



### Test 01

## MATHEMATICAL REASONING

Question Number	Answer	Solution
1	B	<p>A is not the answer as that is all the sides without adding the 3cm.</p> <p><b>B is the answer as You first need to understand that it is an equilateral triangle. A property of these triangles are that they have the same angle as well as the same length for their SIDES. That means you can now push out the caved in portions to make 12cm sides for the left and bottom side. This equals 36cm. You then add the 3cm sides <math>\times 4 = 12\text{cm}</math>. <math>36 + 12 = 48\text{ cm}</math>.</b></p> <p>C is wrong as it is the total if you only add the numbers shown.</p> <p>D is wrong as it is the total without adding two of the small sides.</p> <p>E is wrong as it is the total without adding one of the small sides.</p> <p>Tip: Understand the equilateral triangle properties and add perimeter carefully. Make sure you include the small indents as you may accidentally look past it.</p>
2	E	<p>A is wrong</p> <p>B is not the answer as it is the time that the train arrives to Strathfield.</p> <p>C is wrong</p> <p>D is wrong</p> <p><b>E is the answer as the train takes 60 minutes to travel 40km which means that it takes 6 minutes to travel 4km and 36 minutes to travel 24km. Similarly the bus takes 60 minutes to travel 20km, which means it takes 6 minutes to travel 2km and so 48 minutes to travel 16km. As the bus takes 12 more minutes to travel to Strathfield compared to the train, it must leave 12 minutes before the train leaves Gotham. So the bus must leave Tornado town at 4:03pm.</b></p>
3	E	<p>A is wrong</p> <p>B is wrong</p> <p>C is the amount of sandwiches made with meatballs</p> <p>D is about of sandwiches made if only 1 cheese is used</p> <p><b>E is the correct answer. This is more of a trick question. You need to understand you can only make a whole sandwich if you have the ingredients for it. In this question you are given a pile of stock and one of them will be the limiting factor as once that ingredient runs out, you cannot make sandwiches anymore. So calculate how many sandwiches can be made with each ingredient. Cheese = 433.5 sandwiches, bread = 950, meatball = 1400, pickles = 7000. In this case it is the cheese that is limiting so we can only make 433.5 sandwiches, or 433 WHOLE sandwiches.</b></p> <p>Tip: Make sure you read the question carefully and understand the concept that there is a limiting factor to making these sandwiches.</p>

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- 4 E A is wrong as it is the answer of the pentagon itself  
 B is wrong  
 C is wrong  
 D is wrong  
 E **is right. You need to use your theory of algebra for this question. TO get the pentagon, you divide 536 by 8. This equals 67. Now that you know what the pentagon is, for the next equation you can get the triangle by dividing 268 by 67 to get 4. Now minus 67 – 4 to get the final answer of 63.**

Tip: Get one variable at a time to solve the next variable so you can get all variables.

- 5 C A is wrong as it is the amount of water needed to add into the cordial mix.  
 B is wrong  
 C **is right. First identify how much cordial is in the drink. It is 200mL. Thus Trevor needs 600 more mL to make the 0.8L drink (800mL, you need to convert here to make it easier for you). Now he drinks 0.2L of the drink meaning there is only 600mL left. However this is still mixed in with the cordial. DO NOT GET TRICKED. Now you need to do ratios of how much water is in the 600mL.**

**Referring back to the beginning, since there was 200mL to begin with and you added 600mL, it is a 1:3 ratio or 1 part cordial, 3 part water. Divide 600mL by 4 and then times by 3 to get how much water. This equals 450mL.**

D: is amount of cordial that they consumed.

E is wrong as it is total drink.

Tip: Do not get tricked with how much water is mixed in the cordial versus how much water is added.

- 6 B A is the amount of columns that exist with 5, 6, 7  
 B **is right. You need to read the graph and add the number of students that studied in columns 6 and 7.**  
 B is right as you add up columns 6 and 7  
 C is wrong as if you add up 5, 6 and 7 instead of just 6 and 7.  
 D is wrong  
 E is wrong if you interpret it as there's 3 columns that have more than 5 hours.

Tip: interpret the graph so that you only pick the relevant columns. In this case 6 and 7 and not 5.

- 7 E A is wrong as it is just a full mark  
 B is wrong as it is 10 more than the answer.  
 C is wrong  
 D is the average  
 E **is correct. You need to interpret the exam marks and find all the marks for maths. You work backwards as you know the average was 85. So  $85 \times 3$  to get total marks of 255. With this you do  $255 - (88+99)$  to equal 68**

Tip: Work backwards from the average and use your addition and subtraction appropriately.

- 8 D
- A is wrong as it is the amount of interest made in first year.  
 B is wrong as it is the total after 1 year.  
 C is wrong as it is 20% of \$10 added to \$10.  
**D is right.  $\$10 \times 0.1 = \$1$  interest after one year as you are getting 10% interest. Thus it is a total of \$11 now. Now you do  $\$11 \times 0.1 = \$1.1$  as you are getting 10% of TOTAL money which is \$11 rather than just \$10 because that was the original. Thus add \$1.1 to \$11 total is now \$12.10**  
 E is the amount of total interest

Tip: Make sure you include the original total when you are doing interest rate questions.

- 9 A
- A is right. You first need to interpret the thermometer. It will equal 36.25 degrees Celsius. This is because  $38.75 - 35$  and then divide by 3 to get equal parts on the thermometer. You then minus 36.25 by  $28.25 = 8$  degrees. It takes 40 minutes to go down by 2 degrees. So in total time it will take  $40 \text{ minutes} \times 4 = 160 \text{ mins}$ . Convert 160 mins to hours which is 2 hours and 40 mins.**  
 B is wrong  
 C is the amount of time required to change 2 degrees.  
 D is wrong  
 E is wrong

Tip: Make sure you read the thermometer carefully or else this will affect your future calculations.

- 10 D
- A is wrong as it is just the vertices.  
 B is wrong  
 C is wrong  
**D is right. It's the vertices that have the lines of symmetry as well as the grooves between them.**  
 E is wrong

Tip: use a pencil to draw over the figure and make as many lines of symmetry as you can.

- 11 D
- A is wrong as that is the last hour or you might be mistaken to and think it is an accumulated distance.  
 B is wrong  
 C is wrong  
**D is right. You add each hour, so  $1 + 2 + 3 + 4$  to get total distance travelled.**  
 E is wrong

Tip: Read the x and y axis to determine what the graph is telling you. This can differentiate between whether you are looking at a normal graph or an accumulated graph.

- 12 B
- A is wrong as this is the total area.  
**B is right. You need to know the property of the square where each side is the same. To get the area you just square 8 to get 64.**

**Now divide 64 by 2 to get 32 cm for the rectangle as they have the same area.**

- C is wrong as it is width of the square  
 D is wrong  
 E is wrong

Tip: Make sure you square the square to find the area. After this just be careful with calculations.

13

B

- A this is wrong as it is not taking into account of the removed segment  
**B is right. Once Jessica spins the first time, a green segment will be out. Now there's only 4 segments left. If it lands on green again it will be 1 in 4 chance.**

- C is wrong as it still takes into account of the first green  
 D is wrong as it is the first spins probability  
 E is wrong.

Tip: You need to make sure when you make your second spin you get rid of the first segment as this will change your probability.

14

A

- A is correct. As C is 100, M is 1000 so CM is 900. X is 10, V is 5, I is 1. This is 1018**

- B is wrong because it is wrong if you get the M wrong.  
 C is wrong  
 D is wrong as it is one less than the answer  
 E is wrong

Tip: You need to recognise roman numerals for this question. Make sure you study this!

15

C

- A is wrong  
 B is distance travelled in a minute  
**C is right as first you need to see the distance travelled of a bike after 1 minute. It spins 42 times and is 50cm in circumference. Thus in 1 min it travels  $42 \times 50 = 2100\text{cm}$  or 21m. Now convert 2 hours and 15 minutes into minutes = 135 minutes. From here,  $135 \times 21\text{m} = 2835\text{m}$  or 2.835km.**

- D is wrong  
 E is wrong

Tip: make sure you calculate the distance per minute. And then conversion is important.

16

C

- A is wrong as that is  $190 - 58$   
 B is wrong  
**C is right. You need to understand the basic properties of a straight line which is 180 degrees. Knowing this information you can do  $180 - 58$  degrees = 122 degrees.**

- D is the straight line angle  
 E is wrong as we do have enough information

Tip: learn the properties of a straight line to answer the question.

17

C

- A is wrong as Richard ate more than carlo  
 B is wrong as Richard and ben ate the same amount.

- C is right. Start by converting  $\frac{1}{4}$  into  $\frac{2}{8}$  for the pizza. This means that Carlo ate  $\frac{2}{8}$ , Ben ate  $\frac{3}{8}$  and Richard would have ate  $\frac{3}{8}$  as he ate the remainder. Thus only statement C makes sense.**
- D is wrong  
E is wrong

Tip: convert carlos pizza fraction first to make sure that everything is in the same fraction. This makes it easier to compare fractions.

- 18      A      **A is right. For this one, you need to know what an open box looks like. It will only have 5 sides and leave the top open. Thus if it takes 35 minutes to paint one side, you need to times 35 by 5 to get 175 minutes.**
- B is wrong calculations  
C is wrong again  
D is wrong  
E is the answer you would get if you did  $6 \times 35$

Tip: Know what an open box looks like and make sure you do  $5 \times 35$  not  $6 \times 35$ .

- 19      E      A is wrong  
B is the total number of people if you add basketball and soccer  
C is wrong and is number of soccer players  
D is wrong and is number of basketball players  
**E is right. Since there is only 20 people in the class, there will be 5 overlap as  $8 + 17 = 25$ .**

Tip: Make sure you do not exceed the total number of people in the class. And then see the overlap.

- 20      B      A is wrong  
**B is right. Start by adding  $2 + 7 + 6$  to get a total of 15. Then find the middle square from  $15 - 4 - 6 = 5$ . Then find x from  $15 - 2 - 5 = 8$ .**
- C is wrong  
D is wrong  
E is wrong.

Tip: Do 1 thing a time to ensure you do not make any mistakes.

- 21      E      A is wrong as it is 60kgs – shoes to get the answer  
B is wrong as it is 60kgs – shoes and then also subtracting the faulty 6 kgs.  
C is wrong  
D is wrong  
**E is right. First you need to identify how many grams the scale is faulty by so you can subtract that amount for the final answer. The scale is faulty by 6 kgs currently. Next as the scale has made more than 1 full turn, you need to add the whole scale and then any additional numbers to get the reading. You then subtract this number by the number we got in the beginning to make sure its an accurate reading. Thus  $160\text{kgs} - 6 = 154\text{kgs}$ .**

**Now subtract 40kgs from this new accurate reading to the get weight of his phone.**

**$154 - 40\text{kgs} = 114\text{kgs}$ . If students did not make the full turn, then they would get tricked and get other answers.**

Tip: make sure you read the question as you need to do more than 1 rotation.

22

B

A is wrong

**B is right. This one is tricky. As the first equation and the second equation only has 1 circle of a difference you can assume that the circle is valued at  $18 - 15 = 3$ . Using this information you can now put it into the first equation.  $2 \text{ triangles} + 3 = 15$ .  $2 \text{ triangles} = 12$ .  $1 \text{ triangle} = 6$ .**

C is the circle value

D is wrong

E is wrong

Tip: try look at the bigger picture and try see what the difference is between the two equations.

23

B

A is wrong

**B is right. Convert  $1/5$  of the black paint into  $3/15$ . Thus adding the black paint + blue paint equals 4 parts painted. This leaves 5 parts remaining. Thus converting  $5/15$  back it would equal  $1/3$ , B.**

C is wrong, that's the wrong fraction it should be  $3/15$ .

D is wrong

E is wrong

Tip: Convert everything to the same fraction to make it easier.

24

A

**A is right. Subtract  $\$8.70$  from  $\$20 = \$11.30$ . Then we are only using silver coins so start with 50c first. You can have 22 of the 50c coins. Then a 20c coin and then a 10c coin = 24 coins.**

B is wrong

C is the number of coins if you don't use silver coins.

D is wrong

E is wrong

Tip: read question carefully so you know you have to use the silver coins.

25

C

A is wrong if you do not add the lines properly

B is wrong if you only add half the lines properly.

**C is right. Draw out the square pyramid and add everything. Don't forget the bottom square of the pyramid.**

D is wrong

E is if you forget to add the square on the bottom.

Tip: Draw out the pyramid to see what you are counting.

26

A

**A is the right answer. This is fairly straight forward which numbers will have 2, 3, and 6 all in it as a multiple? Pretty much all the multiples of 6.**

B is wrong as that's just a multiple of 6

- C is wrong  
D is wrong  
E is wrong

Tip: You can draw a number line to see what numbers are there between 0 and 50.

27

C

- A is wrong as this is the number of tissues rounded down.  
B is the wrong answer  
**C is the right answer. First find the dimensions of the table which is 162cm squared. Since water spilled on a third, divide 162 by 3 to get 54cm squared. Now divide 54 by 2.5 to get the amount of tissues = 21.6. Round to 22 for whole tissues**  
D is the wrong answer  
E is the third of the table that is covered in water.

Tip: Make sure you know what a third of the table is as this determines how much water is spilled.

28

A

- A is the right answer. Understand that a clock is a circle with 360 degrees. Now you can actually divide each hour segment by 12 (because there 12 hours) to get 30 degrees. Now from 12 to 5 is 5 segments so  $5 \times 30 = 150$  degrees**  
B is wrong its to trick you because you are at 5oclock.  
C is wrong  
D is wrong as it is up to 4oclock  
E is wrong as that is the whole clock

Tip: Don't let the numbers distract you from the fact that a clock is a full circle and that certain points will represent the angles in that circle.

29

A

- A is correct. You first need to convert 1430 to 12 hour time which is 2:30pm. Now you minus 76 minutes or (1 hour and 16 minutes after conversion) which would equal 1:14pm.**  
B is wrong as this is the time before the adjustment.  
C is if it was in the 12 hour form in AM  
D is wrong and this is in 12 hour form without the change in time.  
E is wrong.

Tip: Make sure you change the time correctly first into pm and not am.

30

C

- A is wrong  
B is wrong  
**C is the right answer. Change the basketball cards and soccer cards into x and y's to make it easier or B and S. If the student knows simultaneous equations they can try do that. Otherwise they most likely won't so a way you can solve this question is, if  $4B$  and  $3S = \$50$  and  $2B$  and  $1S = \$22$ , then you minus the 2<sup>nd</sup> equation from the 1<sup>st</sup>. The difference between the two equations would be  $2B + 2S = \$28$ . Now If you know  $2B$  and  $2S = \$28$  then  $1B$  and  $1S$  should be  $\$14$ .**  
D is wrong  
E is wrong



Tip: Make sure you look at the bigger picture and see what you can work with. Anything that is a multiple of the question that is being asked will work. (e.g. 1B and 1S)

- 31            A            **A is the right answer. The first roll is a distractor and is independent to the probability of the second roll. Thus just focus on the second roll. There are 3 odd numbers, 1, 3, 5 and then a 4. This would mean there is a  $\frac{4}{6}$  chance or  $\frac{2}{3}$  chance for rolling it.**
- B is without the four if the student subtracted the 4 if they got confused.  
 C is wrong  
 D is wrong  
 E is wrong

Tip: Make sure you do the probabilities independently to the first roll. These questions will try to trick you.

- 32            E            A is wrong and will be if you rotated it clockwise.  
 B is wrong if you rotate it a little more.  
 C is wrong  
 D is wrong as it is the full rotation.  
**E is correct as you have rotated it anticlockwise  $\frac{3}{4}$  of the way.**

Tip: Don't get tricked its rotating anti clockwise not clockwise.

- 33            C            A is wrong  
 B is wrong  
**C is correct. This number sentence shows statement above. You start with 68 cookies and divide it by 2. Then you minus 29 to get 5 remaining cookies.**  
 D is wrong  
 E is wrong

Tip: See if each number sentence works with the question. Make sure you get a number that makes sense.

- 34            D            A is wrong  
 B is how many bananas in 40 minutes.  
 C is wrong  
**D is right. In 1 minute, a monkey can eat 3 bananas. If there are 5 monkeys they can eat 15 bananas in a minute. Over an hour you will need  $15 \times 60 = 900$  bananas.**  
 E is wrong as it is the number of bananas ( $15 \times 100$ ).

Tip: Ensure that you take a step by step approach and see how many bananas need to be provided in 1 minute. Then whatever time you are given with, you can multiply that by that minute.

- 35            D            A is wrong  
 B is wrong as this is the number which has been rounded down by James instead of up.  
 C is wrong if you do not put the correct amount of 0s.  
**D is correct. James rounds up to the nearest thousand = 894839000  
 Jesse rounds up to the nearest million = 895000000**

**The difference between these numbers would be 161000.**

E is wrong.

Tip: Be careful of rounding either up or down as this can significantly change your answer.