



QUESTION CATALOGUE

Math A

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I. Logic
A. Logical Operations

1. Logical Equivalence
a. Original and contrapositive

1460.

Each part below consists of three sentences. On your answer paper, write the numbers 1 through 3, and next to each number, write the truth value (TRUE or FALSE) for the third sentence in each part, based on the truth values given for the first two sentences. If the truth value cannot be determined from the information given, write "CANNOT BE DETERMINED."

(1)	It rains or it is cold. It is cold. It rains.	TRUE FALSE ?
(2)	The month is June and it is not warm. The month is June. It is warm.	FALSE TRUE ?
(3)	If I study, I pass math. I pass math. I study.	TRUE TRUE ?

(1) TRUE (2) TRUE (3) CANNOT BE DETERMINED

7154. What is the contrapositive of the statement "If I study, then I pass the test"?

- (1) I pass the test if I study.
- (2) If I do not study, then I do not pass the test.
- (3) If I do not pass the test, then I do not study.**
- (4) If I pass the test, then I study.

7094. Parking charges at Superior Parking Garage are \$5.00 for the first hour and \$1.50 for each additional 30 minutes. If Margo has \$12.50, what is the maximum amount of time she will be able to park her car at the garage?

- (1) $2\frac{1}{2}$
- (2) $3\frac{1}{2}$
- (3) 6
- (4) $6\frac{1}{2}$

7093. Which statement is logically equivalent to "If a triangle is an isosceles triangle, then it has two congruent sides"?

- (1) If a triangle does not have two congruent sides, then it is an isosceles triangle.
- (2) If a triangle does not have two congruent sides, then it is not an isosceles triangle.**
- (3) If a triangle is not an isosceles triangle, then it has two congruent sides.
- (4) If a triangle is an isosceles triangle, then it does not have two congruent sides.

6988. Which statement is logically equivalent to "If it is Saturday, then I am not in school"?

- (1) If I am not in school, then it is Saturday.
- (2) If it is not Saturday, then I am in school.
- (3) If I am in school, then it is not Saturday.**
- (4) If it is Saturday, then I am in school.

6808. Which statement is logically equivalent to "If it is Tuesday, then I have soccer practice"?

- (1) If I have soccer practice, then it is Tuesday.
- (2) If it is not Tuesday, then I do not have soccer practice.
- (3) If I do not have soccer practice, then it is not Tuesday.**
- (4) If it is Tuesday, then I do not have soccer practice.

6806. Which statement is logically equivalent to "If it is my birthday, then I will get presents"?

- (1) If I will get presents, then it is my birthday.
- (2) If it is not my birthday, then I will not get presents.
- (3) If I will not get presents, then it is not my birthday.**
- (4) If it is my birthday, then I will not get presents.

6478. Which statement is logically equivalent to "If Andrea gets a job, she buys a new car"?

- (1) Andrea gets a job and she buys a new car.
- (2) If Andrea does not buy a new car, she does not get a job.**
- (3) If Andrea does not get a job, she does not buy a new car.
- (4) If Andrea buys a new car, she gets a job.

6358. Which statement is logically equivalent to "If the team has a good pitcher, then the team has a good season"?

- (1) If the team does not have a good season, then the team does not have a good pitcher.**
- (2) If the team does not have a good pitcher, then the team does not have a good season.
- (3) If the team has a good season, then the team has a good pitcher.
- (4) The team has a good pitcher and the team does not have a good season.

II. Algebra

C. Solving Algebraic Equations

2. Multiple Step Equations

a. Two-step equations

6321. Walter has to drive 11 miles to school roads with an average speed limit of 40 miles per hour.

a What is the minimum number of minutes Walter will need to get to school if he travels at the average speed limit?

b Walter's friend Luisa is to meet him at school and does not want to be late or early. They are to meet at 7:30 a.m. Luisa lives 7 miles from the school, and the roads she must travel have an average speed limit of 35 miles per hour. At what time should she leave in order to be at school at 7:30 a.m. if she travels at the speed limit?

$$a \quad d = r \cdot t$$

$$\frac{11}{40} = t$$

$$0.275 = t \text{ or } 16.5 \text{ minutes}$$

$$b \quad d = r \cdot t$$

$$7 = 35t$$

$$0.2 = t$$

$$t = 0.2 \times 60 \text{ minutes}$$

$$t = 12 \text{ minutes}$$

$$7:30 - 12 \text{ minutes} = 7:18 \text{ a.m.}$$

6082. A craft shop sold 150 pillows. Small pillows were \$6.50 each and large pillows were \$9.00 each. If the total amount collected from the sale of these items was \$1180.00, what is the total number of each size pillow that was sold?

68 small pillows

82 large pillows

6005. Solve for x : $0.2x + 4.1 = 12.5$

42

5946. A total of 700 votes were cast in an election. The table below represents the votes that were received by the candidates. Candidate C got at least 35 votes more than Candidate D.

Candidate	Number of Votes
A	243
B	198
C	x
D	y

What is the least number of votes that Candidate C could have received?

147

5805. Kimberly and Julia had lunch together. The bill was \$20.00. Kimberly spent \$5.00 more than half of what Julia spent.

How much was Julia's lunch alone?

\$10.00

5945. The table below shows how Jack divides his day. He spends at least 2 more hours exercising than studying.

Activities	Hours
Sleep	8
School	6
Study	x
Exercise	y

What is the least number of hours that Jack could spend his time studying?

0

5944. A survey was taken among 300 people to see what kind of fast food is most preferred. At least 50 more people chose pizza than hotdogs.

Food	Frequency
Hamburger	120
Pizza	x
Hotdog	y

What is the greatest number of people that could have chose hotdogs?

65

5845. The cost for Pete to make pizzas is determined by the formula $C = 77 + 5.70P$, where C represents the cost, and P represents the number of pizzas. Pete makes 80 pizzas every day, and is able to sell all of them. To the nearest cent, for how much should he sell them to make a \$120 profit every day?

\$8.16

5843. Mr. Jones is trying to choose between two long distance companies. Company A offers a plan for \$0.08 cents a minute with monthly fee of \$3.00. Company B offers a plan for \$0.06 cents a minute with monthly fee of \$5.00.

a For what number of minutes will the total monthly fee for the company A and B be the same?

b Mr. Jones' family spends about 10 hours per month on long distance calls.

1) Which phone company should Mr. Jones choose in order to spend less money?

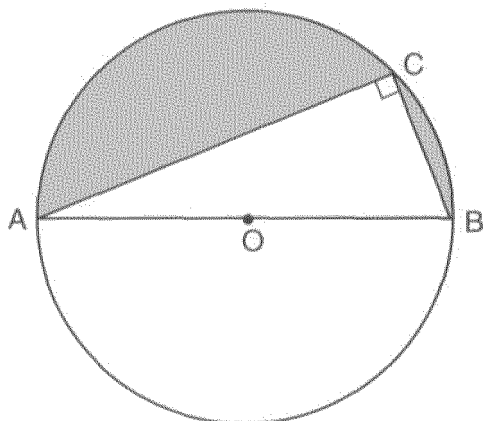
2) How much money will the Jones save in one year by using the less expensive company?

***a* 100 minutes**

***b* B, \$11.60**

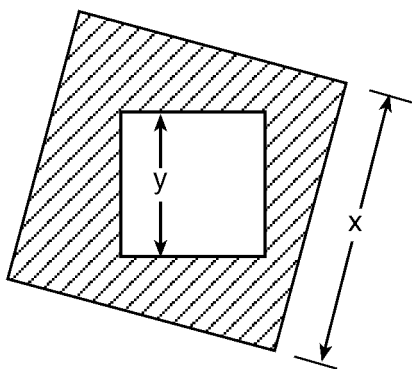
III. Geometry
A. Geometry of Measurement

7165. On the accompanying diagram, right triangle ABC is inscribed in circle O , diameter $AB = 26$, and $CB = 10$. Find to the nearest square unit, the area of the shaded region.



145

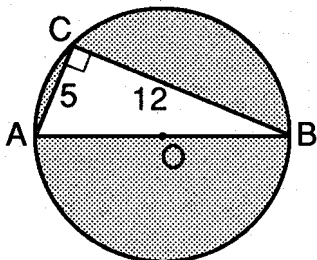
6982. The accompanying diagram shows a square with side y inside a square with side x .



Which expression represents the area of the shaded region?

- (1) x^2 (3) $y^2 - x^2$
 (2) y^2 (4) $x^2 - y^2$

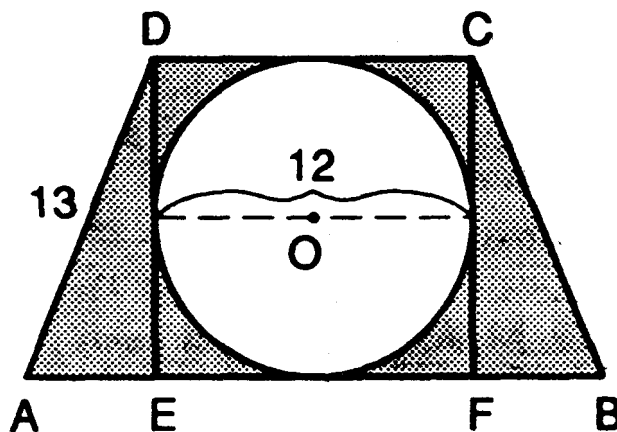
6948. The diagram below represents a circle of fertile soil in which corn may be planted. The farmer decided not to plant on the area of the soil represented by the inscribed right triangle, whose hypotenuse is the diameter of the circle. Find the area on which the farmer may plant.



$42.25\pi - 30$

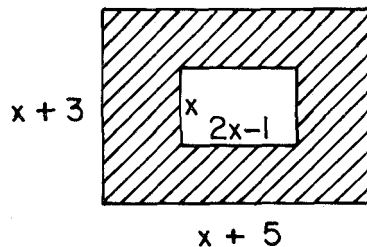
3. Area of Shaded Regions
a. Short answer

6947. One side of the roof on Hailey's house is represented by the isosceles trapezoid $ABCD$. There is a square, $DCFE$, that separates $\triangle AED$ and $\triangle BCF$ into right triangles. There is a circular pane of glass with its center at O is inscribed in $DCFE$. What is the area of the roof if the glass is disregarded as part of the roof?



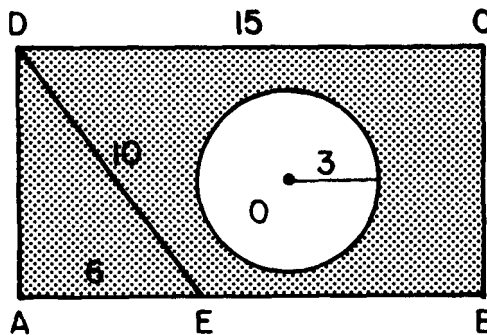
$204 - 36\pi$

6915. The diagram below represents a picture frame with a rectangular space cut out in the center to put a picture. What is the area of the picture frame in terms of x ? What is the area of the picture frame if $x = 3$ cm?



$-x^2 + 9x + 15$; 33 cm

6908. Find the area of the shaded region in terms of π :



$120 - 9\pi$

VII. Counting, Probability, and Statistics

A. Probability And Counting

2390. In a container of 60 coins, there are twice as many quarters as nickels and three times as many dimes as nickels.

a Determine the number of each kind of coin in the container. [Only an algebraic solution will be accepted.]

b If a coin is shaken from the container, what is the probability that the coin is

- (1) a quarter
- (2) not a nickel

c If three coins are shaken from the container, what is the probability that their total value is *more than* \$0.75?

a 10 nickels, 30 dimes, 20 quarters

b (1) $\frac{20}{60}$

(2) $\frac{50}{60}$

(3) 0

2348. A jar contains four coins: a penny, a nickel, a dime, and a quarter. Kathy shakes the jar and two coins fall out.

a Draw a tree diagram or list the sample space for all possible outcomes of the two coins that fell out.

b Of the coins that fell out of the jar, find the probability that

- (1) the total value of both coins is 35¢
- (2) one coin is a nickel
- (3) the total value of both coins is *at most* 15¢
- (4) both coins are pennies

b (1) $\frac{2}{12}$

(2) $\frac{6}{12}$

(3) $\frac{6}{12}$

(4) 0

2262. A jar contains four balls. Each ball has one letter printed on it. The letters are *A*, *E*, *D*, and *G*. One ball is drawn from the jar and its letter is noted. A second ball is then drawn without replacing the first and its letter is noted.

a Draw a tree diagram or list the sample space showing all possible outcomes.

b Find the probability that the letters printed on the two balls drawn consist of

- (1) *at least* one vowel
- (2) no vowels
- (3) the same letter

b (1) $\frac{10}{12}$

(2) $\frac{2}{12}$

(3) 0

3. Probability b. Extended Task

2221. On a Course I test, the scores of ten students were 90, 83, 82, 95, 96, 67, 88, 91, 82, and 86.

a Find the

- (1) mean
- (2) median
- (3) mode

b Find the probability that the score of a student chosen at random will be

- (1) less than the mean
- (2) greater than the median
- (3) greater than or equal to the mode

a (1) 86 (2) 87 (3) 82 *b* (1) $\frac{4}{10}$ (2) $\frac{5}{10}$ (3) $\frac{9}{10}$

2135. Angie has one penny, one nickel, one dime, and one quarter in her pocket. Angie picks one coin at random. Without replacing the coin, she picks a second coin.

a Draw a tree diagram or list the sample space showing all possible outcomes.

b Find the probability that the two coins picked have a sum of

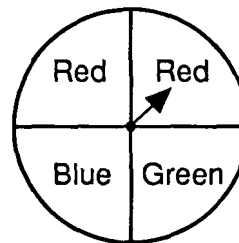
- (1) *exactly* 15 cents
- (2) more than 25 cents
- (3) less than 40 cents

b (1) $\frac{2}{12}$

(2) $\frac{6}{12}$

(3) 1

2093. In the accompanying diagram, the circle is divided into four equal areas. The spinner is spun twice and the color of the area that the spinner stops in is noted.



a Draw a tree diagram or list the sample spaces showing all possible outcomes.

b Find the probability that

- (1) both spins will stop in a red area
- (2) the first spin will stop in a red area and the second spin will stop in a black area
- (3) at least one of the two spins will stop in a green area

b (1) $\frac{4}{16}$ (2) 0 (3) $\frac{7}{16}$