



INTERNATIONAL CATS CONTESTS

COMPETENCE & APTITUDE TESTING SERVICES



ICATS MATHEMATICS CONTEST 2018

**GRADE 9 & 10
ADOLESCENTS**



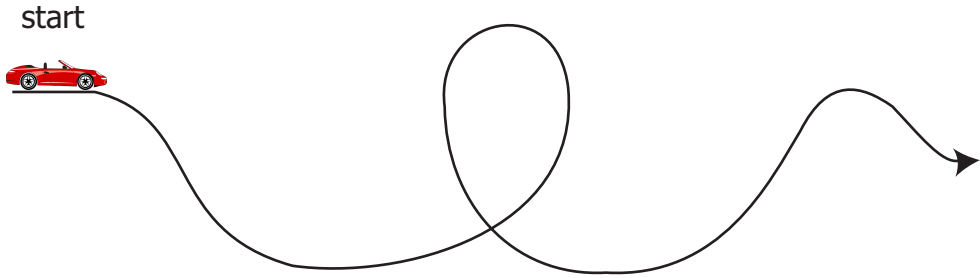
ICATS MATHEMATICS CONTEST 2018
ADOLESCENT (GRADE 9, 10 & O Levels)
TIME ALLOWED : 90 MINUTES, MAXIMUM MARKS : 90
TOTAL QUESTIONS : 30 MCQS

INSTRUCTIONS

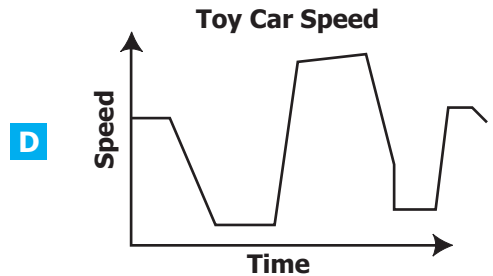
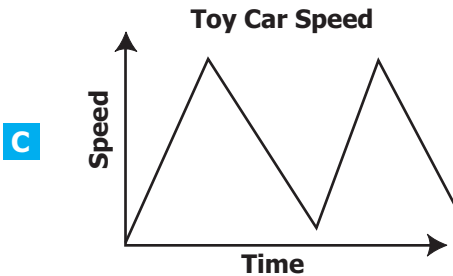
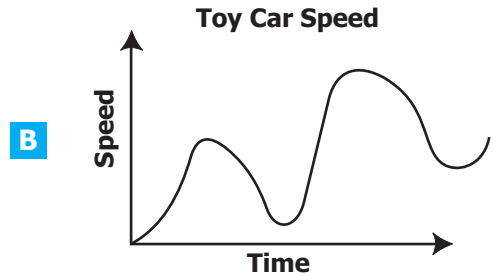
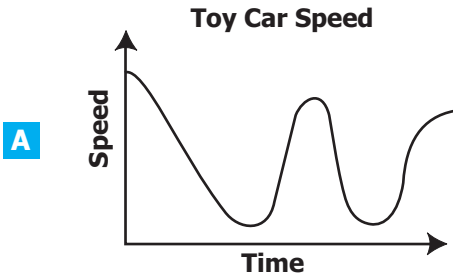
1. DON'T START ATTEMPTING THE PAPER UNTIL INSTRUCTED BY THE INVIGILATORS.
2. INSTRUCTIONS FROM THE EXAMINATION INVIGILATORS MUST BE CARRIED OUT PROMPTLY.
3. WRITE YOUR NAME, FATHER NAME, SCHOOL NAME, ADDRESS ETC AT THE BUBBLE SHEET (ANSWER SHEET) ONLY.
4. RECORD ALL ANSWERS ON THE BUBBLE SHEET ONLY. 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. ONLY 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
15. ANY ACADEMIC MISCONDUCT OR MALPRACTICE MUST BE REPORTED TO INTERNATIONAL CATS CONTESTS AT INFO@CATSCONTESTS.ORG

Q1.

Toy Car Race Track



The picture shows the beginning of a racetrack for a toy car. Which graph models the estimated speed of the toy car as it moves through the racetrack?



Q2. On multiplying a number by 7, the product is a number each of whose digits is 3. The smallest such number is:

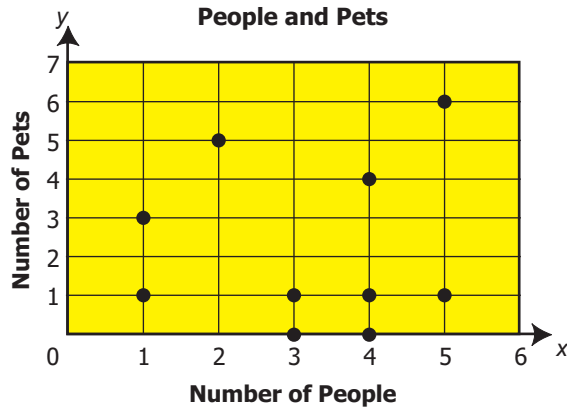
A 47619

B 47719

C 48619

D 47649

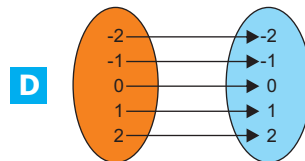
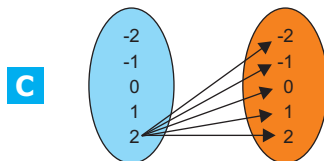
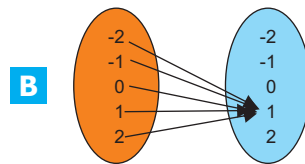
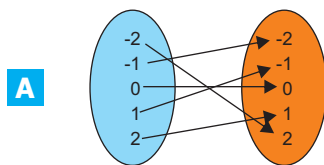
- Q3.** Misha asked ten different coworkers how many people and pets are living in their homes. She used the responses to create the scatter plot shown.



Which statement about the numbers of people and pets living in the homes of Misha's ten coworkers is true?

- A** As the number of people living in the home increases, the number of pets increases.
- B** As the number of people living in the home increases, the number of pets decreases.
- C** As the number of people living in the home decreases, the number of pets decreases.
- D** There is no relationship between the numbers of people and pets living in the home.

- Q4.** Which model is not a function?



- Q5.** Rudy surveyed 80 people about whether they prefer blueberry or cherry pie and whether they prefer the pie with or without ice cream. The results are shown in the table below.

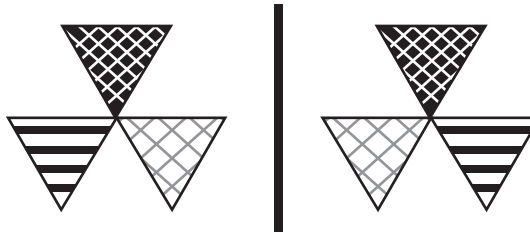
Pie and Ice-Cream Preferences

	Blueberry Pie	Cherry Pie
With Ice Cream	29	24
Without Ice Cream	15	12

Which conclusion can be made based on the results shown in the table?

- A** About $\frac{1}{3}$ of the people prefer pie without ice cream.
- B** There are 2 times as many people who prefer blueberry pie to cherry pie.
- C** Fewer people prefer cherry pie with ice cream than blueberry pie without ice cream.
- D** The ratio of people who prefer blueberry pie to cherry pie is equivalent to the ratio of people who prefer pie with ice cream to pie without ice cream.

- Q6.** The geometric shape on the left side of the solid line can be made to fit onto the geometric shape on the right side of the solid line by

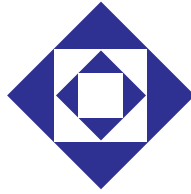


- A** translation
- B** enlargement
- C** rotation
- D** reflection

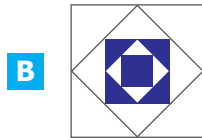
- Q7.** In a certain store, the profit is 320% of the cost. If the cost increases by 25% but the selling price remains constant, approximately what percentage of the selling price is the profit?

- A** 30%
- B** 70%
- C** 100%
- D** 250%

Q8. Study this growing pattern.



If you grow this pattern further the next diagram will be:



Q9. The wheels on Bill's bicycle each have a radius of 35 centimeters. Which of the following is closest to the distance the bicycle moves along the ground in one complete revolution of the wheels?

A 35 cm

B 55 cm

C 110 cm

D 220 cm

Q10. Two families buy refreshments at a concession stand.

- Each drink costs d dollars.
- Each snack costs s dollars.
- The Blake family buys 3 drinks and 2 snacks for \$12.
- The Reese family buys 2 drinks and 4 snacks for \$16.

What is the cost of one drink at the concession stand?

A \$2

B \$3

C \$4

D \$5

Q11. A computer software package is sold to small-business clients. The total cost of the software package is \$500 for the first 10 computers on which the software is installed, plus \$20 for installation on each additional computer. Which statement best describes the function that models the relationship between the number of computers on which the software is installed and the cost of the software?

- A** It is a constant linear function for 10 or fewer computers and an exponential function for more than 10 computers.
- B** It is an increasing linear function for 10 or fewer computers and an exponential function for more than 10 computers.
- C** It is a constant linear function for 10 or fewer computers and an increasing linear function for more than 10 computers.
- D** It is an increasing linear function for 10 or fewer computers and a constant linear function for more than 10 computers.

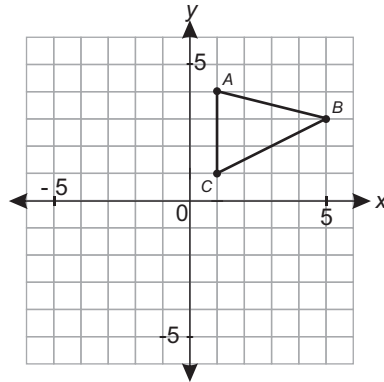
Q12. The first term in a sequence is 24. Each term in the sequence after the first term is equal to half the previous term, plus 4. Which of the following statements best describes the terms in the sequence as it progresses?

- A** The terms get closer to 8.
- B** The terms get closer to 12.
- C** The terms increase at a constant rate.
- D** The terms decrease at a constant rate.

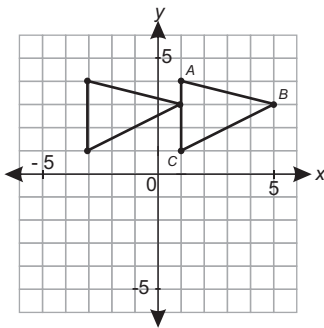
Q13. A green can and a silver can are each in the shape of a right circular cylinder. The cans have the same radius, but the height of the green can is 3 times the height of the silver can. What is the ratio of the volume of the green can to the volume of the silver can?

- A** 27:1
- B** 9:1
- C** 6:1
- D** 3:1

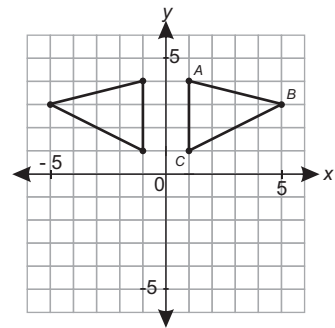
- Q14.** Which of the following represents the combined design when Figure ABC is rotated 180° about the origin to produce rotation symmetry?



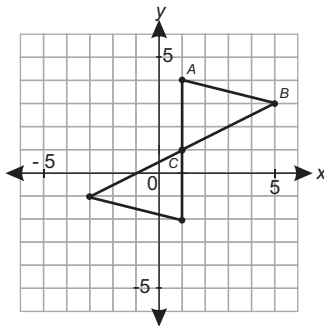
A



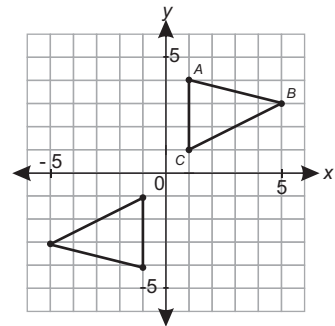
B



C



D



- Q15.** To fill a tank, 25 buckets of water is required. How many buckets of water will be required to fill the same tank if the capacity of the bucket is reduced to two-fifth of its present ?

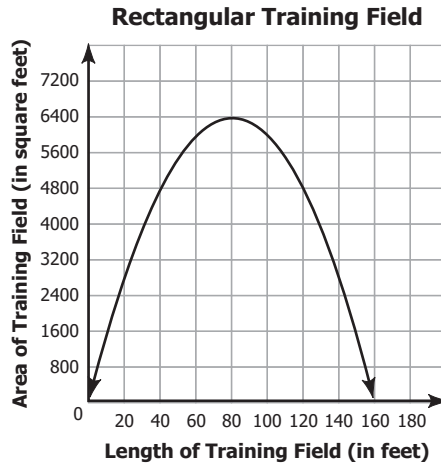
A 10

B 35

C 62.5

D Cannot be determined

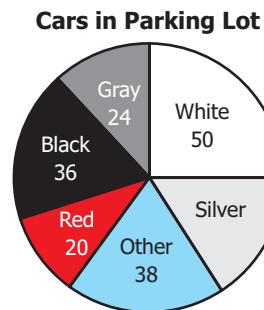
- Q16.** A dog trainer will use 320 feet of fence to create a rectangular training field. The graph below displays the relationship between the length, in feet, of the training field and the area, in square feet, of the training field.



What is the length of the rectangular training field that has the greatest area?

- A** 40 feet **B** 80 feet **C** 160 feet **D** 180 feet

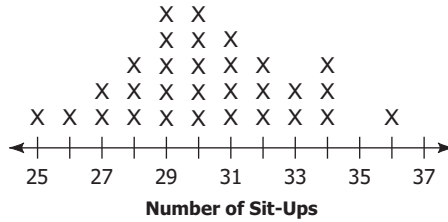
- Q17.** The circle graph below represents the number of cars in a parking lot and their colors.



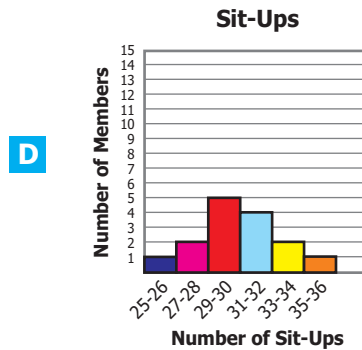
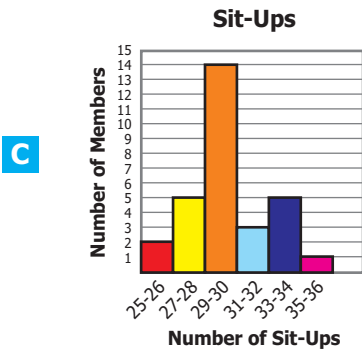
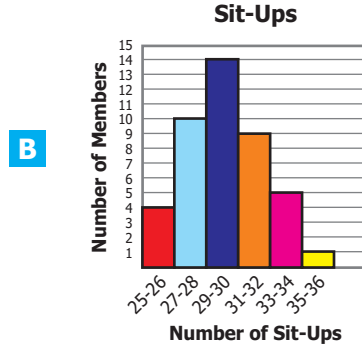
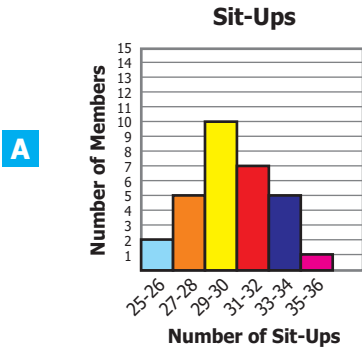
If 25% of the cars in the parking lot are white, how many cars in the parking lot are silver?

- A** 32 **B** 36 **C** 42 **D** 56

Q18. Members of a gym recorded the number of sit-ups they did in one minute. The results are shown in the line plot below.



Which of the following histograms best represents the data?



Q19. Find out the wrong number in the given sequence of numbers.

125, 127, 130, 135, 142, 153, 165

A 130

B 142

C 153

D 165

- Q20.** The areas of some bodies of water in Massachusetts are shown in the table below:

Massachusetts Bodies of Water

Body of Water	Area (in acres)
Silver Lake	70
Neponset Reservoir	300
Whitehall Reservoir	575
Greenwood Lake	110
Kingsbury Pond	

The mean area of the 5 bodies of water is 214 acres. What is the area, in acres, of Kingsbury Pond?

- A** 254 **B** 50 **C** 43 **D** 15
-

- Q21.** Jake measured the dimensions of a rectangular picture frame to the nearest inch. He found that the height was 16 inches and the width was 10 inches. Based on Jake's measurements, which of the following statements could be true?

- A** The actual width of the picture frame is 9.4 inches.
B The actual height of the picture frame is 16.5 inches.
C The actual perimeter of the picture frame is 50 inches.
D The actual area of the picture frame is 175 square inches.
-

- Q22.** Wyatt owns a food truck. He offers a selection of 8 types of sandwiches and 4 types of tacos.

He will increase his selection of sandwiches by 1 per month.

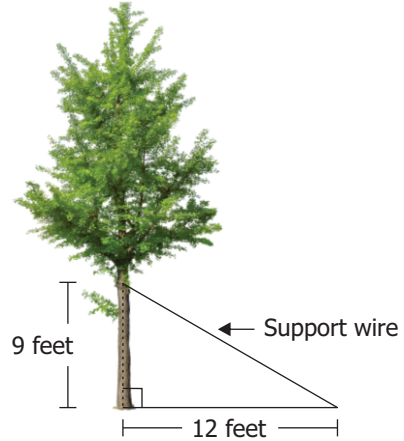
He will increase his selection of tacos by 2 per month.

In how many months will Wyatt offer an equal number of sandwich and taco selections?

- A** 2 months **B** 4 months **C** 8 months **D** 12 months

- Q23.** A support wire is attached to a tree at a height of 9 feet. The wire is anchored to the ground, as shown in the diagram below.

Based on the dimensions in the diagram, what is the length, in feet, of the support wire?



- A** 12 feet
- B** 15 feet
- C** 18 feet
- D** 21 feet

- Q24.** The long term parking rate at Raleigh-Durham Airport is \$2 per hour (or part of an hour) with \$10 daily maximum (12:00 a.m. to 12:00 a.m.). Suppose you park your car on Friday afternoon at 8:30 p.m. and pick it up on the following Tuesday at 9:30 a.m., what will be your parking fee?

- A** \$58
- B** \$50
- C** \$48
- D** \$38

- Q25.** In an arithmetic series, the terms of the series are equally spread out. For example, in $1 + 5 + 9 + 13 + 17$, consecutive terms are 4 apart. If the first term in an arithmetic series is 3, the last term is 136, and the sum is 1,390, what are the first 3 terms?

- A** 3, 10, 17
- B** 3, 11, 19
- C** 3, 23, 43
- D** 3, 139, 1,251

Q26. Marco says that the interior angles of a triangle add up to 180° . He claims that the interior angles of a hexagon must add up to 360° because a hexagon has twice as many vertices as a triangle and can be divided into two triangles. Therefore, its interior angles must sum to twice the value of those of a triangle.

Which statement, if any, explains Marco's error?

- A** A hexagon does not have 6 vertices.
 - B** A hexagon can be divided into 4 triangles, not 2.
 - C** The interior angles of a triangle do not add up to 180° .
 - D** Marco's statement is correct and contains no error.
-

Q27. A biologist tracks the number of bacteria living in a water tank. The biologist used a function that represents the amount of a certain chemical solution that is added to the water.

- When the water has no chemicals, the number of bacteria (b) is 1200 per gallon.
- For each tablespoon of the chemical solution (c) added to each gallon of water, the number of bacteria decreases by 75 per gallon.

How much of the chemical, in tablespoons, must be added to a 500-gallon tank to reduce the bacteria count to a safe 300 bacteria per gallon?

- A** 3000
 - B** 6000
 - C** 9000
 - D** 12000
-

Q28. How many times in a day, are the hands of a clock in straight line but opposite in direction?

- A** 20
- B** 22
- C** 24
- D** 48

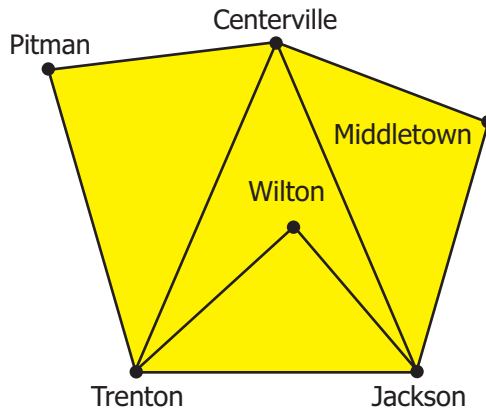
- Q29.** Matt and his three coworkers each weigh a package three times using different scales. Their results are given in the table below.

	Trial 1	Trial 2	Trial 3	Range	Mean
Matt	5.45 lbs.	5.35 lbs.	5.38 lbs.	0.10 lb.	5.39 lbs.
Scott	5.34 lbs.	5.39 lbs.	5.37 lbs.	0.05 lb.	5.37 lbs.
Jasmine	5.36 lbs.	5.38 lbs.	5.40 lbs.	0.04 lb.	5.38 lbs.
Jacob	5.39 lbs.	5.41 lbs.	5.40 lbs.	0.02 lb.	5.40 lbs.

Which worker's scale yielded the least precise measurements?

- A** Matt's **B** Scott's **C** Jasmine's **D** Jacob's

- Q30.** An airplane will fly from Middletown to Wilton. The pilot of the airplane wants to stop in no more than 2 cities between Middletown and Wilton. How many different ways can the pilot fly from Middletown to Wilton?



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

Compete
if you are
the best