
MATHCOUNTS®

2018
■ State Competition ■
Target Round
Problems 1 & 2

Name _____

School _____

Chapter _____

DO NOT BEGIN UNTIL YOU ARE INSTRUCTED TO DO SO.

This section of the competition consists of eight problems, which will be presented in pairs. Work on one pair of problems will be completed and answers will be collected before the next pair is distributed. The time limit for each pair of problems is six minutes. The first pair of problems is on the other side of this sheet. When told to do so, turn the page over and begin working. This round assumes the use of calculators, and calculations also may be done on scratch paper, but no other aids are allowed. All answers must be complete, legible and simplified to lowest terms. Record only final answers in the blanks in the left-hand column of the problem sheets. If you complete the problems before time is called, use the time remaining to check your answers.

Problem 1	Problem 2	Scorer's Initials



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1. \$ _____ Chris needs to move 500 kg of furniture 5000 km from San Francisco to Washington D.C. One moving company charges a \$500 fixed cost for any move in addition to \$0.30 per kilometer traveled and \$0.40 per kilogram carried. A different moving company charges no fixed cost, but charges \$0.50 per kilometer traveled and \$0.30 per kilogram carried. How many dollars can Chris save by choosing the less expensive moving company?

2. _____ percent Matt, the donut quality inspector, randomly tastes five donuts out of 10 dozen. If one or more donuts tastes burnt or is under cooked, then the whole batch has to be discarded. Given that there are exactly four unacceptable donuts in a batch of 10 dozen, what is the probability that Matt rejects the batch? Express your answer to the nearest whole percent.

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2018
■ State Competition ■
Target Round
Problems 3 & 4

Name _____

School _____

Chapter _____

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Problem 3	Problem 4	Scorer's Initials

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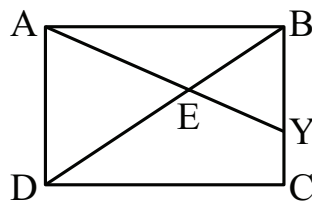
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3. _____ bigons It costs a geometrist \$400 to set up machinery and \$3 to produce each bigon. If she makes the bigons to order and sells the bigons for \$8 each, what is the least positive number of bigons she has to sell to avoid losing money?

4. _____ cm In rectangle ABCD, side AB has length 10 cm and side BC has length 6 cm. Point Y is on side BC such that $CY = 2$ cm. Segment AY intersects diagonal BD at point E. What is the length of segment AE? Express your answer as a common fraction in simplest radical form.



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2018
■ State Competition ■
Target Round
Problems 5 & 6

Name _____

School _____

Chapter _____

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Problem 5	Problem 6	Scorer's Initials

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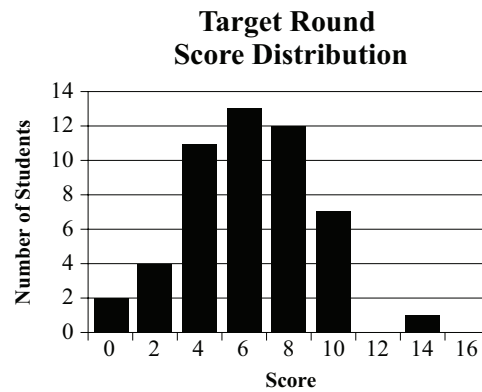
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5. _____ Fifty students participated in a MATHCOUNTS Chapter competition. The histogram shows the distribution of their Target Round scores. What was the mean score of the competitors on the Target Round? Express your answer as a decimal to the nearest tenth.



6. _____ Two lines with slopes m and n , with $m > n > 0$, intersect at the origin. The line $y = x$ bisects the angle between the two lines. If $m + n = 2\sqrt{65}$, what is the value of $m - n$?

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2018
■ State Competition ■
Target Round
Problems 7 & 8

Name _____

School _____

Chapter _____

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Problem 7	Problem 8	Scorer's Initials

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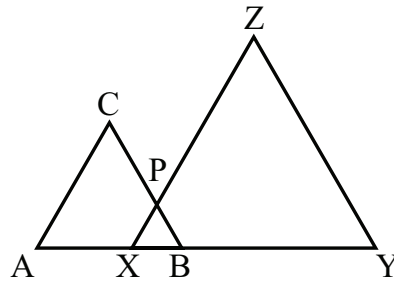
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7. _____ cm Equilateral triangles ABC and XYZ of side lengths 3 cm and 5 cm, respectively, overlap, as shown, to form equilateral triangle XBP of side length 1 cm. What is the perimeter of concave pentagon AYZPC?



8. Page _____ One evening, Varun finishes reading a novel that he has been reading for several days and finds the ending so exciting that he immediately begins reading the novel's sequel. Each novel has pages numbered consecutively, starting with page 1. Each novel has fewer than 1000 pages. If Varun reads a total of 42 pages in one sitting and the sum of the page numbers he reads in that sitting is 2018, what is the number of the last page of the first novel?