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Directorate of National Examinations

إدارة الامتحانات الوطنية

Grade 12 National Examinations

الامتحانات الوطنية للصف الثاني عشر

March 2017

امتحان مارس 2017

PROBLEM SOLVING

حل المشكلات

Paper 1 Problem Solving

الورقة 1 حل المشكلات

Duration: 90 minutes

مدة الامتحان: 90 دقيقة

Write your answer on the question paper.

اكتب الإجابة في ورقة الأسئلة.

Additional materials: ruler, pencil, eraser,  
calculator.

الأدوات الإضافية: مسطرة، قلم رصاص، ممحاة،  
آلة حاسبة.

**Read these instructions first:**

Use a blue pen only.

Attach your CPR label here

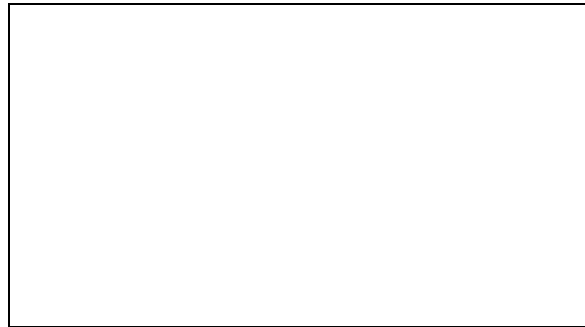
Do not write in the margin.

Answer **all** questions.

The use of calculators is permitted.

There are four options to each question. Select **one**  
correct answer from the options by circling the letter  
as follows:

**B**



**Note:**

Each correct answer will score one mark. Marks will  
**not** be deducted for incorrect answers.

The total number of marks for this paper is 30.

This document consists of **32** printed pages

- 1** Raed drove his sister from home to the mall and then went back home. She called her brother after spending 3 hours at the mall asking him to pick her up and take her back home.

*For  
Examiner's  
Use*

It took Raed 30 minutes to get to the mall and 45 minutes to get back home.

How long did Raed spend at home waiting for his sister's call?

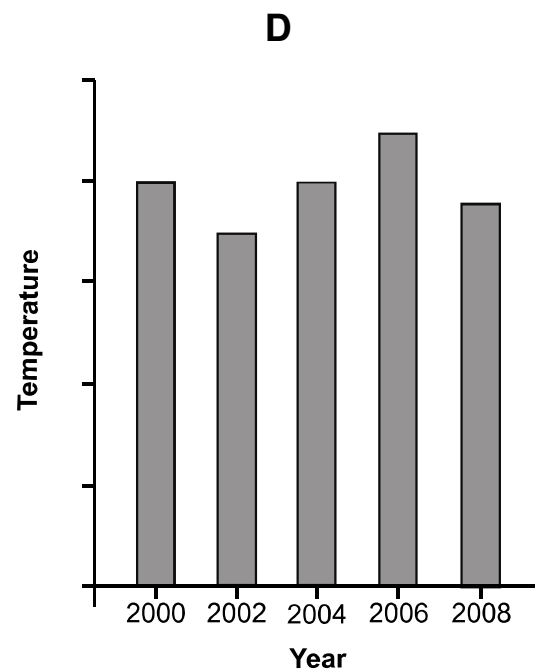
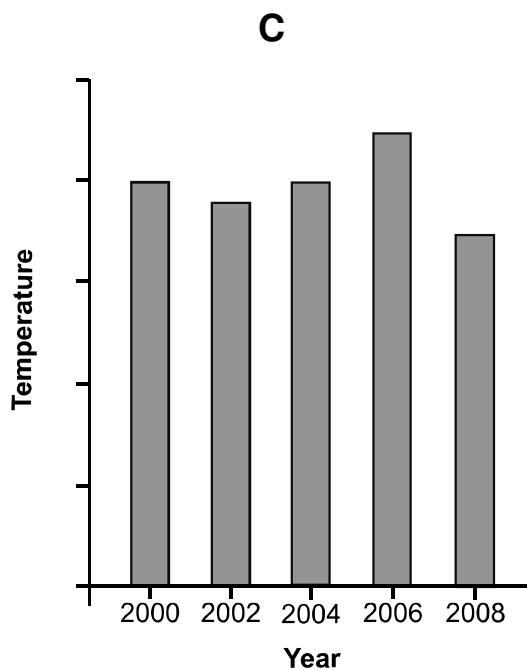
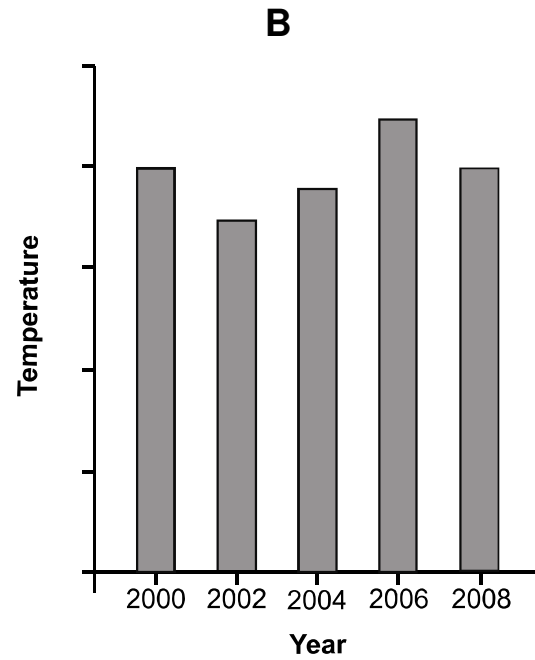
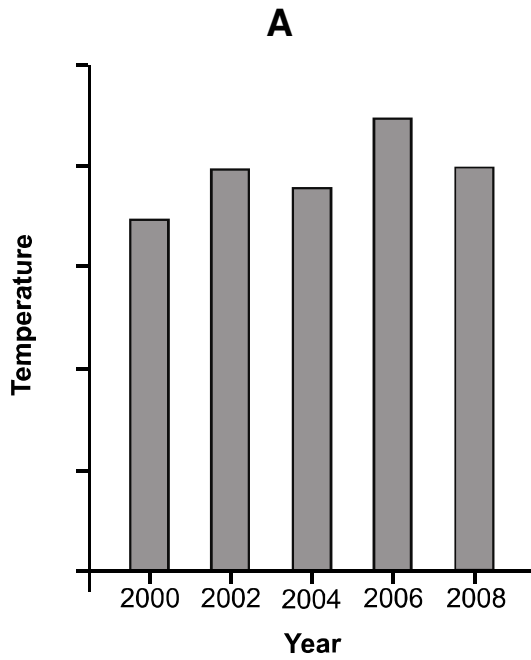
- A** 1 hour and 45 minutes
- B** 2 hours and 15 minutes
- C** 3 hours
- D** 3 hours and 30 minutes



- 2 During a weather forecast, the weatherman compared the mean temperatures for the month of August in five previous years. He stated that the mean temperature in 2004 was less than the mean temperature in 2006, but higher than the mean temperature in 2008 and equal to the mean temperature in 2000, and that the lowest mean temperature was in 2002.

For  
Examiner's  
Use

Which one of the following charts could represent the mean temperatures for the five years?



- 3** A school administration wants to honour the three highest achieving students in the previous semester and has allocated BD 50 to do so. It has been agreed to choose three gifts from those listed below.

*For  
Examiner's  
Use*

<b>Gift</b>	<b>Price</b>
Wristwatch	BD 18.100
Sunglasses	BD 16.400
Digital camera	BD 17.500
Perfume	BD 15.300

Which gifts can be bought using the maximum amount of the money allocated for the gifts?

- A** Wristwatch, sunglasses and digital camera.
- B** Wristwatch, sunglasses and perfume.
- C** Wristwatch, digital camera and perfume.
- D** Sunglasses, digital camera and perfume.



- 4 The teacher put a square table next to a shaded circle drawn on the floor, then she divided the table surface into nine squares and numbered the squares as follows:

1	2	3
4	5	6
7	8	9



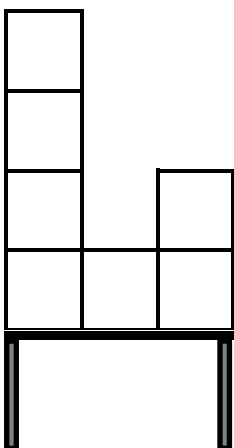
Then she placed equal-sized cubes on top of the numbered squares on the table as follows:

- Two cubes on square number 8.
- Three cubes on square number 2.
- One cube on square number 6.
- Four cubes on square number 1.

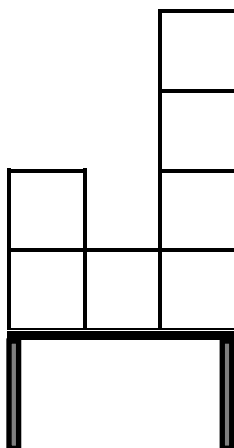
The teacher asked Shahad, a student, to stand on the shaded circle facing the boxes and then asked her to draw the perspective she saw.

Which one of the following diagrams represents the perspective that Shahad drew?

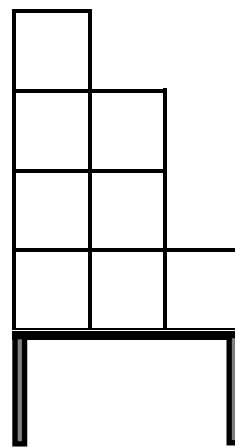
A



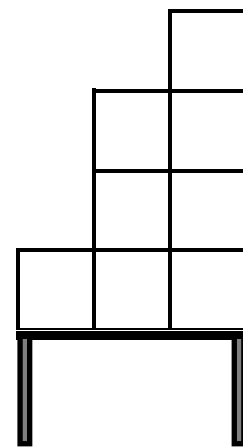
B



C



D



- 5** The absences of employees at a factory were counted during a week. It was found that the number of absent employees on Sunday was twice the number of absent employees on Monday, the number of absent employees on Tuesday was half the number of absent employees on Wednesday, the number of absent employees on Wednesday was half the number of absent employees on Monday, and the number of absent employees on Thursday was the same as the number of absent employees on Sunday.

Which day had the least number of employees absent?

- A** Sunday
- B** Monday
- C** Tuesday
- D** Wednesday





- 6 Hussain is the owner of a restaurant. He needs a driver for home delivery service. He posted an advertisement in the newspaper that interested candidates should apply with the information of their age, experience and the number of accidents, if they had any. He will interview only those candidates who are under 40 years of age, have more than 3 years of experience and have fewer than 5 accidents.

The following are the details of applications received:

Name	Age	Years of experience	Number of accidents
Ali Abbas	32	5	4
Ahmed Salman	24	3	0
Mohammad Yusuf	26	2	6
Hamza Rashid	41	9	9
Basit Sharif	39	10	0
Khalid Jalal	37	7	3
Usman Tariq	45	10	5
Shahid Khan	36	4	6

How many candidates will **not** be short-listed for the interview?

- A 2
- B 3
- C 4
- D 5



- 7 Khalid is a 6<sup>th</sup> grade student at Al-Fateh Primary School. His marks in his subjects at the end of the first and second semester of the academic year 2013/2014 were as follows:

For  
Examiner's  
Use

Subject	Arabic	English	Mathematics	Science
First semester	79	75	....	....
Second semester	74	70	78	78

His marks average at the end of the second semester was 5 marks less than his marks average at the end of the first semester, and, at the end of the first semester, his marks in mathematics were 6 marks higher than his marks in science.

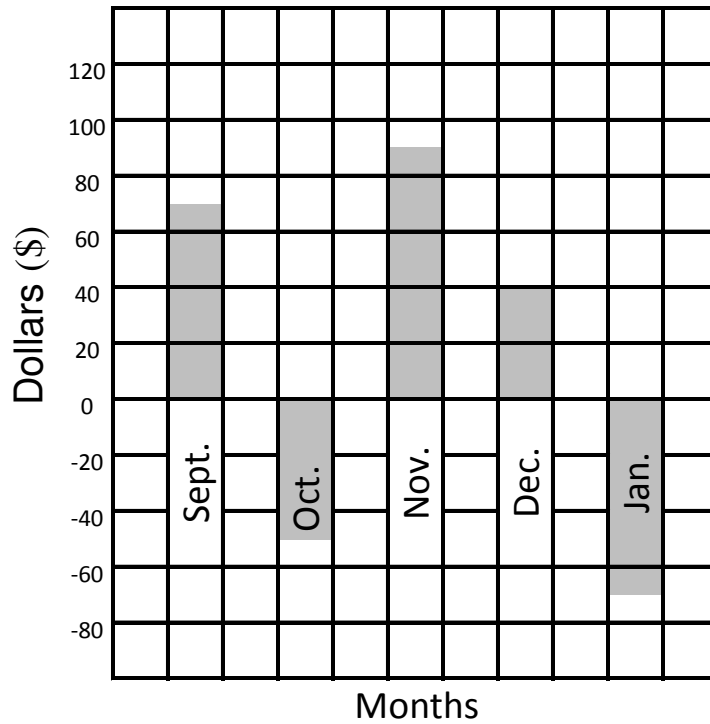
What was the mark achieved by Khalid in science at the end of the first semester?

- A 60
- B 70
- C 80
- D 83



- 8 Ahmed drew a bar chart to show his credit card account balance at the end of each month from September to January, as illustrated below.

For  
Examiner's  
Use



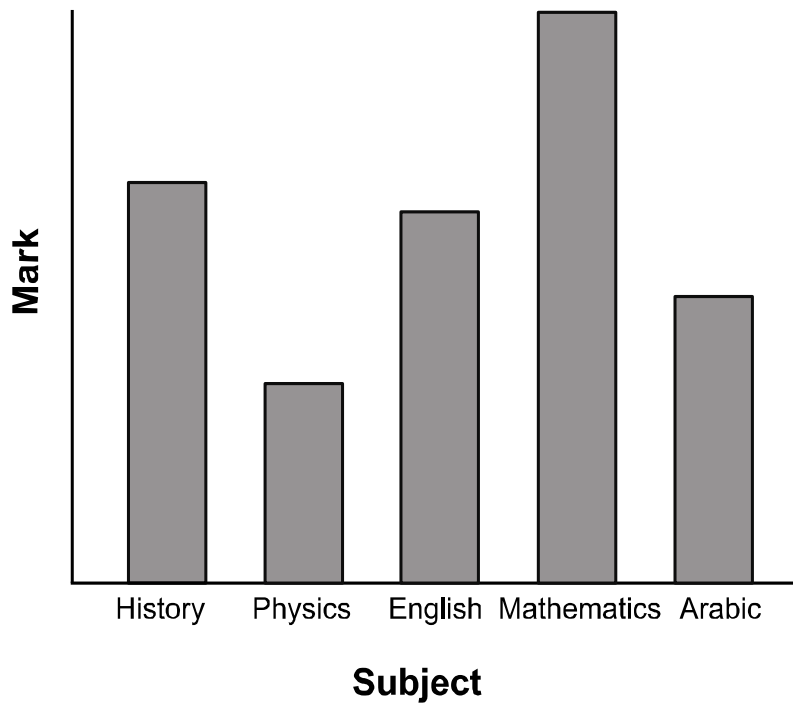
How much money did he deposit into his account during November?

- A \$70
- B \$90
- C \$110
- D \$140



- 9 The following chart represents the marks achieved by Nader in midterm exams of the first semester for five subjects:

For  
Examiner's  
Use



Which of the following tables could represent Nader's marks in the five subjects?

**A**

Subject	History	Physics	English	Mathematics	Arabic
Mark	16	8	14	19	13

**B**

Subject	History	Physics	English	Mathematics	Arabic
Mark	14	6	13	16	8

**C**

Subject	History	Physics	English	Mathematics	Arabic
Mark	14	7	13	20	10

**D**

Subject	History	Physics	English	Mathematics	Arabic
Mark	14	7	16	20	9



**10** An architect designed a building with the following specifications:

*For  
Examiner's  
Use*

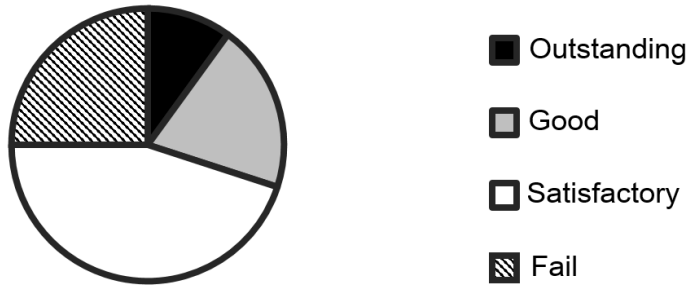
- The building consists of a basement, a ground floor, and 10 higher storeys.
- The height of the basement is 10 m.
- Starting from the ground floor, every 3 consecutive storeys have the same height as each other.
- The height of each subsequent group of 3 storeys is 0.4 m less than the group beneath.
- The height of the tenth storey is 3.2 m.

How high above the basement floor is the floor of the sixth storey?

- A** 23.2
- B** 25.2
- C** 34.4
- D** 35.2

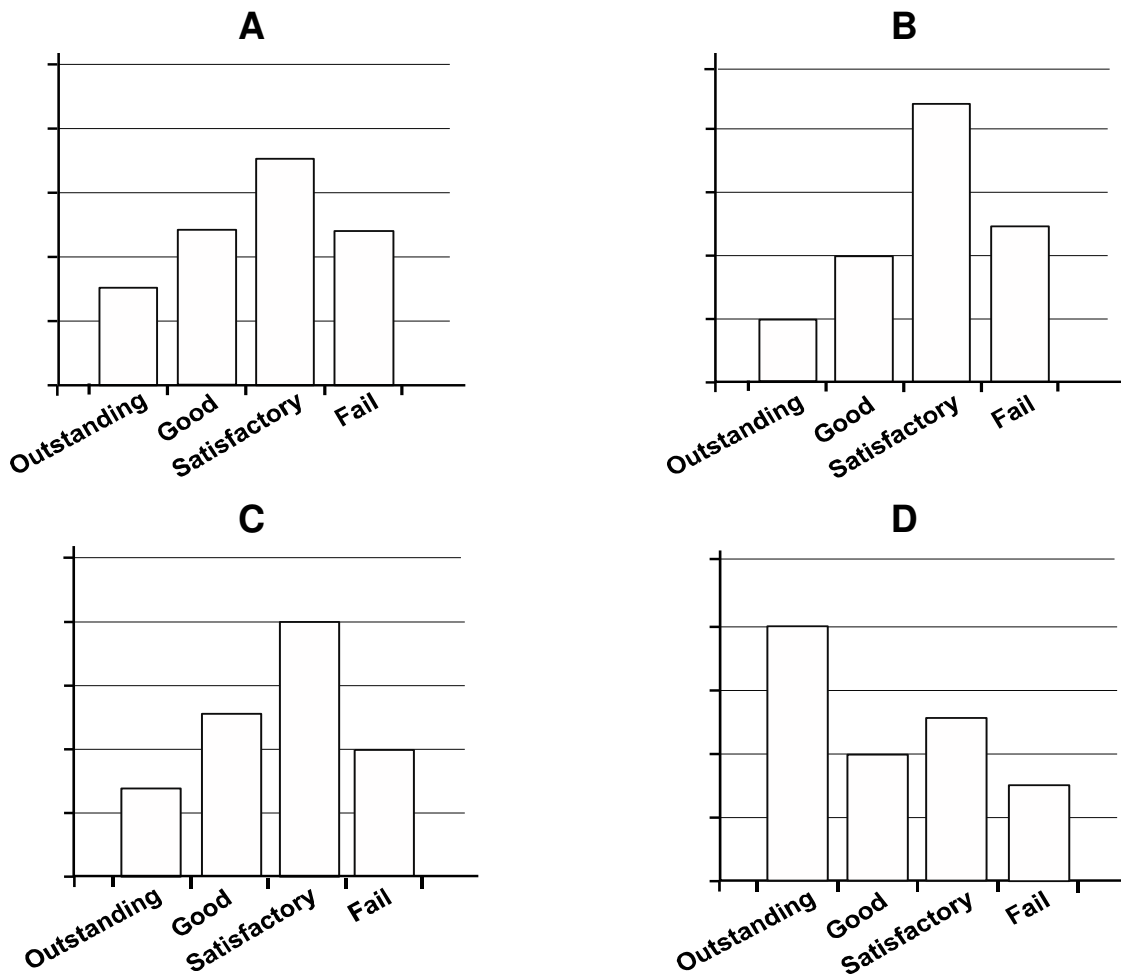


- 11 In the second semester of the academic year 2014/2015, students of Al-Naser Primary School achieved the percentages represented in the chart below in mathematics.



In the second semester of the academic year 2015/2016, pass rates in mathematics increased from 2014/2015 and the percentage of students who achieved good was 25%.

Which one of the following charts could represent the percentages achieved by students in mathematics in the second semester of the academic year 2015/2016?



- 12** Shaima has BD 330 to spend. She has gone to a home appliances store to buy some home appliances. She has decided to buy a TV costing BD 120, but is subject to a 20% discount, and a refrigerator for BD 165, which the salesman says he will reduce by BD 25. Shaima also wants to buy a washing machine, and she has found the following prices:

Washing machine type	Size		
	Small	Medium	Large
<b>Twin tub</b>	BD 57	BD 77	BD 102
<b>Top loading</b>	BD 85	BD 99	BD 153
<b>Front loading</b>	BD 120	BD 173	BD 200

Which washing machine will Shaima buy with as much as possible of the remaining money she has with her?

- A** Large top loading
- B** Small twin tub
- C** Medium twin tub
- D** Small top loading



- 13** Huda opened her money box in which she saves money from her daily allowance. She found 85 coins, comprising 100 fils, 50 fils and 25 fils coins. She found that the number of 100 fils coins was five coins more than the number of 50 fils coins and the total amount was BD 4.

Which of the following could explain the coins' distribution inside the money box?

- A** 30 coins of 100 fils, 25 coins of 50 fils and 30 coins of 25 fils
- B** 21 coins of 100 fils, 12 coins of 50 fils and 52 coins of 25 fils
- C** 20 coins of 100 fils, 15 coins of 50 fils and 50 coins of 25 fils
- D** 25 coins of 100 fils, 20 coins of 50 fils and 20 coins of 25 fils





- 14** Yousif folded a rectangular-shaped piece of paper in the direction shown by the arrows below in figure 1, and then he cut off the shaded part as in figure 2.

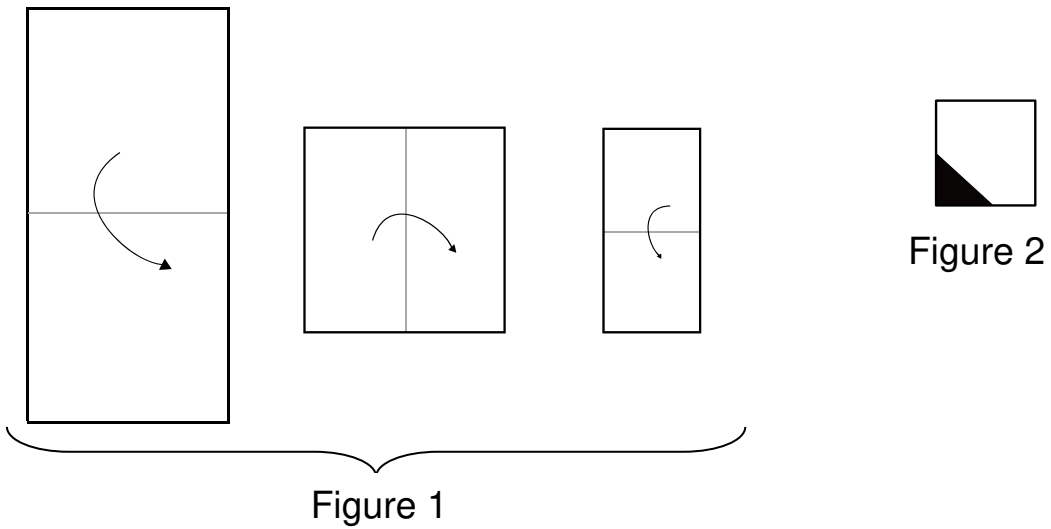
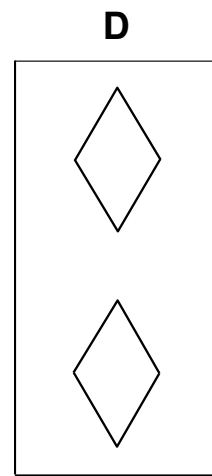
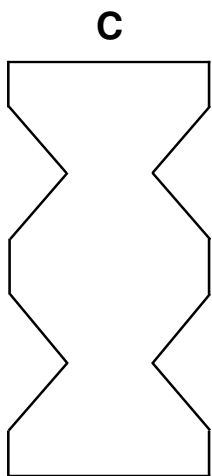
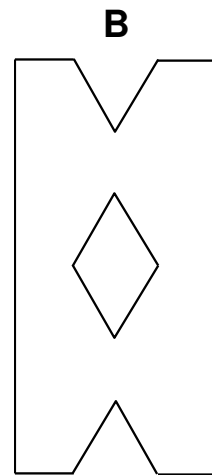
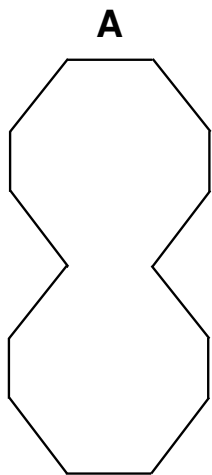


Figure 2

Which shape is Yousif going to get when he opens the folded piece of paper?



- 15** Fatima wants to travel from Jeddah to Colombo. She asked her son to provide her with departure times from Jeddah (JED) to Colombo (CMB) via Dubai (DXB). He missed recording the details of some flights for an airline company as shown in the following table:

<b>Itinerary</b>	<b>Departure time from JED</b>	<b>Arrival time at DXB</b>	<b>Departure time from DXB</b>	<b>Arrival time at CMB</b>
<b>I</b>	01:00		07:45	13:30
<b>J</b>	20:30	00:10*	03:30	09:15*
<b>K</b>	11:55	15:35		00:55*
<b>L</b>		21:15	00:45	06:30*

- Durations of all flights from Jeddah to Dubai are the same.
- Durations of all flights from Dubai to Colombo are the same.
- The symbol (\*) indicates a time that is on the day after the departure from Jeddah.

Which itinerary should Fatima select to give her the shortest waiting time in Dubai?

- A** Itinerary I  
**B** Itinerary J  
**C** Itinerary K  
**D** Itinerary L



- 16** A clothing store provides offers on the items described in the following table:

*For  
Examiner's  
Use*

<b>Item on offer</b>	<b>Price</b>
A pack of 2 trousers	BD 20
A pack of 3 shirts	BD 12
A pack of 5 ties	BD 5
A jacket	BD 22

Zaid bought 20 pieces of clothing from three items that have offers and paid BD 77.

Which of the following combinations of items did Zaid buy?

- A** Trousers, shirt and tie
- B** Trousers, shirt and jacket
- C** Trousers, tie and jacket
- D** Shirt, tie and jacket



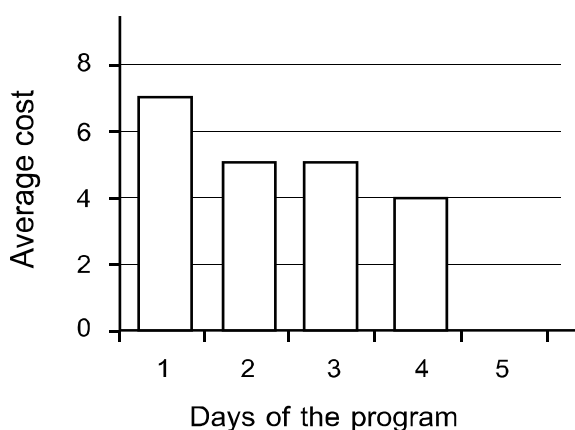
- 17** Jassim joined a weight loss program which lasted for 5 days.

He paid BD 7 for the first day and paid BD 5 each for the next two days. Further, he paid BD 4 for the fourth day. He paid nothing on the fifth day. Nobody was allowed to join after the first day or rejoin after missing a day, but at least one person dropped out after each of the first four days.

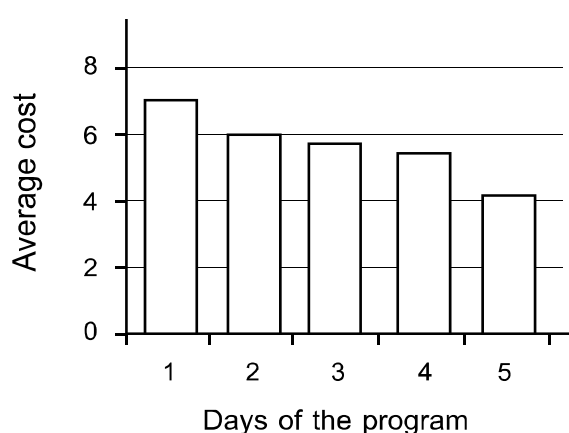
Which one of the following charts represents the average cost per day of the program depending on how many days a person took part?

For  
Examiner's  
Use

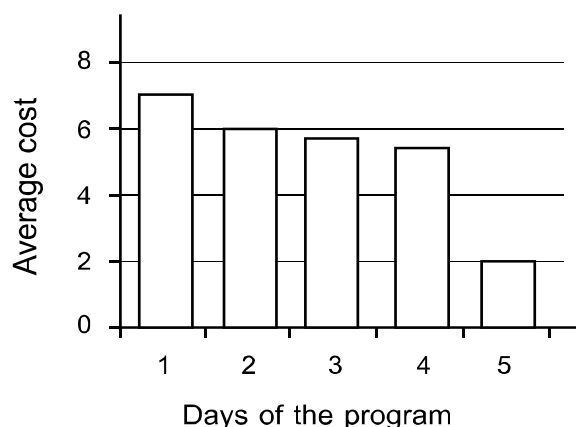
**A**



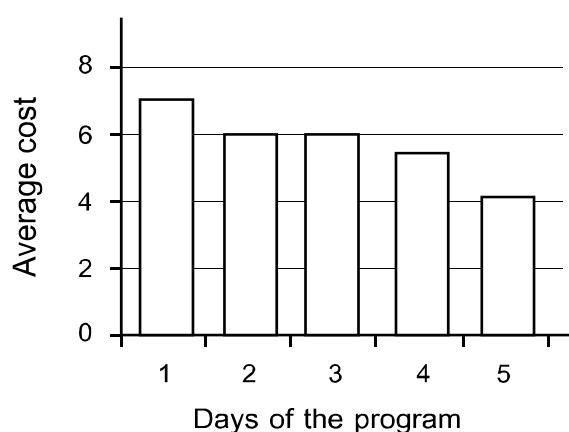
**B**



**C**



**D**



- 18** At the beginning of break period, a display refrigerator at a school cafeteria had 42 sandwiches, distributed as follows:
- 13 chicken burger sandwiches, each at a price of 300 fils
  - 14 cheese sandwiches, each at a price of 300 fils
  - 15 egg sandwiches, each at a price of 250 fils

At the end of break period, the total income from selling sandwiches was BD 6.100, BD 2.100 of which from the sale of cheese sandwiches.

Which one of the following additional pieces of information would be sufficient by itself to find the number of remaining sandwiches of each kind?

- A** Total price of remaining sandwiches in the refrigerator
- B** Number of remaining sandwiches in the refrigerator
- C** Total price of sandwiches available for sale at the beginning of break period
- D** Number of remaining cheese sandwiches in the refrigerator



- 19** Salman wrote down the quantities of fish he had for sale, the cost and the selling price for each type, as follows:

Type of fish	Quantity (kg)	Cost (BD/kg)	Selling price (BD/kg)
<b>Safi</b>	80	2.000	3.000
<b>Shary</b>	60	2.400	3.500
<b>Hamour</b>	30	5.000	7.000

When half the original quantity remained for each type of fish, Salman applied a 500 fils discount to the lowest priced type and a 10% discount to the other two types.

At 2:00 pm, Salman had 33 kg of Safi, 27 kg of Shary and 14 kg of Hamour remaining. At 4:15 pm, all the fish were sold out.

How much profit did Salman earn from the fish that he sold between 2:00 pm and 4:15 pm?

- A** BD 35.750
- B** BD 54.950
- C** BD 165.000
- D** BD 255.750



- 20** Waseem is a cake supplier. He got an order to supply 26 large cakes and 800 cupcakes for a birthday party. However, he faced certain challenges. The kitchen was available only for 3 hours. Per hour, each chef could make either 2 large cakes or 35 cupcakes.

He hired the minimum number of chefs needed to prepare the order. How many chefs did he hire?

- A** 11
- B** 12
- C** 13
- D** 36

*For  
Examiner's  
Use*



- 21** Ahmad's car consumes between 20 and 28 litres of gas to travel 80 km, and its gas tank maximum capacity is 110 litres.

*For  
Examiner's  
Use*

Ahmad has stopped to fill up the gas tank at a gas station that is 2350 km away from a friend's home, which he wants to visit. However, the fuel gauge in his car is broken, but he knows that the distance between each gas station and the next one is 25 km.

What is the least number of additional stations that Ahmad will have to stop at and fill up the gas tank to make sure he gets to his friend's home?

- A** 5
- B** 6
- C** 7
- D** 8





**22** Yousif uses a package from one of the telecommunications companies on phone calls, and the details of his package are as follows:

- Monthly fee BD 5
- First 200 local minutes (same carrier) free
- Additional local minutes (same carrier) 20 fils/min
- Local minutes (other carriers) 25 fils/min

Yousif was surprised that the amount due on his March bill was BD 10.000, which was not consistent with his package, because he made local calls of 625 minutes, 75 of which were to other carriers.

Which of the following changes to his package details explains his bill of BD 10.000?

- A** Increasing the rate of local minutes to other carriers by 15 fils
- B** Unifying the rate of additional local minutes to the same carrier and to other carriers at 10 fils/min
- C** Reducing the rate of additional local minutes to the same carrier by 15 fils and increasing it to other carriers by 5 fils
- D** Reducing the rate of additional local minutes to the same carrier by 10 fils and to other carriers by 5 fils



- 23** A group of friends went on a holiday to a hill station. During their holiday, it rained on 13 days. When it rained in the morning, the afternoon was clear, and when it rained in the afternoon, the day was followed by a clear morning.

Altogether there were 11 clear mornings and 12 clear afternoons.

How many days did their holiday last?

- A** 18
- B** 23
- C** 24
- D** 36



- 24** A company has a car park with 521 m<sup>2</sup> of parking space, in addition to space for the vehicles to move in the car park. The vehicles that park in the car park are of different sizes, as described in the following table:

Size	Space needed (m <sup>2</sup> )
Small car	7
Mid-size car	16
Bus	23

Today the whole of the parking space is occupied.

There are 40 small cars in the car park today. How many other vehicles (mid-size cars and buses) are there?

- A** 11
- B** 12
- C** 13
- D** 26



- 25** Ibrahim works for a courier company. He had to deliver 5 parcels. His motorcycle covers 45 km per 3 litres of fuel. The motorcycle tank has a capacity of 12 litres of fuel and was full when he started out.

The fuel consumed for the delivery of the first parcel was one quarter of the tank capacity. For the second and third parcels together he consumed half of the remaining fuel.

He recognized that the fuel left in the tank after delivering the third parcel was only three fifths of what he needed to deliver the last two parcels. He added what he needed and finished his deliveries.

How far did Ibrahim travel to deliver the 5 parcels?

- A** 180 km
- B** 210 km
- C** 225 km
- D** 270 km



- 26** Mariam went to a party. She made a note of what people were wearing, as shown in the table below.

For  
Examiner's  
Use

Trousers or skirt		Shoe colour		Gender	
Trousers	35	Black	14	Male	22
Skirt	11	Brown	19	Female	24
		White	13		

- No males wore a skirt.
- 5 females wore skirts and white shoes.
- 8 females wore black shoes.
- 10 males wore brown shoes.
- 5 females wore trousers and black shoes.

Mariam wore trousers and white shoes. How many other girls wore trousers and white shoes?

- A** 1  
**B** 2  
**C** 7  
**D** 8

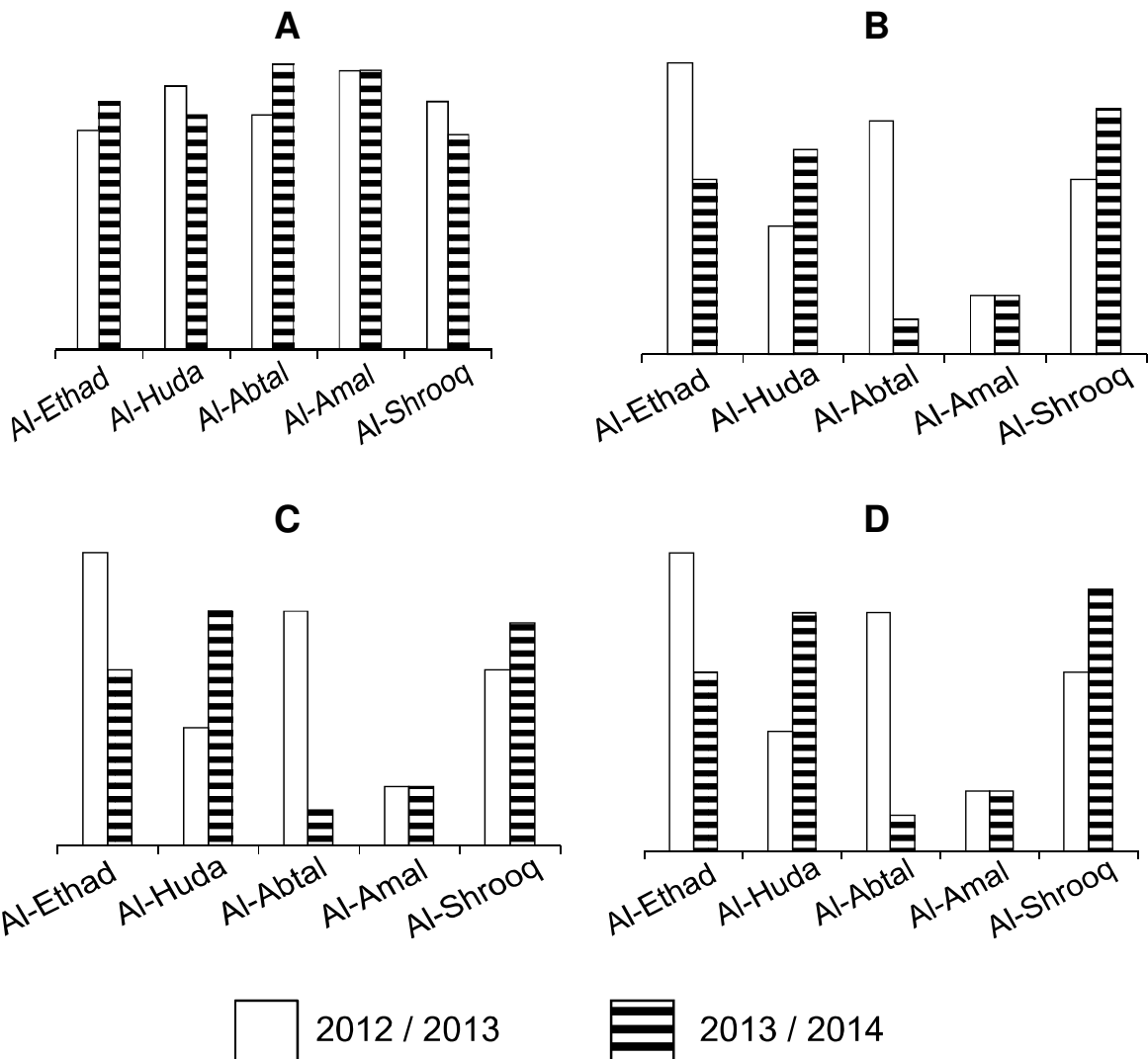


27 The table below shows the pass rates in five intermediate schools in one of Bahrain's governorates at the end of the year 2012/2013.

School	Al-Ethad	Al-Huda	Al-Abtal	Al-Amal	Al-Shurooq
Pass rate	75%	90%	80%	95%	85%

At the end of the year 2013/2014, the results of the same schools were recorded. It was found that Al-Abtal school had the lowest fail rate and Al-Shurooq school had the lowest pass rate. Al-Amal school maintained the same pass rate as in 2012/2013, and Al-Ethad school's pass rate was 5% higher than Al-Huda school, whose pass rate declined from the previous year by 10%.

Which one of the following charts could represent **fail** rates in both academic years 2012/2013 and 2013/2014?



**28** Happy Family restaurant offers hot lunch meals. In the summer vacation, it offered the following meals to its customers:

- Chicken plate, rice and soda at a price of BD 2.500
- Beef plate, fries and soda at a price of BD 2.500
- Chicken plate, fries and small salad at a price of BD 2.200
- Beef plate, rice and small salad at a price of BD 2.800

The restaurant also sells a large salad for BD 0.900 and a cup of juice for BD 0.800.

Rashid decided to invite his friends Jasim, Osama and Ibrahim for lunch at Happy Family restaurant. Rashid wanted a chicken plate, rice, a large salad and a cup of juice, and Jasim wanted a beef plate, fries, a small salad and a soda, while Osama wanted the same as Rashid and Ibrahim wanted the same as Jasim.

By ordering carefully, Rashid paid the minimum possible, which was BD 14.750.

How much did the restaurant charge for the service?

- A** BD 1.350
- B** BD 2.950
- C** BD 3.150
- D** BD 4.750



- 29** Sameer and his friends agreed to divide themselves into one-player teams to play a PlayStation soccer game; each team plays one match only against each of the other teams.

They also agreed to award points as follows:

<b>Result</b>	Win	Draw with goals	Draw without goals	Loss
<b>Points</b>	3	2	1	0

After all the matches ended, Sameer's team had 10 points without losing any matches.

Which one of the additional pieces of information is sufficient by itself to find with certainty the number of teams participating in the tournament?

- A** Number of Sameer's team's wins = 2
- B** Number of Sameer's team's wins + number of Sameer's team's draws with goals = 5
- C** Number of Sameer's team's draws with goals = 3
- D** Number of Sameer's team's draws with goals = number of Sameer's team's wins





- 30** Two creeper plants, one golden hop and the other tea rose, are both climbing up and round a cylindrical tree trunk. The golden hop twists clockwise and the tea rose anticlockwise, and they both start at the same point on the ground. Before they reach the first branch on the tree the golden hop has made 5 complete turns around the tree trunk and the tea rose has made 3 complete turns. The turns are equidistant for each creeper.

How many times do the two creepers cross before reaching the first branch, without counting the bottom and the first branch?

- A** 6
- B** 7
- C** 8
- D** 9



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PS12/01E

March 2017

PROBLEM SOLVING

Paper 1 Problem Solving

امتحان مارس 2017

حل المشكلات

الورقة 1 حل المشكلات

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