

KINGDOM OF BAHRAIN

مملكة البحرين

EDUCATION & TRAINING QUALITY AUTHORITY

هيئة جودة التعليم والتدريب

Directorate of National Examinations

إدارة الامتحانات الوطنية

Grade 12 National Examinations

الامتحانات الوطنية للصف الثاني عشر

**Mathematical Skills 2024**

امتحان المهارات الرياضية ٢٠٢٤

**Duration: 120 minutes**

مدة الامتحان: ١٢٠ دقيقة

**Read the following instructions:**

Answer **all** the questions on the answer sheet.

Read the instructions on the answer sheet.

Use **pencil** only.

The use of dictionaries is NOT permitted during the exam.

You must complete the answer sheet within the time limit.

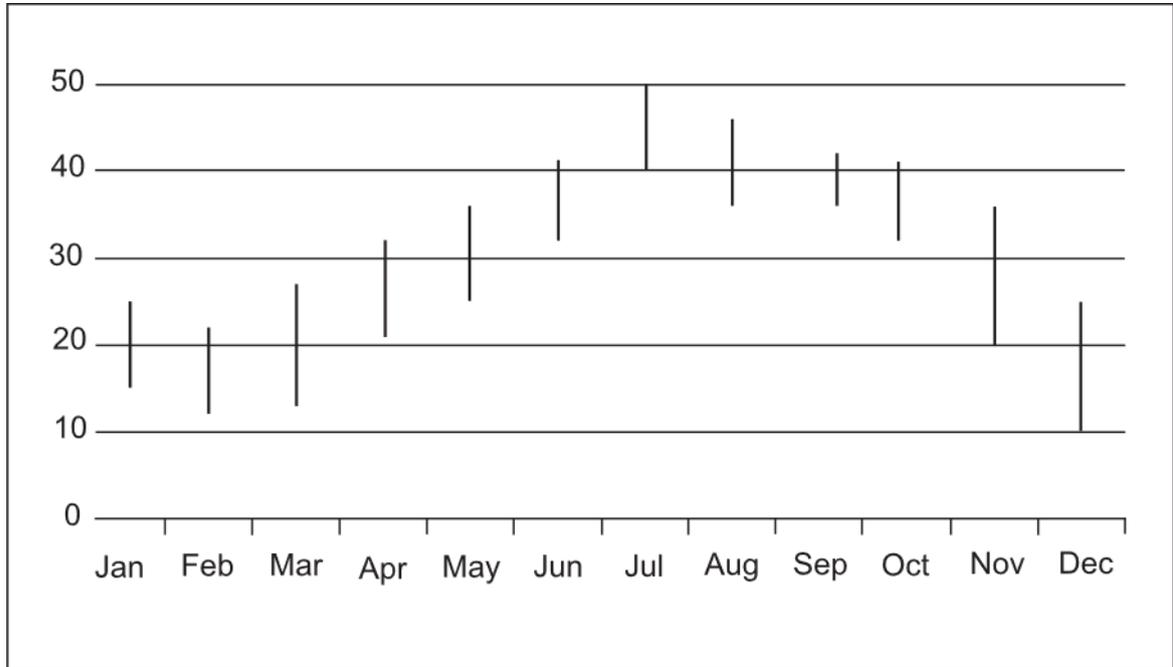
At the end of the test, hand in your answer sheet.

**Additional materials:** Ruler and eraser.

Students are permitted to use calculators.

This document consists of **32** printed pages

- 1 The meteorological authority of a state published a chart showing last year's highest and lowest monthly temperatures as illustrated in the chart below.



Example: Temperatures in January ranged from 15° C to 25° C.

What is the difference between the highest and lowest temperatures recorded last year?

- A 10° C
- B 15° C
- C 40° C
- D 50° C

- 2 A train moved from the first station with 40 passengers on board. In every following station, 10 passengers got off and 8 passengers got on the train. In the last station, all remaining 14 passengers got off the train.

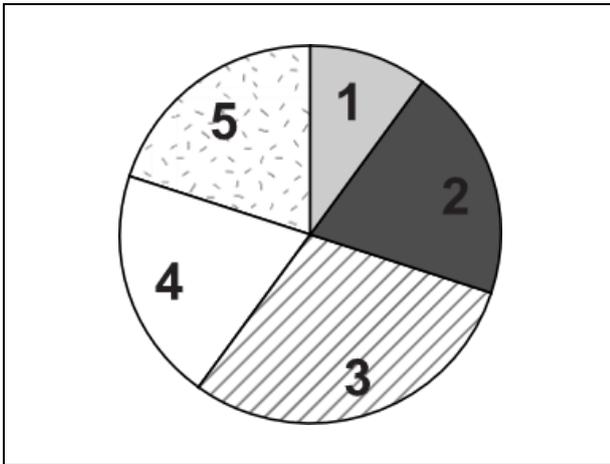
What is the total number of stations that the train stopped in including the starting station?

- A 13
- B 14
- C 15
- D 21

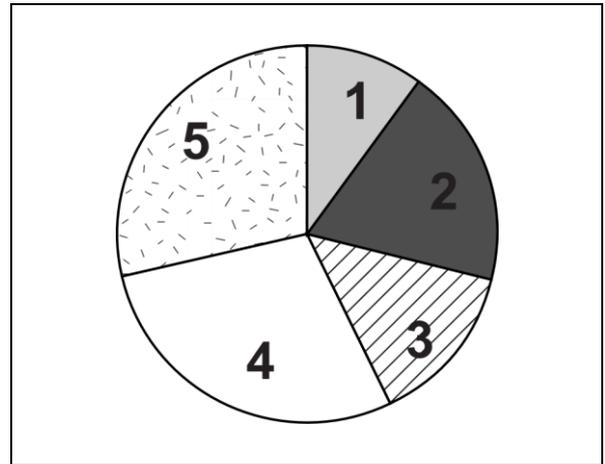
- 3 A drinking water bottle factory produced 1000 bottles in the first week and 1500 bottles in the second week. In the third week, it produced double the number of bottles produced in the first week, while in the fourth and fifth weeks, it produced a number of bottles that is equal to the total number of bottles produced in the first and third weeks.

Which of the following charts represent the number of bottles produced by the factory each week?

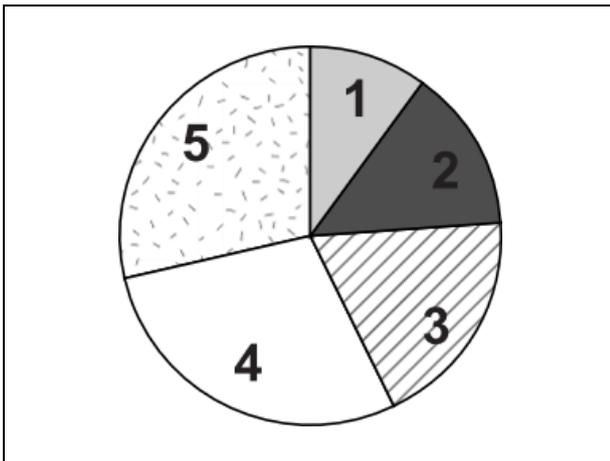
A



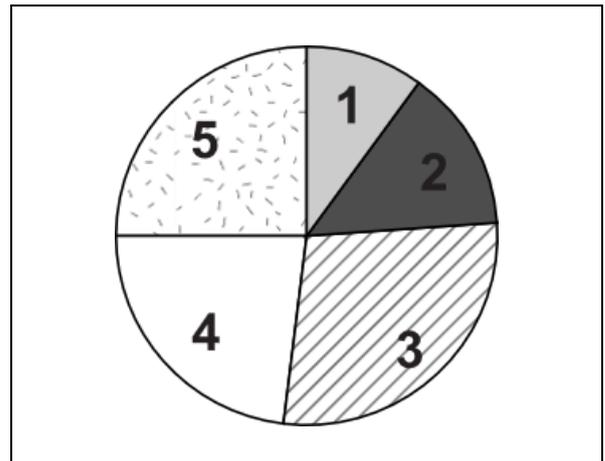
B



C



D

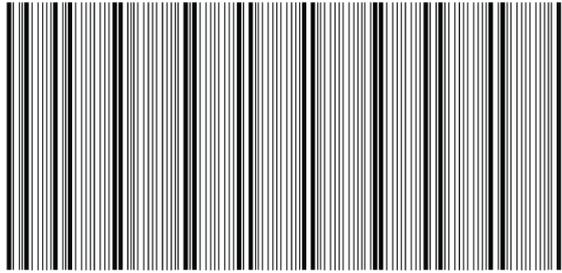


- 4 Ali has 3 bags of candy, each contains 35 to 37 pieces of candy. Every day, Ali eats 5 to 7 pieces of candy.

What is the maximum number of days in which Ali can eat at least 5 pieces of candy?

- A 7
- B 21
- C 22
- D 23

- 5 A barcode consists of 8 numbers, where the two leftmost numbers (1<sup>st</sup> and 2<sup>nd</sup>) indicate the year of productions, the following 5 numbers (3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup>) indicate the product number and the rightmost number (8<sup>th</sup>) indicates the check number, as in the following example:



00 - 3 4 6 0 0 - 8

Year of Production	Product Number	Check Number
00	34600	8

The result of the equation below must be divisible by 10.

$$2 \times (1^{\text{st}} + 3^{\text{rd}} + 5^{\text{th}} + 7^{\text{th}}) + (2^{\text{nd}} + 4^{\text{th}} + 6^{\text{th}} + 8^{\text{th}})$$

What is the value number of (X) in the barcode 00-08639-X?

- A 1
- B 4
- C 6
- D 9

- 6 Hassan found some candies in a bowl and ate half of them. Later on, his mother added twelve more candies to the bowl, then Hassan ate half of them again, leaving the same number of pieces as in the beginning.

What is the total number of pieces that Hassan ate?

- A 8
- B 10
- C 12
- D 20

- 7 The table below shows individuals' daily need of calories based on their lifestyle.

<b>An Individual's Need of Calories Based on Lifestyle</b>			
<b>Age (Years)</b>	<b>Inactive</b>	<b>Moderately Active</b>	<b>Active</b>
<b>4 - 8</b>	1400	1400 - 1600	1600 - 2000
<b>9 - 13</b>	1800	1800 - 2200	2000 - 2600
<b>14 - 18</b>	2200	2400 - 2800	2800 - 3200
<b>19 - 30</b>	2400	2600 - 2800	3000
<b>31 - 50</b>	2200	2400 - 2600	2800 - 3000
<b>50 +</b>	2000	2200 - 2400	2400 - 2800

What is the minimum number of calories that a moderately active 20-year-old person needs in 30 days?

- A** 72000
- B** 78000
- C** 81000
- D** 84000

- 8 Hammed is a businessman who owns a big trading company with four branches in four different places. The table below shows the time it takes him to travel from his house to each branch and back.

<b>Branch</b>	<b>Time to Travel to the Branch (min.)</b>	<b>Time to Travel Back to His House (min.)</b>
<b>First</b>	20	15
<b>Second</b>	25	15
<b>Third</b>	15	10
<b>Fourth</b>	30	20

Hammed works 7 days a week, and goes to only one branch every day. Last week, he visited all branches and the total time he spent to go and come back was 300 min.

Which branch did Hammed visit the most last week?

- A** First
- B** Second
- C** Third
- D** Fourth

- 9 A school is planning to organize a graduation party for its students. 140 guests are invited to the party. The organizers want to serve juice in 200 ml cups per person. The table below shows the volumes and prices for three types of juice.

Type	Volume	Price
A	20 Liters	BD 11
B	5 Liters	BD 3
C	1 Liter	BD 0.800

What is the lowest cost to buy the juice for serving all the guests?

- A BD 14.800
- B BD 16.400
- C BD 17.000
- D BD 22.000

- 10** In cooperation with a charity society, an institute gives offers on courses to students who are members of the society.

The prices of offers are calculated as follows:

- Category 1: 50% discount on the course price for families with an income of BD 300 or less.
- Category 2: 25% discount on the course price for families with an income of less than BD 400 and more than BD 300.
- Category 3: BD 5 discount on the course price for families with an income of less than BD 500 and equal to or more than BD 400.

The institute's regular course price is BD 40. The number of society's members who benefited from the offer was 3 persons in the first category, 5 in the second and 7 in the third.

What is the total amount saved by the society's members?

- A** BD 110
- B** BD 145
- C** BD 245
- D** BD 455

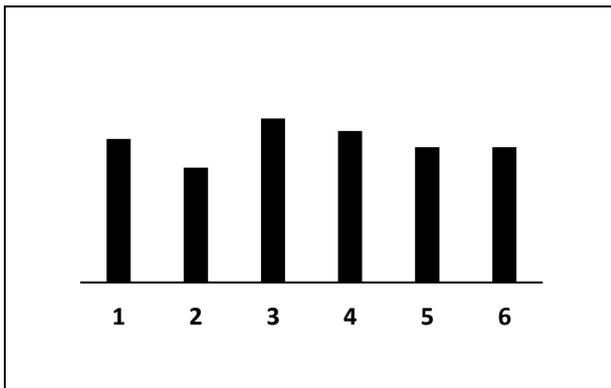
- 11 A training centre has two halls in which it offers training courses. Hall No.1 accommodates 50 trainees and Hall No.2 accommodates 40 trainees. The centre posted an advertisement for six courses for September.

The table below shows the number of trainees registered at the beginning of the courses, and the hall in which each course will be held:

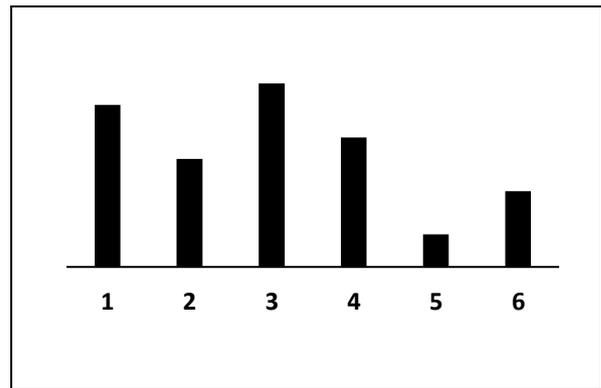
Course No.	Hall No.1			Hall No.2		
	1	3	5	2	4	6
Registered Trainees	35	40	33	28	37	33

Which of the following charts represents the number of vacant seats in each of the training centre's courses?

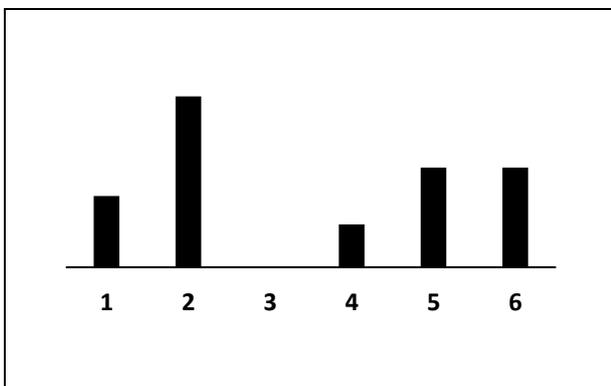
A



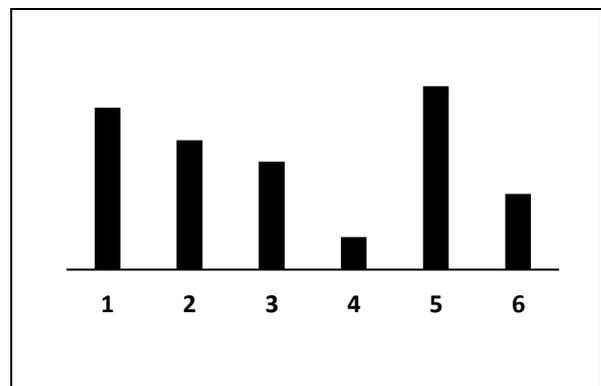
B



C



D



- 12** A merchant bought an item for BD 1500 and offered it for sale at a price that is 20% more than its cost price. However, the merchant was only able to sell the item after reducing its sale price by 10%.

How much did the merchant sell this item for?

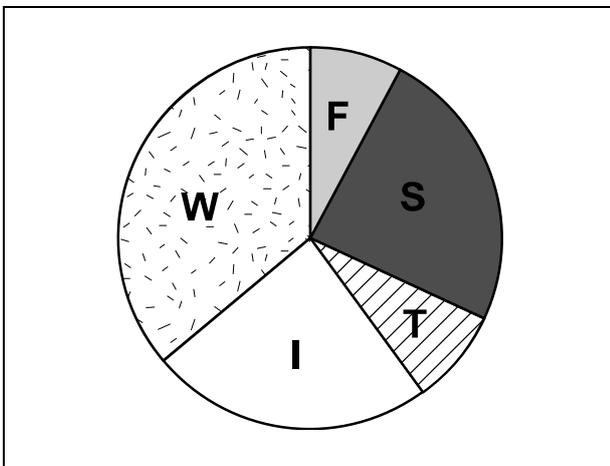
- A** BD 1320
- B** BD 1620
- C** BD 1800
- D** BD 1980

- 13 Layla asked a group of her friends about the social media application they use the most, and recorded the following data:

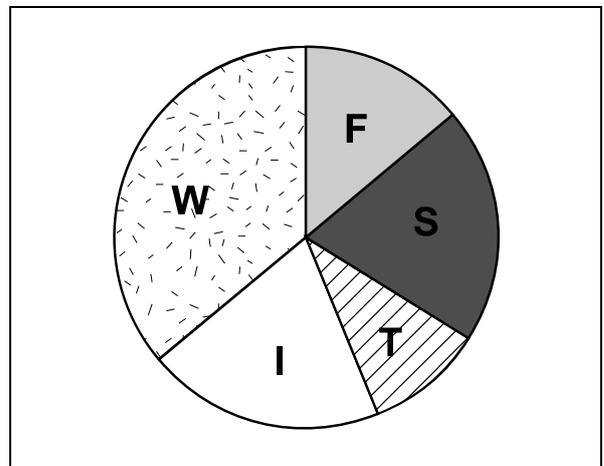
Application	Facebook (F)	Snapchat (S)	TikTok (T)	Instagram (I)	WhatsApp (W)
No. of Users	4	12	4	12	18

Which of the following charts represents the data collected by Layla?

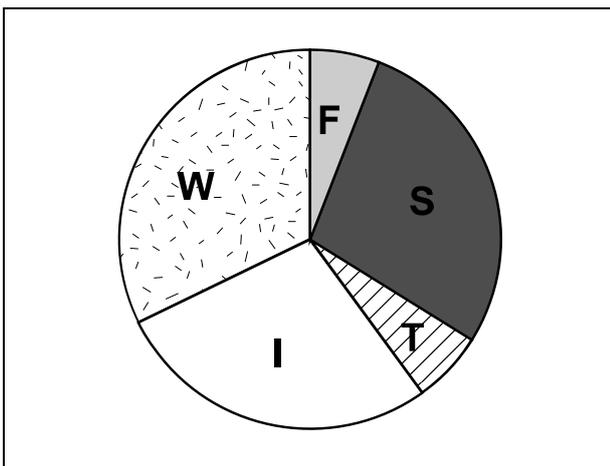
A



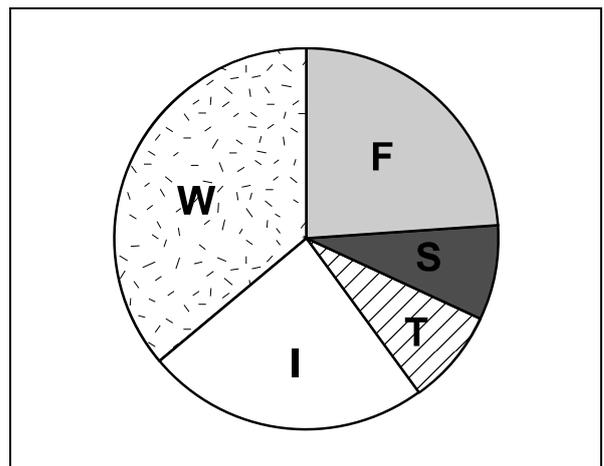
B



C



D



- 14 Qassem has BD 1000 and wants to buy some furniture for his house. He went to a furniture store and decided to buy a pair of curtains, each for a price of BD 120 with a 25% discount, and a carpet for BD 155, which the salesman told him that the price will be reduced by BD 20. He also wanted to buy a seating set for the living room and found the following prices:

Fabric Type	Seating set Size		
	Small	Medium	Large
Regular	BD 550	BD 625	BD 700
Velvet	BD 590	BD 660	BD 725
Silk	BD 630	BD 695	BD 745

Which seating will Qassem buy by spending the highest possible amount of his remaining money?

- A A medium regular fabric seating set.
- B A medium velvet seating set.
- C A large regular fabric seating set.
- D A large silk seating set.

- 15** Ahmed is working on an expansion project for his house. He bought one and quarter tonnes of steel for a price of BD 292.500. One month later, he bought three-quarters of a tonne for a price of BD 193.050

How much was the change in the price of one tonne of steel?

- A** 10.0% increase
- B** 9.1% increase
- C** 34.0% decrease
- D** 51.5% decrease

- 16 A restaurant has an offer for the users of its online application in the form of a 25% discount on all items. The application's menu contains the following dishes:

Item	Barbecue				
	Whole Fish	Steak	Neck Meat (Chuck)	Mixed Sea Food	Mixed Meat
Price (BD)	2.300	3.000	2.800	3.800	5.000
Item	Pasta				
	Vegetable	chicken	Sausages	Meat	Shrimp
Price (BD)	1.500	1.500	1.700	1.700	2.000
Item	Indian Dishes				
	Fish Masala	Meat Masala	Shrimp Masala	Spicy Fish	Lentil Masala
Price (BD)	1.500	1.700	1.800	1.500	0.800

Adel wants to use the offer to buy dinner for his family of five. He knows that his wife will order one dish that is neither meat nor an Indian dish. He also knows that his son will order one dish that is not fish, and his two daughters will share one dish of chicken pasta. He, on the other hand, will order one dish of meat that is different from those ordered by his children, and will also order one juice for each of his family members for the price of BD 1.

What is the minimum cost that Adel may pay the restaurant?

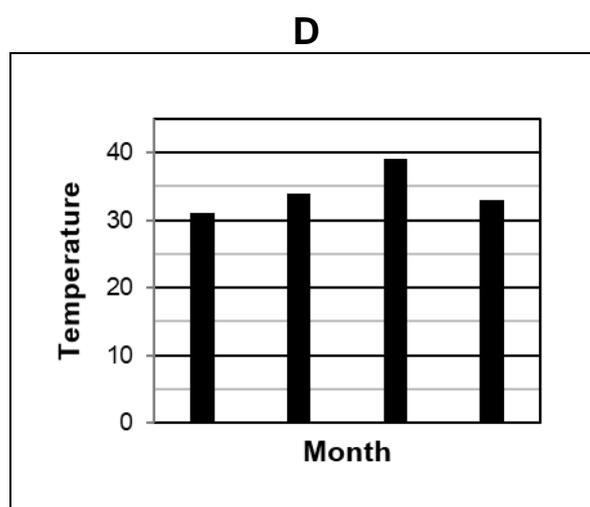
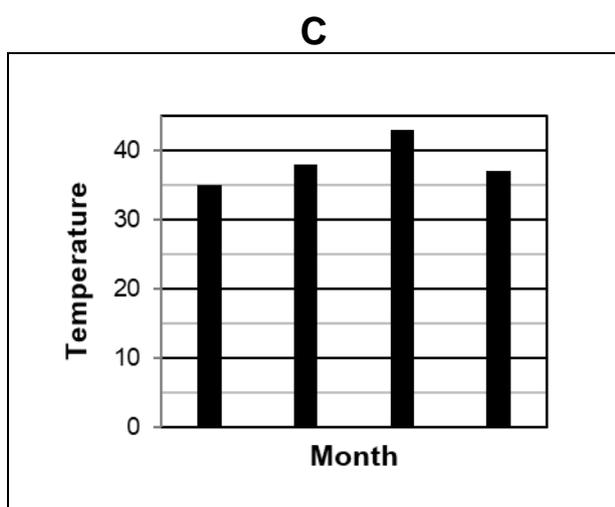
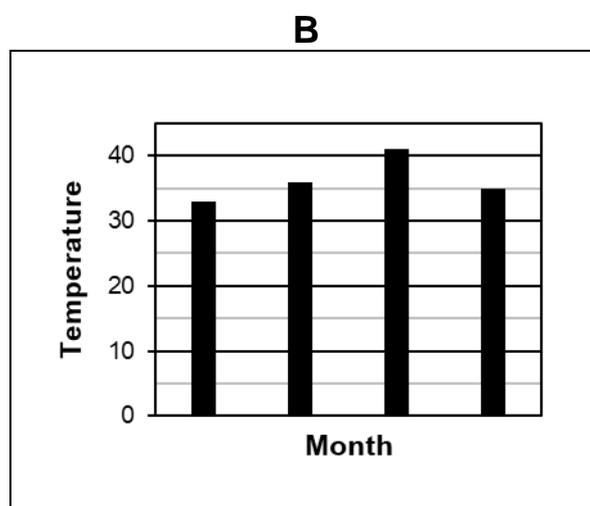
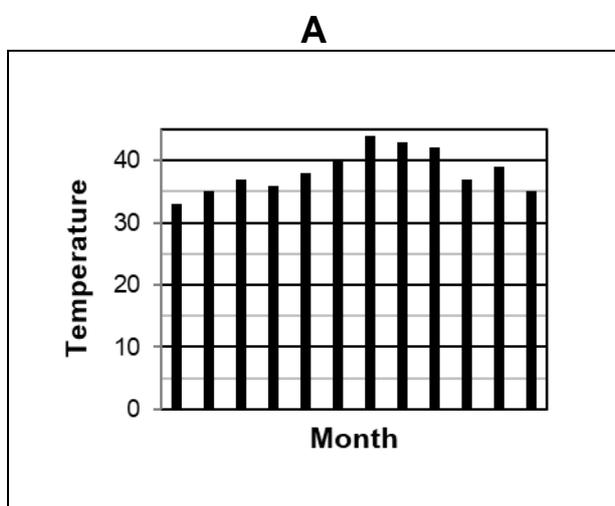
- A BD 2.625
- B BD 4.125
- C BD 7.875
- D BD 10.500

- 17 The table below shows the temperatures on three different days of the month for 4 months straight measured using a meteorological device:

Month	1			2			3			4		
Temp. (C)	31°	33°	35°	34°	36°	38°	42°	41°	40°	35°	37°	33°

However, a defect was discovered in the measurement device; as it adds 2°C to the temperature.

Which of the following figures represents the average temperature in each month?



**18** In an educational tournament broadcasted on the local television, the presenter (who manages the tournament) asks each participant 20 questions. Points are awarded in accordance with the following:

- The participant gets 5 points for every correct answer.
- The participant does not get any point for a wrong answer.
- The participant gets one point for choosing not to answer.

The participant who gets the highest total points wins the tournament.

Which of the following **cannot** be the total points scored by a participant by the end of the tournament?

- A** 92
- B** 93
- C** 95
- D** 96

- 19** Dawoud and Suleiman work in a store that assembles two types of toy cars. Dawoud works in the morning shift from 7 am to 2 pm, with a one-hour break. Suleiman works in the evening shift from 2:30 pm to 7 pm, with a 30-minute break.

Every two hours of work, Dawoud assembles two cars of the first type and one car of the second type. Every hour of work, Suleiman assembles two cars of the first type and one car of the second type.

What is the total number of cars of both types assembled by Dawoud and Suleiman in four days?

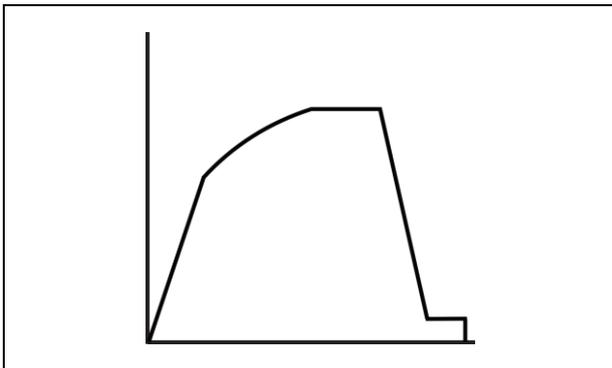
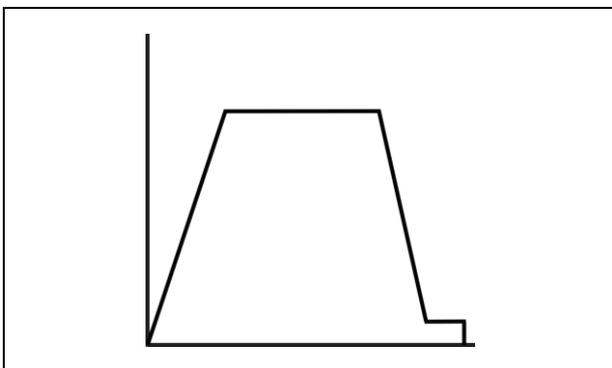
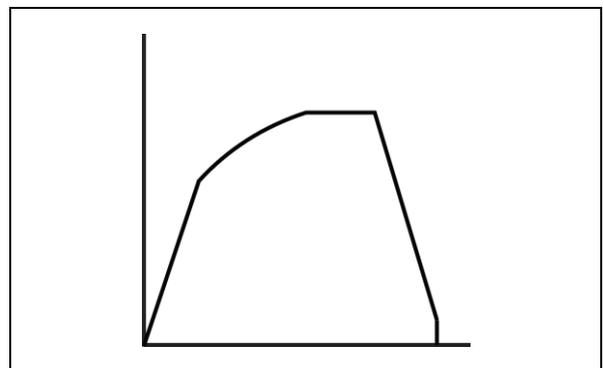
- A** 21
- B** 84
- C** 92
- D** 96

- 20** A person who is interested in skydiving asked the person in charge of the programme to explain the relation between speed and time from the moment of jumping out of the plane until landing on the ground.

The person in charge provided a brief explanation of the process in 6 stages by saying:

- Stage 1: Your speed starts from zero and increases rapidly.
- Stage 2: Your speed increases at a lower pace due to the wind.
- Stage 3: Your speed stabilizes for a while due to deploying the parachute.
- Stage 4: Your speed decreases sharply after you deploy the parachute.
- Stage 5: Your speed stabilizes again for a while.
- Stage 6: Your speed decreases sharply as you reach the ground.

Which of the following charts can represent the relation between the skydiver's speed and the time needed to reach the ground?

**A****B****C****D**

- 21** Sarah bought four glass jars, a box of red marbles and a box of green marbles. She filled the jars with the green and red marbles with a 3:5 ratios, noting that all the marbles are of the same size.

The table below shows the capacity of each jar, represented by the number of marbles it can accommodate:

Jars	Jar 1	Jar 2	Jar 3	Jar 4
Capacity (Marbles)	387	405	465	600

Which jar will have the largest empty space after being filled with the greatest possible number of marbles that satisfies the above ratio?

- A** Jar 1
- B** Jar 2
- C** Jar 3
- D** Jar 4

**22** Ibrahim forgot his 4-digit bank account PIN number. He keeps the following set of information to help him remember the PIN number:

- The PIN number consists of four different numbers.
- The PIN number does not contain any even number.
- The last number is 5.
- The sum of the first and last numbers is equal to the sum of the second and third numbers.

How many possible combinations are there for Ibrahim's PIN number?

- A** 1
- B** 2
- C** 4
- D** 19

- 23** A fresh juice shop has daily offers, and sells all available types of juice in fixed-size glasses. Last Tuesday, the shop had the following offers:

First Offer: Buying one glass as per the types and prices listed in the table below:

Juice Type	Layers	Magician	Mango	Avocado	Saffron	Banana	Water-melon
Price per Glass (BD)	1.000	0.700	0.400	0.300	0.200	N/A	N/A

Second Offer: Buying a set of glasses for BD 1 as per the types and numbers listed in the table below:

Juice Type	Layers	Magician	Mango	Avocado	Saffron	Banana	Water-melon
No. of Glasses for BD 1	1	N/A	3	4	6	7	10

On the day of the offer, Muneer bought at least one glass of each of the types available in the shop for a total cost of BD 7.

What is the largest number of juice glasses that Muneer can buy?

- A** 39
- B** 41
- C** 44
- D** 70

- 24** Car tyre companies state the tyre production date by engraving it on the outside wall of the tyre. The production date consists of four numbers, where the two numbers on the left indicate the beginning of the manufacturing week, and the two other numbers indicate the manufacturing year.

Khaled is buying tyres bearing the numbers 5217, in the fourth week of January 2021.

How long were the tyres stored since their production date until the beginning of the fourth week of January 2021?

- A** Two years and four weeks.
- B** Three years.
- C** Three years and four weeks.
- D** Four years and three weeks.

- 25 The table below shows the amount of each type of fuel sold in a fuel station for the last four days:

Day	Super Gasoline (L)	Mumtaz (Premium) Gasoline (L)	Jayyid (Regular) Gasoline (L)	Diesel (L)
1	1500	4500	27000	2000
2	1000	3000	28000	1000
3	2800	3600	26000	1500
4	2300	4000	29700	2600

The table below shows the price of each type of fuel sold in this station:

Fuel	Super Gasoline	Mumtaz (Premium) Gasoline	Jayyid (Regular) Gasoline	Diesel
Price (BD)	0.235	0.200	0.140	0.180

What is the station's total revenue from the sale of fuel in days in which the amount sold did not exceed 35000 L?

- A BD 5966.500
- B BD 10223.000
- C BD 15615.500
- D BD 21582.000

- 26** The Holy Quran consists of 30 parts. The starting page number for each is 2 in the ones digits, while the tens and hundreds digits are the results of the following equation:  
 $2 \times (\text{part number} - 1)$ .

Example: Part 7 starts on page 122, where:  
 $2 \times (7 - 1) = 12$ , which are the tens and hundreds digits, with the ones digit being 2.

What is the number of the part that includes page 560?

- A** 27
- B** 28
- C** 29
- D** 30

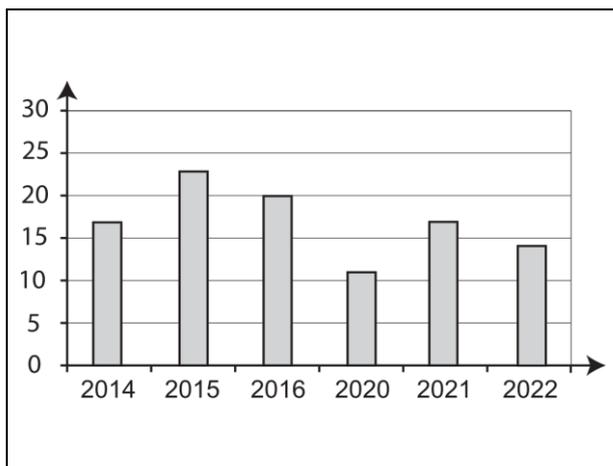
- 27 The head of department in a factory prepared a summary of Sameer's absence for June in six years, as shown in the table below, where the absence rate is calculated by dividing the days of absence by 30 days.

Year	2014	2015	2016	2020	2021	2022
Absence Rate	30%	50%	40%	10%	20%	30%

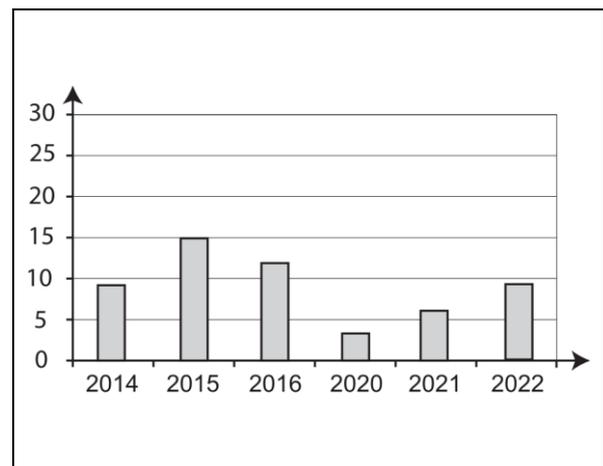
Every employee in the factory is entitled to 8 days of weekly leave every month of the above stated years. These are not included in the absence rate. The manager wanted a chart showing Sameer's days of attendance in June for the last six years.

Which of the following charts represents Sameer's days of attendance in June for the last six years?

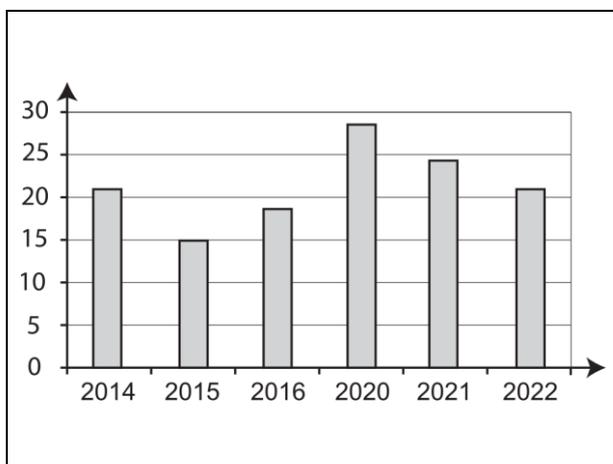
A



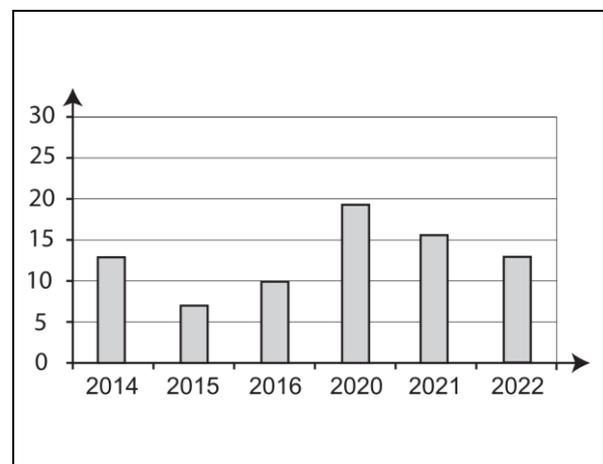
B



C



D



- 28** 40 teams took part in an indoor football league, and were divided into 8 equal groups. Each team played one match against each other team in its group, but the absence of some teams at the beginning of the league reduced the number of matches in the groups league by 32 matches, with no more than 3 teams absent in the same group.

What is the greatest possible number of teams that were absent from the league?

- A** 8
- B** 9
- C** 10
- D** 11

- 29** On the occasion of Teachers' Day, three students wanted to honor their teachers by giving them roses. Each student decided to buy 110 roses from a flower shop that gives offers on every single invoice, as shown in the table below:

Quantity	Price per Rose (BD)
First 100 roses	0.500
More than 100 roses and up to 200 roses	0.400
More than 200 roses	0.300

The students bought all the roses with one invoice, and divided the total amount equally among them, instead of buying the roses individually with separate invoices.

How much did each student save by buying the roses with one invoice instead of three separate invoices?

- A** 11 BD
- B** 22 BD
- C** 33 BD
- D** 36 BD

**30** In an international film festival held in Vienna, the festival committee organized showrooms for delegations from around the world. Ali, Mohammad, Fahad, Saud and Hassan from the UAE watched the films shown in Showroom X and Y on the first two days of the festival as follows:

- In one of the two days, Ali and Mohammad went to Showroom X, while Fahd, Saud and Hassan watched the film in the same showroom (either X or Y).
- In one of the two days, Ali and Hassan went to the same showroom (either X or Y), while Mohammad, Fahad and Saud watched the films in the same showroom, but not with Ali and Hassan.
- Hassan went to Showroom Y in both days.

Which of the five friends went to the same showroom in both days other than Hassan?

- A** Ali
- B** Saud
- C** Fahad
- D** Mohammad

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MS12

Mathematical Skills 2024

امتحان المهارات الرياضية ٢٠٢٤

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