



INTERNATIONAL  
**CATS CONTESTS**  
COMPETENCE & APTITUDE TESTING SERVICES  
**FASTEST GROWING CONTESTS IN PAKISTAN**

**2023**

**QUESTION  
BOOKLET**

**GRADE 9 & 10  
ADOLESCENTS**

Time Allowed: 90 Mins.  
Maximum Marks: 90

**ICATS**  
**MATHEMATICS**  
**CONTEST 2023**



# ICATS MATHEMATICS CONTEST 2023

## ADOLESCENTS (GRADE 9 & 10)

TIME ALLOWED : 90 MINUTES, MAXIMUM MARKS : 90

TOTAL QUESTIONS : 30 MCQS

### INSTRUCTIONS

1. DON'T START ATTEMPTING THE PAPER UNTIL INSTRUCTED BY THE INVIGILATORS.
2. INSTRUCTIONS FROM THE EXAMINATION INVIGILATORS MUST BE CARRIED OUT PROMPTLY.
3. CAREFULLY RECHECK YOUR NAME, FATHER NAME, SCHOOL NAME, ADDRESS ETC AT THE BUBBLE SHEET / ANSWER SHEET.
4. RECORD ALL ANSWERS ON THE BUBBLE SHEET ONLY. SELECT BEST ANSWER FROM THE FOUR GIVEN OPTIONS AND MARK ONLY ONE OPTION IN EACH QUESTION.
5. USE BLUE / BLACK INK TO FILL UP THE CIRCLES FOR YOUR ANSWERS ON THE BUBBLE SHEET. USE OF LEAD PENCIL IS NOT ALLOWED.
6. USE OF ANY HELPING MATERIAL INCLUDING CELL PHONES AND ELECTRONIC DEVICES IS STRICTLY PROHIBITED.
7. EVERY CORRECT ANSWER EARNS THREE POINTS. THERE WOULD BE NEGATIVE MARKING. ONE POINT WOULD BE DEDUCTED FOR EVERY INCORRECT ANSWER.
8. CANDIDATES MAY NOT LEAVE THE EXAMINATION ROOM UNESCORTED FOR ANY REASON, AND THIS INCLUDES USING THE WASHROOM.
9. NO MATERIALS OR ELECTRONIC DEVICES SHALL BE BROUGHT INTO THE ROOM.
10. THERE ARE FIVE CATEGORIES OF THE CONTEST AS UNDER:
  - A. TODDLERS (GRADE 1 & 2)
  - B. KIDS (GRADE 3 & 4)
  - C. JUNIORS (GRADE 5 & 6)
  - D. JUVENILES (GRADE 7 & 8)
  - E. ADOLESCENTS (GRADE 9 & 10 / O-LEVELS)
11. REGISTERED STUDENTS CAN PARTICIPATE IN THE CONTEST.
12. NO CANDIDATE SHALL TAKE OUT OF THE HALL ANY ANSWER BOOK(S) OR PART OF AN ANSWER BOOK, WHETHER USED OR UNUSED, OR OTHER SUPPLIED MATERIAL.
13. IF A PARTICIPANT DOES NOT UNDERSTAND A WORD OR PHRASE ON THE EXAM PAPER, NEITHER EXAMINER NOR INVIGILATOR IS PERMITTED TO ANSWER.
14. FOR INFORMATION ABOUT UPCOMING CONTESTS OR PROVIDING VALUABLE FEEDBACK, PLEASE VISIT [WWW.CATSCONTESTS.ORG](http://WWW.CATSCONTESTS.ORG)
15. ANY ACADEMIC MISCONDUCT OR MALPRACTICE MUST BE REPORTED TO INTERNATIONAL CATS CONTESTS AT [INFO@CATSCONTESTS.ORG](mailto:INFO@CATSCONTESTS.ORG)

**Q1.** Last season, Dayton Theater sold 1,360 tickets to Shakespearean plays. This season, it sold 1,564 tickets to Shakespearean plays. What is the percent of increase in Shakespeare ticket sales per season?

**A** 9%

**B** 11%

**C** 13%

**D** 15%



**Q2.** For a science fair project, Jenna is trying to estimate the population of armadillidiidae bugs (more commonly known as roly polies) on her parent's property. Jenna traps 170 roly polies, marks them, and releases them. She then replaces the traps and ends up catching 900 roly polies, 45 of which are marked. To the nearest whole number, what is the best estimate for the roly poly population?

**A** 3200

**B** 3300

**C** 3400

**D** 3500



**Q3.** Fatima drew a scale drawing of a swimming pool. The scale of the drawing was 4 millimeters : 3 meters. The pool is 24 meters long in real life. How long is the pool in the drawing?

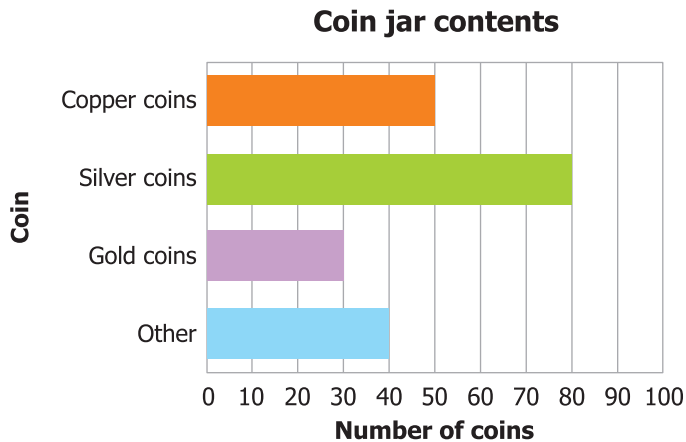
**A** 30 millimeters

**B** 31 millimeters

**C** 32 millimeters

**D** 33 millimeters

- Q4.** Amna recently emptied her coin jar and counted the coins as shown in the following bar graph.



What percent of the coins were copper coins?

- A** 25%                      **B** 40%                      **C** 45%                      **D** 50%



- Q5.** Musfirah follows the same workout cycle each time she goes to the gym. First, she runs for  $\frac{1}{3}$  of an hour. Then, she lifts weights for  $\frac{1}{6}$  of an hour. If Musfirah has  $1\frac{1}{2}$  hours to spend at the gym, how many times can she go through her workout cycle?

- A** 3 times                      **B** 3.5 times                      **C** 4 times                      **D** 4.5 times



- Q6.** You are buying a Honda Civic car.

You are offered one of the following discount options. Which will you select?

- A** 150% of Rs. 60000                      **C** Both, A & B are equal  
**B** 180% of Rs. 50000                      **D** None of these

**Q7.** Fatima would like to buy a wooden toy chest with an original price of \$227.74. Which coupon should she use?

- A** 70% off  
**B** \$150 off  
**C** Both, A & B are equal  
**D** None of these



**Q8.** At the start of the softball season, the  $p$  players on the Hammerin' Homers softball team each ordered white uniforms. A white jersey cost \$18 and a white hat cost \$7. Later in the season, the players decided to switch to a blue uniform with a special logo instead. So, each player paid \$20 for a blue jersey and \$10 for a blue hat.

Pick the expression that represents the total cost of the team's uniforms.

- A**  $(18p + 7p) + (20p + 10p)$   
**B**  $25p + 30$   
**C**  $(18p + 7) + (20p + 10)$   
**D**  $38p + 17$



**Q9.** The members of a school club are selling tickets for a fundraiser. The goal for the fundraiser is to earn \$50.00 each day from ticket sales. The list below shows the percent of the goal reached each day.

- On the first day, the members earned 90% of their daily goal.
- On the second day, the members earned 6% more than their daily goal.
- On the third day, the members earned 14% less than their daily goal.

How much money, in dollars, did the members earn from ticket sales on all three days?

- A** \$140  
**B** \$141  
**C** \$142  
**D** \$143

**Q10.** The store where Ali works is having a sale on wooden spoons and spatulas. When his shift started, there were twice as many spatulas as spoons. During his shift, the store sold 32 spatulas and 13 spoons. At the end of Ali's shift, the store had the same number of each item.

How many spoons did the store have at the beginning of Ali's shift?

**A** 17 spoons

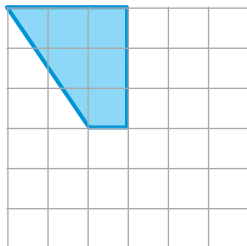
**B** 19 spoons

**C** 24 spoons

**D** 28 spoons

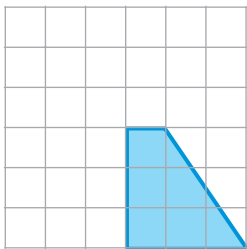


**Q11.** Look at this shape:

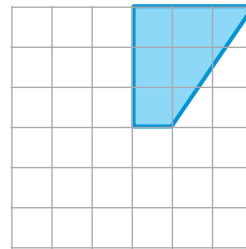


Which image shows the reflection?

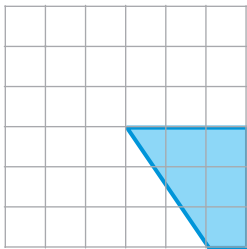
**A**



**C**



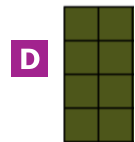
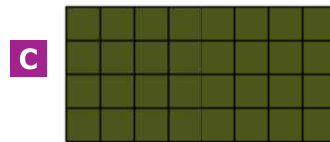
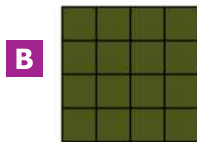
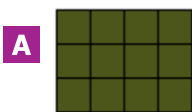
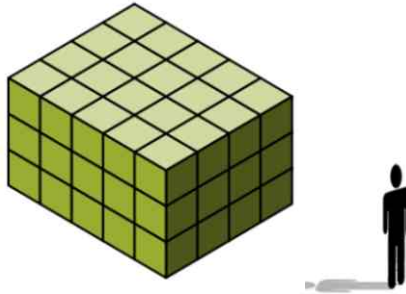
**B**



**D**

None of these

**Q12.** If you look at this object from the side, what will you see?

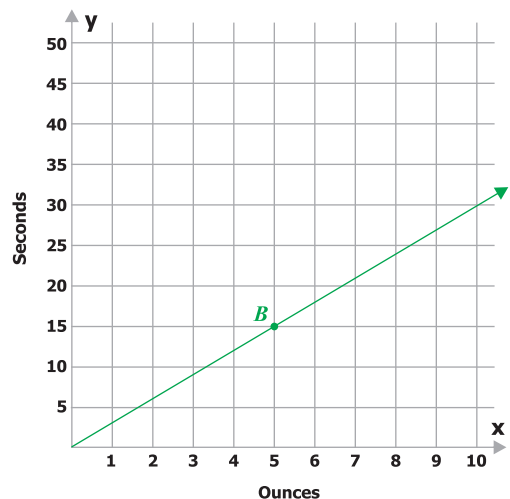


**Q13.** Tina wants to fill her water bottle between classes, but the water fountain next to her classroom is frustratingly slow.

The graph shows the proportional relationship between the amount of water (in ounces) Tina puts in her water bottle and how long (in seconds) it takes to get that amount.

What does the point *B* represent?

- A** To get 5 ounces of water in her bottle, it takes Tina 5 seconds.
- B** To get 15 ounces of water in her bottle, it takes Tina 5 seconds.
- C** To get 5 ounces of water in her bottle, it takes Tina 15 seconds.
- D** None of these.



**Q14.** Ali goes biking every morning. The farther he bikes, the more calories he burns during the bike ride.

$d$  = the distance Ali bikes.

$c$  = the number of calories Ali burns during the bike ride.

Which of the variables is independent and which is dependent?

**A**  $d$  is the independent variable and  $c$  is the dependent variable.

**B**  $c$  is the independent variable and  $d$  is the dependent variable.

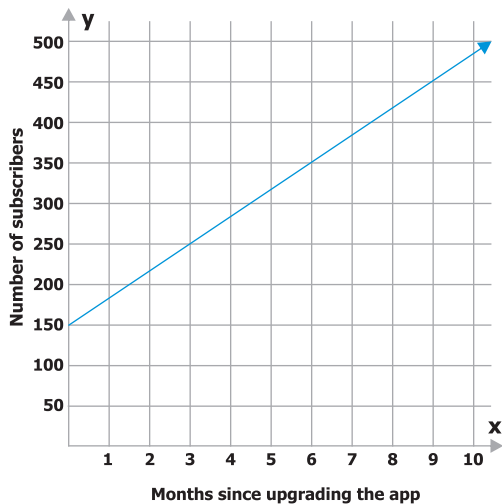
**C** Both  $d$  and  $c$  are dependent variables.

**D** None of above.



**Q15.** David runs the music-streaming service "Absolute Audio". Since upgrading his app last year, David has steadily gained subscribers.

This situation can be modeled as a linear relationship.



What does the slope of the line tell you about the situation?

**A** David had 350 subscribers 5 months after upgrading the app.

**B** David gained 100 subscribers every 3 months.

**C** David gained 150 subscribers every 3 months.

**D** David had 150 subscribers when he upgraded the app.



**Q16.** Ali is twice as good work man as Basit and together they finish a piece of work in 18 days. In how many days will Ali alone finish the work?

**A** 27 days

**B** 28 days

**C** 30 days

**D** 31 days



**Q17.** A certain magazine has 14 sports pages and 10 movie pages out of a total of 140 pages.

How many sports pages will have to be changed into movie pages in the magazine if the editor wishes to reduce the number of sports pages so that the ratio of sports pages to movie pages is 5 : 15?

**A** 6

**B** 8

**C** 4

**D** 7



**Q18.** "The Wholesome Bakery" baked 4 loaves of bread on Wednesday, 8 loaves of bread on Thursday, 16 loaves of bread on Friday, 32 loaves of bread on Saturday, and 64 loaves of bread on Sunday. If this pattern continues, how many loaves of bread will they bake on Monday?

**A** 127 loaves of bread

**B** 128 loaves of bread

**C** 129 loaves of bread

**D** 130 loaves of bread

**Q19.** Tabassum reaches her office 15 minutes early by traveling at a speed of 30 km/h and reaches 1 minute early by traveling at a speed of 25 km/h. By how much time will she be early or late if she travels at 20 km/h?

**A** 10 minutes early

**C** 20 minutes early

**B** 10 minutes late

**D** 20 minutes late



**Q20.** A boat covers 28 km upstream and 48 km downstream in 4 hours. Also, it covers 20 km upstream and 64 km downstream in the same time then the speed of boat in still water is \_\_\_\_ km/h.

**A** 17.50 km/h

**B** 18.50 km/h

**C** 19.50 km/h

**D** 20.50 km/h



**Q21.** Find the 45th term of the arithmetic sequence  $-9, -2, 5, 12, \dots$

**A** 299

**B** 306

**C** 317

**D** 324



**Q22.** Ahmad travels 60 miles per hour going to a neighboring city and 50 miles per hour coming back using the same road. He drove a total of 5 hours away and back. What is the distance from Ahmad's house to the city he visited? (round your answer to the nearest mile).

**A** 116 miles

**B** 126 miles

**C** 136 miles

**D** 146 miles

**Q23.** The number of weeds in your garden began at 4. They grow at a rate of 15% a day. How many weeds will there be after a week?

**A** 10

**B** 4.4

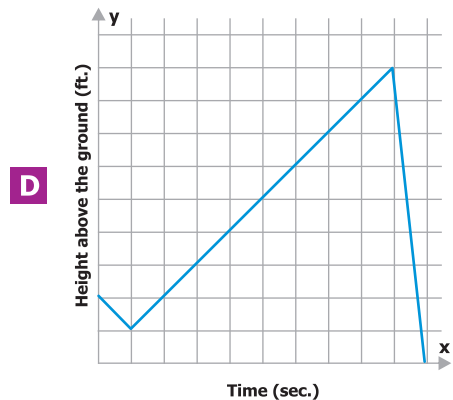
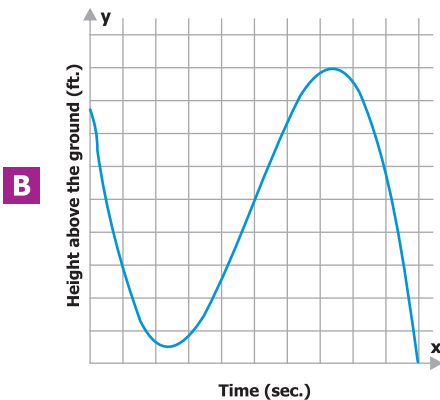
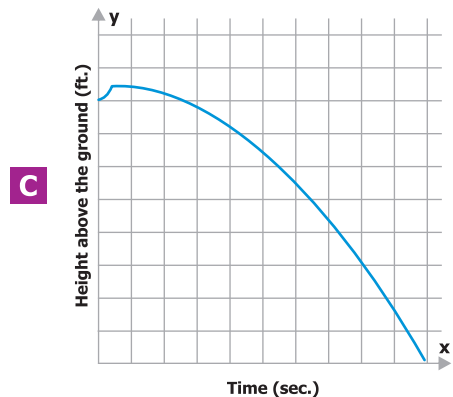
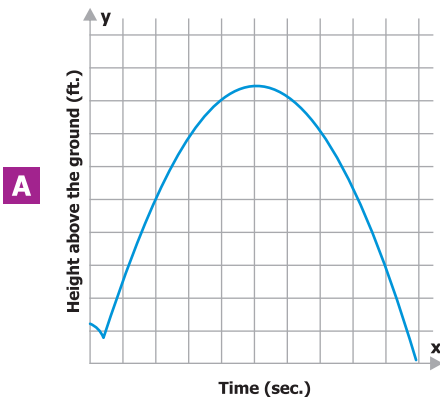
**C** 11

**D** 4.6



**Q24.** Jacob is the punter for his school's football team. During practice, he has the ball in his hand, ready to punt. He drops the ball and then kicks it before it hits the ground. The ball flies through the air and lands farther down the field.

Which graph could show the height of the football above the ground over time?



**Q25.** The workload has to be shared out between three workers, A, B and C in the ratio 2:6:3 respectively. If the work consists of 1,100 units, how many units will each of the workers have to do?

**A** A 600, B 600 and C 300

**C** A 200, B 600 and C 300

**B** A 300, B 600 and C 200

**D** A 300, B 200 and C 600



**Q26.** A ferry crossing was set up between Boston and the Cape. The cost of the ferry was \$720,000.00. Each passenger who took the ferry had to pay \$4.50. There are approximately 2,300 passengers that take the ferry every day. How many days will the ferry have to run before it makes a profit of at least \$300,000.00?

**A** 78 days

**B** 99 days

**C** 110 days

**D** 139 days



**Q27.** Shape R is a rectangle. A smaller rectangle is cut from R, to make shape L.



Which one statement is true?

**A** The perimeter of R is longer than the perimeter of L

**B** The perimeter of R is the same as the perimeter of L

**C** The perimeter of R is shorter than the perimeter of L

**D** It is not possible to tell which perimeter is longer

**Q28.** At 11:00 am, John started driving along a highway at constant speed of 50 miles per hour. A quarter of an hour later, Jimmy started driving along the same highway in the same direction as John at the constant speed of 65 miles per hour. At what time will Jimmy catch up with John?

**A** 11:55 am

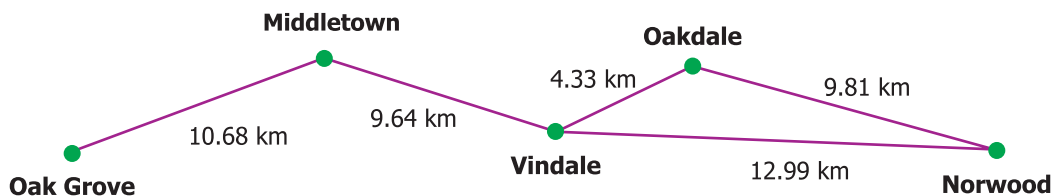
**B** 12:05 pm

**C** 12:15 pm

**D** 12:25 pm



**Q29.** Using the paths shown, how long is the shortest route from Oak Grove to Norwood?



**A** 20.32km

**B** 20.80km

**C** 33.31km

**D** 34.46km



**Q30.** David is two years older than three times of Lucy's age. If Lucy is  $M$  years old, how would you calculate David's age?

**A**  $3M + 2$

**B**  $3(M-2)$

**C**  $3M^2$

**D**  $3(M+2)$

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National Toppers  
ICATS  
Art Contest  
2023

Student Name	Father Name	Grade	School
ZOHA SUALEH	MIR M. SHAH SUALEH	1	FUTURE WORLD SCHOOL
SHAZIL ASAF	ASAF JAVED	1	ARMY PUBLIC SCHOOL & COLLEGE FOR BOYS
MUHAMMAD WALEE KHAN	FAHEEM ASHRAF	2	NUST CREATIVE LEARNING SCHOOL & COLLEGE
RAYYAN IRFAN	DR. MUHAMMAD YOUSAF	3	DHA JUNIOR SCHOOL
ANABIYA	HUSSAIN ABID	3	APS&C PMA
MAHNOOR	GHULAM MUSTAFA	4	AES SCHOOL FOR GIRLS
MEERAB KHAN	ADNAN ASIF KHAN	5	LAHORE GRAMMAR SCHOOL (JUNIOR SECTION)
MAHEEN MUNIR	MUNIR KHAN	6	FAUJI FOUNDATION SCHOOL
TALHA ALI KHAN	SADAQAT ALI	7	JOINT STAFF PUBLIC SCHOOL & COLLEGE
AREESHA MOBEEN	MOBEEN TAHIR	8	LAHORE GRAMMAR SCHOOL
ASMA NAEEM	NAEEM AMIN	9	ALLAMA IQBAL PUBLIC GIRLS HIGH SCHOOL
SUMERA KHAN	IMRAN KHAN	10	AES SCHOOL FOR GIRLS

*Congratulations*


National Toppers  
ICATS  
Creative Writing  
Contest  
2023

Student Name	Father Name	Grade	School
FAARIS ALI QURESHI	DANYAL QURESHI	1	LAHORE GRAMMAR SCHOOL
KHADIIJA AHSAN	AHSAN MAJEED	2	LAHORE GRAMMAR SCHOOL
ZAYYAN MUSTAFA	QAMAR MUSTAFA	3	ARMY PUBLIC SCHOOL (BOYS & GIRLS)
SIBTAIN ALI KHAN	FAWAD ALI PATHAN	4	PAK-TURK MAARIF INTERNATIONAL SCHOOLS & COLLEGES
SAARIM THARANI	IMRAN NOORALI THARANI	5	AGA KHAN SCHOOL GARDEN
M. AHMED JADOON		6	THE CITY SCHOOL (RAVI CAMPUS)
ARISHA MAZHAR	MAZHAR ALI	7	KOHSAR CHILDREN'S ACADEMY
VERDAH SAHAR USMAN	USMAN TARIQ SHEIKH	7	LAHORE GRAMMAR SCHOOL
SALEHA SHAHID	SHAHID WAHEED	8	THE CITY SCHOOL (PESHAWAR CAMPUS)
HALEEMA USMAN	USMAN AHMED	8	TNS BEACONHOUSE
UMAIMA AIMEN	MUBASHIR MUSTAFA	9	RANGERS PUBLIC SCHOOL
RANIA ZAKIA MALIK	TAHIR NAEEM MALIK	10	ISLAMABAD COLLEGE OF ARTS AND SCIENCES

*Congratulations*

Compete if you are the best

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