hour.

The hour hand is slightly before 5, so the hour of 5 has not been passed.

The time is 15 minutes to 5 or a quarter to 5 or 4:45.

Answer _____ 4:45 _____

10. In the diagram below, the length of each square is 1 cm.



What is the area of triangle PQR ?

[1]

$$PQ = 4 \text{ units in height}$$

$$= 4 \times 1$$

$$= 4 \text{ cm in height}$$

$$QR = 4 \text{ units long}$$

$$= 4 \times 1$$

$$= 4 \text{ cm long}$$

$$\text{Area of triangle } PQR = \frac{\text{Base} \times \text{Height}}{2}$$

$$= \frac{4 \times 4}{2}$$

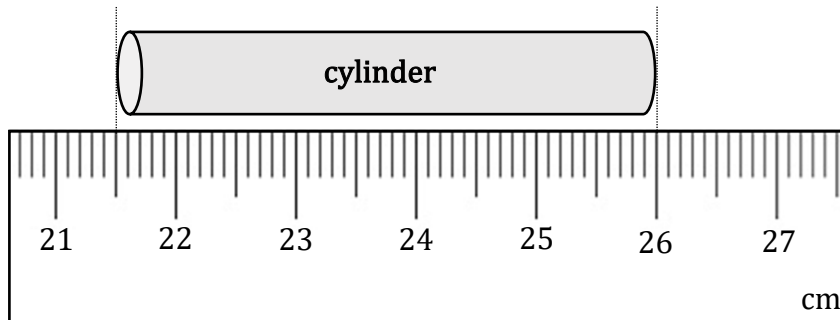
$$= \frac{16}{2}$$

$$= 8 \text{ cm}^2$$

Answer _____ 8 cm^2 _____

11. Write down the length of the cylinder.

[1]



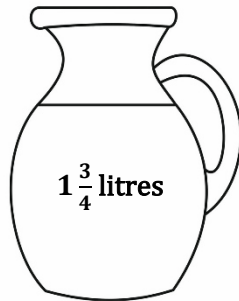
$$\text{Length of the cylinder} = 26 - 21.5$$

$$\begin{array}{r} 26.0 \\ - 21.5 \\ \hline 4.5 \end{array}$$

$$\text{Length of cylinder} = 4.5 \text{ cm}$$

Answer 4.5 cm

12. A jug and a cup are shown below. If the container is full of juice, how many cups of juice can be filled from the jug? [1]



Jug



Cup

$$\text{Volume of the jug} = 1\frac{3}{4} \text{ litres}$$

$$\text{Recall: } 1 \text{ litre} = 1000 \text{ ml}$$

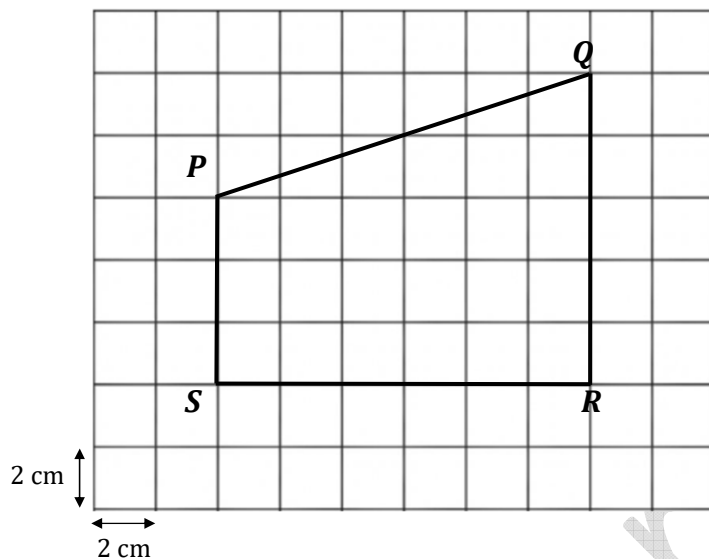
$$\begin{aligned} \therefore \text{Volume of the jug} &= 1\frac{3}{4} \times 1000 \\ &= 1.75 \times 1000 \\ &= 1750 \text{ ml} \end{aligned}$$

$$\text{Volume of the cup} = 250 \text{ ml}$$

$$\begin{aligned} \therefore \text{The number of cups that can be filled from the jug} &= \frac{\text{Volume of jug}}{\text{Volume of cup}} \\ &= \frac{1750}{250} \\ &= 7 \text{ cups} \end{aligned}$$

Answer _____ 7 cups _____

13. In the diagram below, the length of each square is 2 cm. The perimeter of the shape is 42 cm.



Determine the length of the side PQ .

[1]

The length of each square = 2 cm

The perimeter of the shape = 42 cm

Length of PS + Length of SR + Length of RQ + Length of PQ = 42 cm

$\therefore (3 \times 2) + (6 \times 2) + (5 \times 2) + \text{Length of } PQ = 42 \text{ cm}$

$6 + 12 + 10 + \text{Length of } PQ = 42 \text{ cm}$

$28 + PQ = 42$

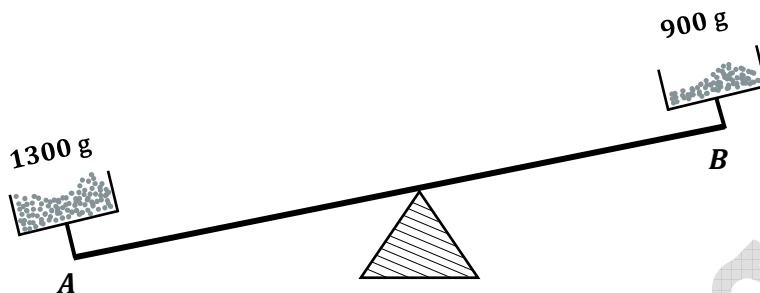
$PQ = 42 - 28$

$PQ = 14 \text{ cm}$

Answer _____ 14 cm _____

14. How many grams must be removed from **A** and placed on **B**, to balance the scale?

[1]



A weighs 1 300 g

B weighs 900 g

For the scale to balance, both sides must have the same weight. To obtain this weight, we must find the total on both sides and divide this total by 2.

$$(1300 + 900) \div 2 = 2200 \div 2 \\ = 1100$$

Hence, 1100 g must be on each side.

So, if $1300 - 1100 = 200$ g is removed from **A**, then **A** will weigh 1100 g.



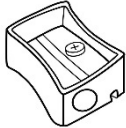
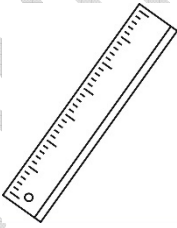
When this 200 g is added to **B**, it will now weigh $900 + 200 = 1100$ g.

Both will now weigh 1100 g and the scale will balance.

Answer _____ 200 g _____

15. Complete the bill shown below.

[1]

Item	Price
	\$10.40
	\$ _____
	\$1.25
	\$3.65
Total	\$18.15

Total cost of notebook, sharpener and ruler = $\$10.40 + \$1.25 + \$3.65$

= $\$15.30$

$$\begin{array}{r} \$ 10.40 \\ \$ 1.25 \\ + \$ 3.65 \\ \hline \$ 15.30 \\ \hline \end{array}$$

Total including the pen = \$18.15

Hence, the cost of the pen is

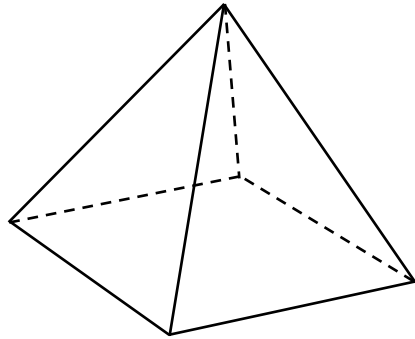
$$\begin{array}{r} \$ 18.15 \\ - \$ 15.30 \\ \hline \$ 2.85 \\ \hline \end{array}$$

Answer \$2.85

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16. Write down the name of the solid shown below.

[1]



The base of the solid is a square.

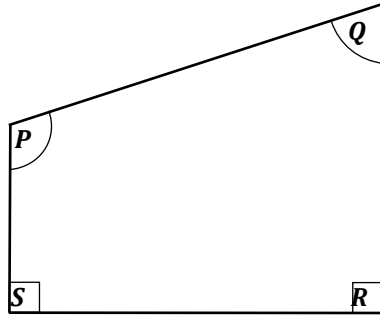
Therefore, the figure or solid is a square-based pyramid.

Answer _____ square-based pyramid _____

Kerwin Springer

17. Which angle in the shape below is **less than** a right angle?

[1]



S and R are right angles (90°).

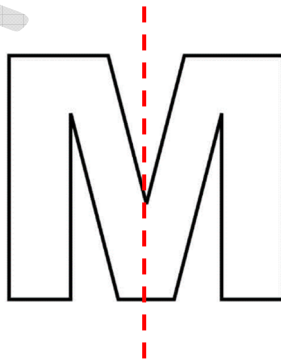
P is obtuse (more than 90°).

Q is acute (less than 90°).

Answer _____ *Q* _____

18. Draw the line of symmetry on the letter below.

[1]



19. The mean of 13, 18 and 20 is the same as the mean of 19 and .

What number does represent?

[1]

$$13 + 18 + 20 = 51$$

$$\text{Mean} = \frac{51}{3}$$

$$= 17$$

Therefore, the mean of 19 and is 17.

$$\text{So, the total is } 19 + \text{} = 17 \times 2$$

$$= 34$$

$$19 + \text{} = 34$$

$$\text{} = 34 - 19$$

$$\text{} = 15$$

Answer _____ 15 _____

20. There are 30 students in a class. The incomplete tally chart below shows the favourite animal chosen by some of the students.

Animal	Number of Students
Dog	
Panda	
Horse	
Turtle	

How many students chose panda?

[1]

Number of students who chose dog = 5 + 5 + 1

$$= 11$$

Number of students who chose horse = 5 + 3

$$= 8$$

Number of students who chose turtle = 4

Total number of students who chose dog, horse and turtle = 11 + 8 + 4

$$= 23$$

Total in the class = 30

Hence,

$$\begin{aligned} \text{The number of students who chose panda} &= 30 - 23 \\ &= 7 \end{aligned}$$

Answer _____ **7 students** _____

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SECTION II

21. $3\frac{2}{3} - 2\frac{1}{6} =$

[2]

$$\begin{aligned} 3\frac{2}{3} - 2\frac{1}{6} &= \frac{11}{3} - \frac{13}{6} \\ &= \frac{22}{6} - \frac{13}{6} \\ &= \frac{9}{6} \\ &= \frac{3}{2} \quad \text{or} \quad 1\frac{1}{2} \end{aligned}$$

Answer _____ $1\frac{1}{2}$ _____

22. Three-sevenths of a number is 18. What is **half** of the same number?

[2]

$\frac{3}{7}$ of a number is 18.

Therefore, $\frac{1}{7}$ of the number is $\frac{18}{3} = 6$.

$$\begin{aligned} \text{The (whole) number} &= 6 \times 7 \\ &= 42 \end{aligned}$$

Half of the number = $42 \div 2$

$$= 21$$

Answer _____ 21 _____

23. An auditorium has 9 rows. Each row has 25 seats. All of the seats in 8 rows were completely occupied while 7 seats in the 9th row were **not** occupied.

How many seats were occupied altogether?

[2]

8 rows with all 25 seats occupied will have = 25×8

= 200 occupied seats

7 seats were not occupied in the 9th row.

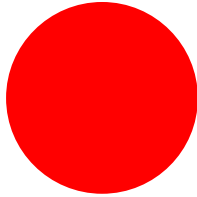
So, the 9th row has $25 - 7 = 18$ occupied seats

Total number of occupied seats = $200 + 18$

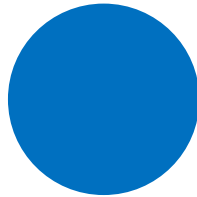
= 218 seats

Answer _____ 218 seats _____

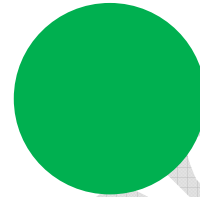
24. Diana painted 75 circles of three different colours: red, blue and green. There are 15 green circles and an equal number of red and blue circles.



Red



Blue



Green

What percentage of the circles are blue?

[2]

Total number of circles = 75

Number of green circles = 15

Therefore, the number of red and blue circles together = $75 - 15$
= 60

The number of red and blue circles is the same, so there are $= 60 \div 2$
= 30 each

Percentage of blue circles = $\frac{\text{Number of blue circles}}{\text{Total number of circles}} \times 100\%$

$$= \frac{30}{75} \times 100\%$$

$$= \frac{2}{5} \times 100\%$$

$$= 40\%$$

Answer _____ 40% _____

25. The sum of Ally, Barry and Chelsea's ages is 56. Barry is 14 years older than Ally, and Chelsea is 18 years older than Ally.

(a) What is Ally's age? [1]

$$\text{Ally's age} + \text{Barry's age} + \text{Chelsea's age} = 56 \text{ years}$$

Barry is 14 years older than Ally and Chelsea is 18 years older than Ally.

This is a total of $14 + 18 = 32$ years

$$\begin{aligned} \text{Ally's age} &= \frac{56-32}{3} \\ &= \frac{24}{3} \\ &= 8 \text{ years} \end{aligned}$$

Answer _____ 8 years _____

(b) What is Chelsea's age? [2]

$$\begin{aligned} \text{Chelsea's age} &= 8 + 18 \\ &= 26 \end{aligned}$$

Answer _____ 26 years _____

26. Sally bought a radio for \$350 and then sold it to make a profit of 50%.

What was the selling price of the radio?

[2]

$$\text{Profit} = 50\% \text{ of } \$350$$

$$= \frac{50}{100} \times \frac{350}{1}$$

$$= \$175$$

$$\text{Selling Price} = \text{Cost Price} + \text{Profit}$$

$$= \$350 + \$175$$

$$= \$525$$

Answer \$ 525

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27. How many pieces of tape, each of length 25 cm, can be cut from a $7\frac{1}{4}$ m roll of tape? [2]

Length of 1 piece of tape = 25 cm

Length of the roll = $7\frac{1}{4}$ m

$$= 7\frac{1}{4} \times 100$$

$$= 725 \text{ cm}$$

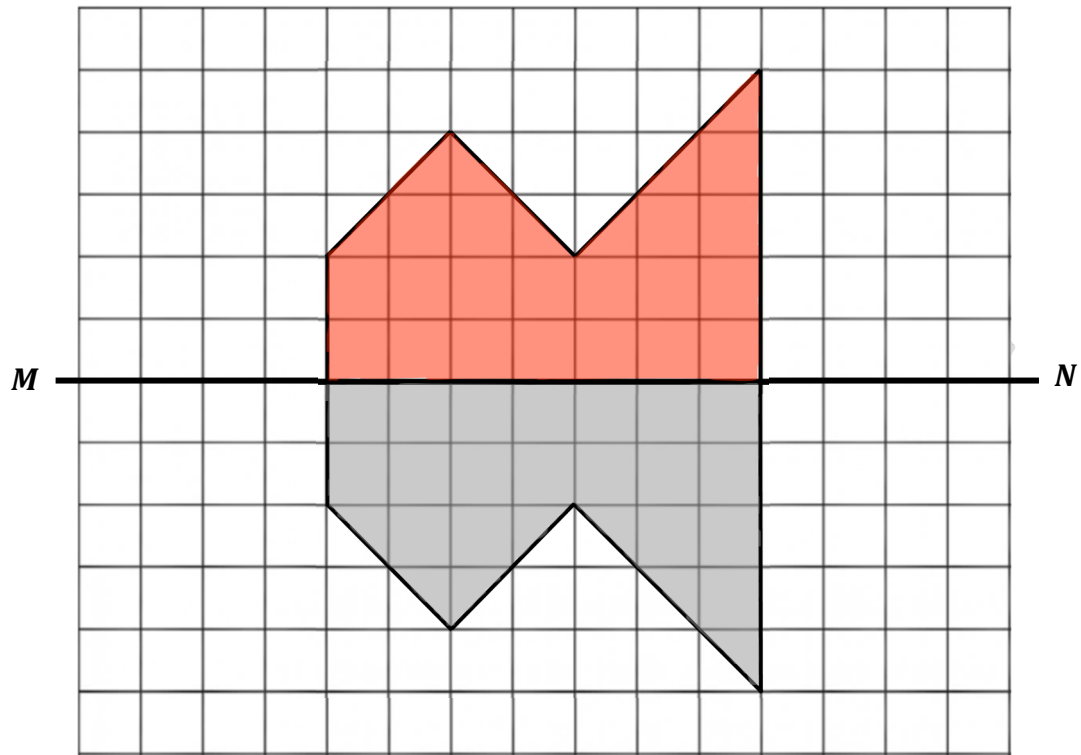
The number of pieces of tape = $\frac{\text{Length of entire roll}}{\text{Length of 1 piece of tape}}$

$$= \frac{725}{25}$$

$$= 29 \text{ pieces}$$










Answer 29 pieces

28. Complete the shape below using the line MN as the line of symmetry. [2]



Kerwin

29. The pictograph below shows the favourite subjects chosen by 60 students.

Mathematics			
Geography			
English			
Science			

How many student chose English as their favourite subject?

[2]

Total number of complete hearts = 6

Total number of half hearts = 3

$$= 3 + \frac{1}{2}$$

$$= 1\frac{1}{2} \text{ hearts}$$

Hence, $7\frac{1}{2}$ hearts represents 60 students.

$$1 \text{ heart will represent} = \frac{60}{7\frac{1}{2}}$$

$$= \frac{60}{\frac{15}{2}}$$

$$= \frac{60}{1} \times \frac{2}{15}$$

$$= 8 \text{ students}$$

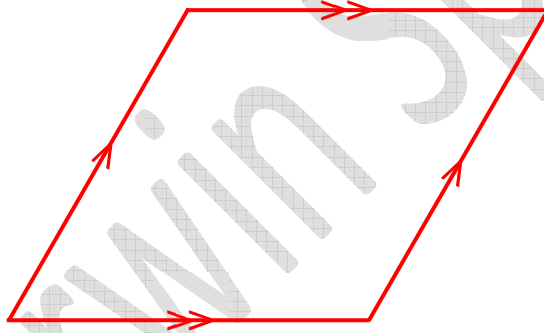
The number of students who chose English as their favourite subject is represented

by $1\frac{1}{2}$ hearts.

$$\begin{aligned} \text{Number of students who chose English} &= 8 \times 1\frac{1}{2} \\ &= 8 \times \frac{3}{2} \\ &= 12 \text{ students} \end{aligned}$$

Answer _____ **12 students** _____

30. (a) Draw a quadrilateral with **two pairs** of parallel sides and **no** right angles. [2]

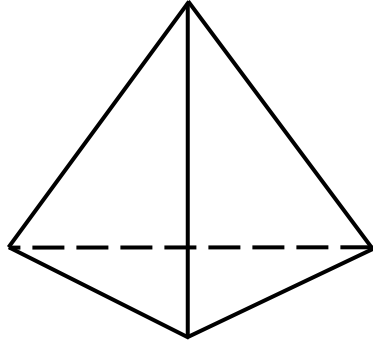


(b) Write the name of the quadrilateral.

[1]

Answer _____ **rhombus** _____

31. Sophia has the solid shown below made up of four equilateral triangles. Each edge measures 7 cm.



(a) Write down the name of the solid. [1]

Since all faces are triangles, then the solid is a triangular pyramid.

Answer _____ triangular pyramid _____

(b) What is the total length of all the edges? [1]

There are 6 edges.

Each edge is 7 cm long.

Hence, the total length of all the edges = 7×6

= 42 cm

Answer _____ 42 cm _____

(c) Sophia drew 8 circles on EACH face. How many circle did she draw? [1]

There are 4 faces.

8 circles are drawn on each face.

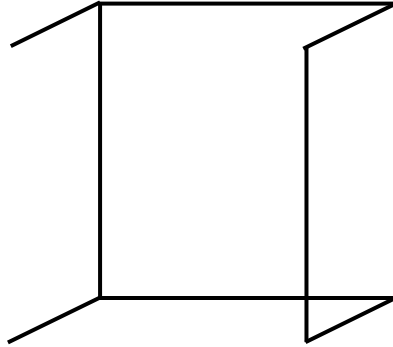
Therefore, the number of circles crawn will be = 8×4

= 32 circles

Answer _____ 32 circles _____

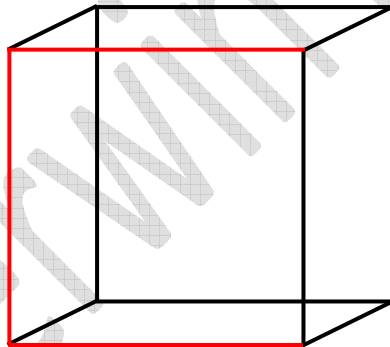
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32. A solid has 12 edges. A part of the solid is drawn below.



(a) Complete the drawing.

[1]

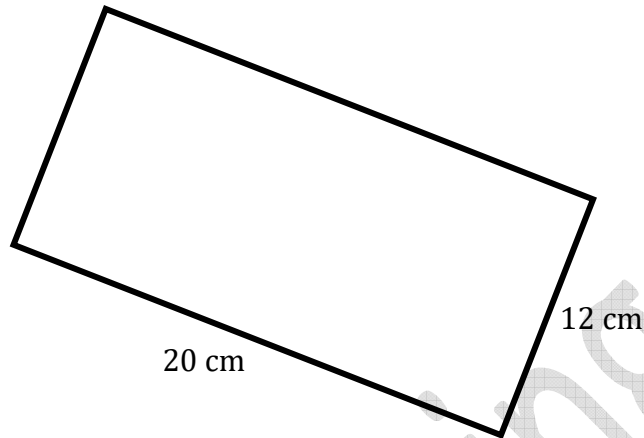


(b) How many vertices are there in the solid?

[1]

Answer _____ **8 vertices** _____

33. For an art project, a student is required to draw a rectangle that is 20 cm long and 12 cm wide.



- (a) Calculate the perimeter of the shape that the student is required to draw. [1]

$$\begin{aligned}\text{Perimeter} &= 2(20 + 12) \\ &= 2(32) \\ &= 64 \text{ m}\end{aligned}$$

Answer 64 m

(b) The student places stickers , 4 cm apart, along the outline of the shape. How many stickers are needed? [2]

Stickers are placed 4 cm apart.

For the **length of the rectangle**,

The number of 4 cm intervals that will cover a length of 20 cm = $20 \div 4$
 $= 5$

The number of stickers is one more than the intervals, so 6 stickers will be placed along the 20 cm length, including the corners.

For the **width of the rectangle**,

The number of 4 cm intervals that will cover a width of 12 cm = $12 \div 4$
 $= 3$

The number of stickers is one more than the intervals, so 4 stickers will be placed along the 12 cm width, including the corners.

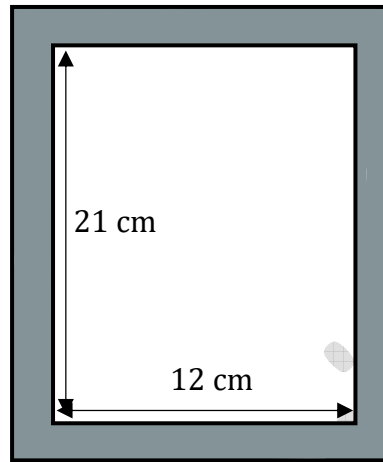
However, the corners are already accounted for , so we must subtract two stickers and this would leave $4 - 2 = 2$ stickers.

Therefore, one length and one width uses $6 + 2 = 8$ stickers.

Hence, the number of stickers needed along the entire outline of the rectangle is $8 \times 2 = 16$ stickers.

Answer _____ 16 stickers _____

34. The diagram below shows a placard with a shaded border. The border is 2 cm wide on all sides.



(a) Calculate the **total** area of the placard.

[1]

$$\begin{aligned} \text{Length of the placard} &= 2 + 21 + 2 \\ &= 25 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Width of the placard} &= 2 + 12 + 2 \\ &= 16 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Area of the placard} &= 25 \times 16 \\ &= 400 \text{ cm}^2 \end{aligned}$$

Answer _____ 400 cm^2 _____

(b) What is the area of the border?

[2]

$$\begin{aligned} \text{Area of the placard not including the border} &= 21 \times 12 \\ &= 252 \text{ cm}^2 \end{aligned}$$

$$\begin{array}{r} 21 \\ \times 12 \\ \hline 210 \\ 42 \\ \hline 252 \end{array}$$

Hence,

$$\begin{aligned} \text{Area of the shaded border} &= \text{Area of entire placard} - \text{Area of placard without the border} \\ &= 400 - 252 \\ \text{shaded border} &= 148 \text{ cm}^2 \end{aligned}$$

Answer 148 cm²

35. Mr. Kim bought a large box of fruits containing mangoes and oranges at the store.
 The total weight of the box was 18 kg 300 g.

(a) What was the weight of the mangoes if the box contained 13 kg 875 g of oranges? [1]

$$\begin{aligned} \text{Weight of mangoes} &= \text{Weight of box} - \text{Weight of oranges} \\ &= 18 \text{ kg } 300 \text{ g} - 13 \text{ kg } 875 \text{ g} \\ &= 4 \text{ kg } 425 \text{ g} \end{aligned}$$

Answer _____ 4 kg 425 g _____

(b) How many mangoes did the box contain if the weight of one mango is 295 g? [2]

$$\begin{aligned} \text{Weight of mangoes} &= 4 \text{ kg } 425 \text{ g} \\ \text{Number of mangoes} &= \frac{4425}{295} \\ &= 15 \end{aligned}$$

Answer _____ 15 _____ mangoes

36. Mr. Jason had \$2400 and decided to share it among his 3 grandchildren. Daisy received twice more than Michael and Alison received five times more than Michael. How much money did Daisy receive? [3]

Michael received 1 part.

Daisy received 2 parts.

Alison received 5 parts.

$$\begin{aligned} \text{Total parts} &= 1 + 2 + 5 \\ &= 8 \text{ parts} \end{aligned}$$

$$8 \text{ parts} = \$2400$$

$$\begin{aligned} 1 \text{ part} &= \frac{\$2400}{8} \\ &= \$300 \end{aligned}$$

$$\begin{aligned} 2 \text{ parts} &= 2 \times \$300 \\ &= \$600 \end{aligned}$$

Answer \$ 600

SECTION III

37. A group of students uses seashells to create patterns in the sand. The pattern is shown below.

Item Number	Number of Seashells Used
1	2
2	4
3	8
4	16
5	32

(a) What is the pattern rule for the number of seashells used?

[1]

For Item Number 1, number of seashells used is $2^1 = 2$.

For Item Number 2, number of seashells used is $2^2 = 4$.

For Item Number 3, number of seashells used is $2^3 = 8$.

For Item Number 4, number of seashells used is $2^4 = 16$.

For Item Number 5, number of seashells used is $2^5 = 32$.

Answer _____ (2) Item Number _____

(b) Using the same rule, how many seashells will be used to make Item

Number 7?

[1]

$$\begin{aligned} \text{For Item Number 7, number of seashells used is } 2^7 &= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \\ &= 128 \end{aligned}$$

Answer _____ **128 seashells** _____

(c) For which item number will 256 seashells be used?

[1]

$$\begin{aligned} 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 &= 2^8 \\ &= 256 \text{ seashells} \end{aligned}$$

The item number is 8.

Answer _____ **Item Number 8** _____

(d) The group decides to use 384 seashells to make two items, with each item being

made from more than 100 seashells.

How many seashells will be used for each item?

[1]

The number of seashells used = 384

We need to find two numbers, greater than 100, whose sum is 384.

By inspection,

$$384 = 128 + 256$$

$128 = 2^7$, so the item number 7

$256 = 2^8$, so the item number 8

Answer: Item number 7 using 128 seashells and item number 8 using 256 seashells

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38. Rachel scored 340 points in a Scrabble contest. Jade scored 67 fewer points than Rachel and 29 more than Susy.

(a) How many points did Susy score?

[1]

Rachel scored 340 points.

Jade scored 67 fewer points than Rachel.

Therefore, Jade scored $340 - 67$ points.

$$\begin{array}{r} 340 \\ - 67 \\ \hline 273 \end{array}$$

Jade scored 29 points more than Susy.

Therefore, Susy scored $273 - 29$ points.

$$\begin{array}{r} 273 \\ - 29 \\ \hline 244 \end{array}$$

Answer **244 points**

(b) Rachel placed 3rd in the contest and four students were between her and Jade.

At what position did Jade place?

[1]

There are four students between Rachel and Jade.

Therefore,

Rachel is 3rd

1st student after $3 + 1 = 4^{\text{th}}$

2nd student after $4 + 1 = 5^{\text{th}}$

3rd student after $5 + 1 = 6^{\text{th}}$

4th student after $6 + 1 = 7^{\text{th}}$

And Jade is $7 + 1 = 8^{\text{th}}$

Answer _____ 8th position _____

(c) Rachel wants her score to increase by 10% in the next contest.

How many points should she obtain in her next Scrabble contest?

[2]

Rachel scored 340 points.

Rachel wishes to increase her score by 10%.

$$\text{Increase} = \frac{10}{100} \times 340$$

$$= 34 \text{ points}$$

In the next Scrabble contest, Rachels' score should be,

= Present score + Expected increase

= 340 + 34

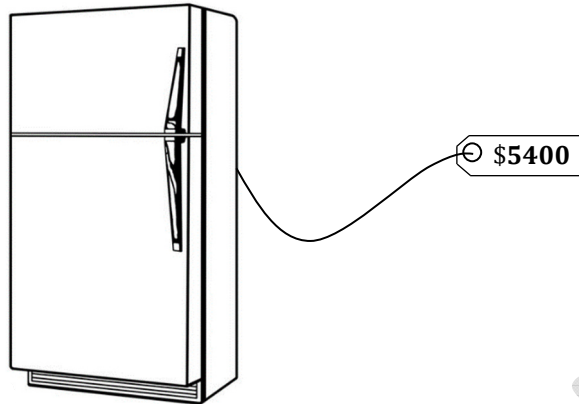
= 374 points

Answer _____ 374 points _____

Kerwin Springer

39. Justin bought the refrigerator shown below.

During a sale, it was marked down to \$3 960.



(a) What was the amount of discount?

[1]

$$\begin{aligned} \text{Discount} &= \$5400 - \$3960 \\ &= \$1440 \end{aligned}$$

Answer \$1440

(b) What was the percentage discount on the refrigerator?

[1]

$$\begin{aligned} \text{Percentage discount} &= \frac{1440}{5400} \times 100\% \\ &= 26\frac{2}{3}\% \end{aligned}$$

Answer 26 $\frac{2}{3}$ %

(c) The store adds a delivery fee of 5% of the sale price. Calculate the amount that a customer would pay altogether for the refrigerator. [2]

$$\text{Delivery fee} = 5\% \text{ of } \$3\,960$$

$$= \frac{5}{100} \times 3960$$

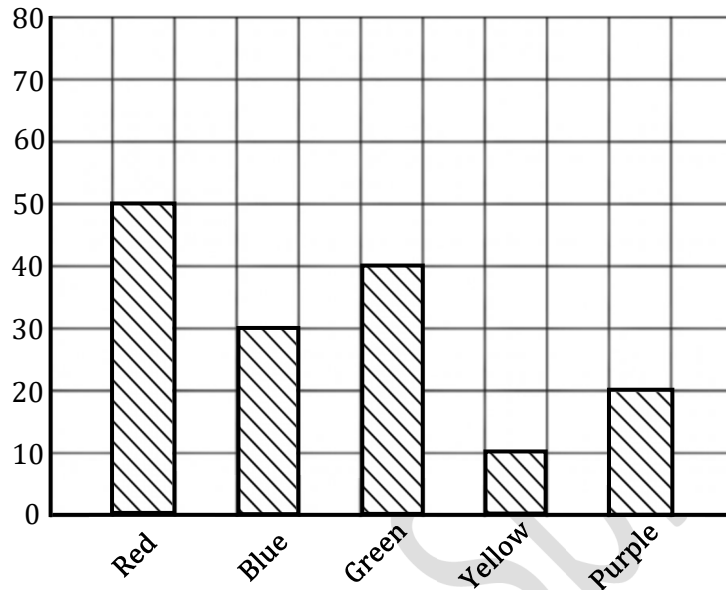
$$= \$198$$

$$\text{Total amount} = \$3960 + \$198$$

$$= \$4158$$

Answer _____ \$4158 _____

40. A student has 80 beads of each colour to use in a project. The bar graph below shows the number of beads that were **not** used.



(a) Which colour bead was most used in the project?

[1]

The shortest bar is that of yellow which reads 10 yellow beads were not used in the project.

Hence, $80 - 10 = 70$ beads were used and this represents the most.

Answer _____ **yellow** _____

(b) How many beads were used **altogether**?

[1]

The number of beads used,

Red $80 - 50 = 30$

Blue $80 - 30 = 50$

Green $80 - 40 = 40$

Yellow $80 - 10 = 70$

Purple $80 - 20 = 60$ +

Total $= \underline{\underline{250}}$

Answer 250 beads

(c) How many more blue beads than red beads were used?

[2]

Number of blue beads used = 50

Number of red beads used = 30

Therefore, $50 - 30 = 20$ more blue beads were sold than red beads.

Answer 20 beads