MONTH 5

Estimation & Competition Strategies

Monthly Learning Goals

Month 5 develops students' ability to estimate efficiently and apply flexible strategies to unfamiliar problems. Students move from real-world estimation into competition-style questions that draw on number sense, geometry, ratios, probability, and logical reasoning.

The goal is not simply to finish every problem. Students learn to select useful information, approximate when appropriate, recognize familiar structures, and explain why a strategy is reasonable.

By the End of This Month, Students Should Be Able To:

- Round quantities appropriately for a useful estimate.
- Use estimation to compare costs, rates, time, and capacity.
- Choose efficient strategies for unfamiliar problems.
- Identify relevant information and ignore distractions.
- Check whether an answer is reasonable in context.
- Move between arithmetic, diagrams, ratios, and logical reasoning.
- Discuss and compare multiple solution approaches.

Skills We Will Practice

Estimation
Using friendly numbers to produce useful approximate results.

Strategic Problem Solving
Selecting an approach based on the structure of a problem.

Number Sense
Recognizing magnitude, relationships, factors, and efficient calculations.

Competition Strategy
Managing time, choosing problems, and checking results.

Mathematical Communication
Explaining why a method works and whether an answer is reasonable.

This Month's Activities

- Real-world estimation problems
- Cost, rate, and time estimates
- MATHCOUNTS-style challenge set
- AMC 8 multiple-choice problems
- Strategy comparison
- Reasonableness checks

Connection to the Rest of the Year

Month 5 brings together the pattern recognition, logic, geometry, and modeling developed in earlier months. Estimation and strategic problem selection will remain important in probability, data analysis, and future competition-style work.

Corbett maths

Estimation

Video 215 on www.corbettmaths.com

(g) $\dfrac{18.5 \times 51.9}{4.69 + 20.01}$ (h) $\dfrac{19.2 \times 41.3}{9.9 \times 5.1}$

Question 5: Estimate the answers to the following

(a) $\frac{3}{10}$ *of* 68.9 (b) $\frac{7}{20}$ *of* 83 (c) $\frac{1}{5}$ *of* 414.7

(d) $\frac{1}{3}$ *of* 551 (e) $\frac{6}{11}$ *of* 91 (f) $\frac{2}{15}$ *of* 103

Question 6: Work out an estimate to each of the following

(a) 8.9^2 (b) 6.02^2 (c) 7.1^2 (d) 11.95^2 (e) 21^2 (f) 49^2

(g) 81.72^2 (h) 597^2 (i) 3.2^3 (j) 1.95^3 (k) 9.88^3 (l) 20.4^3

Question 7: Estimate each of the following.
Give each answer to 1 decimal place.

(a) $\sqrt{30}$ (b) $\sqrt{10}$ (c) $\sqrt{19}$ (d) $\sqrt{44}$ (e) $\sqrt{15.98}$

(f) $\sqrt{140}$ (g) $\sqrt{75}$ (h) $\sqrt{56.74}$ (i) $\sqrt{300}$ (j) $\sqrt[3]{7}$

(k) $\sqrt[3]{30}$ (l) $\sqrt[3]{20}$ (m) $\sqrt[3]{109}$ (n) $\sqrt[3]{149}$ (o) $\sqrt[4]{23}$

Question 8: Work out an estimate to each of the following

(a) 9.9% of 5987 (b) 25.2% of 61 (c) 76% of 197

(d) 14.87% of 80.8 (e) 90.42% of 398.1 (f) 0.49% of 498

Question 9: Find the approximate answer to each of the following multiplications

(a) 40×0.19 (b) 0.497×600 (c) 0.81×5000

(d) 18×0.72 (e) 0.889×303 (f) 209×0.379

(g) 0.052×1984

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Corbett maths

Estimation

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Question 3: A roll of wallpaper cost £7.85.
Richard buys 29 rolls of wallpaper.
Work out an estimate for the total cost.

Question 4: The scientist Robert Boyle was born in 1627.
Work out an estimate for how many years ago he was born.

Question 5: Estimate the total cost of 32 printers at £198 each and 58 ink cartridges at £31.15 each.

Question 6: In a cinema there are 28 rows and in each row there are 22 seats.
Each ticket costs £8.10

Work out an estimate for the total income from the ticket sales.

Question 7: Estimate how many books costing $5.95 can be bought from $305

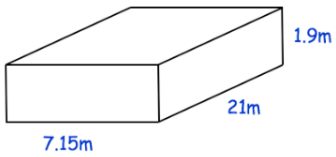
Question 8: Lauren is given two job offers

Job A: £785 a week
Job B: £1950 a month

Which job is offering the greatest pay?

Question 9: A buzzer beeps every 1,111 seconds.
Work out an estimate for the number of times the buzzer beeps in 1 week.

Question 10: Andrew is going to fill an empty swimming pool.



Andrew fills the swimming pool with water at a constant rate of 2.1 litres per second.

Given $1m^3 = 1000$ litres, estimate how long it takes to fill the pool.

Answers



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AoPS Community 2010 AMC 8

AMC 8 2010

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by Mrdavid445, Amir Hossein, bluecarneal, rrusczyk

1 At Euclid High School, the mathematics teachers are Mrs. Germain, Mr. Newton, and Mrs. Young. There are 11 students in Mrs. Germain's class, 8 in Mr. Newton, and 9 in Mrs. Young's class are taking the AMC 8 this year. How many mathematics students at Euclid High School are taking the contest?

(A) 26 **(B)** 27 **(C)** 28 **(D)** 29 **(E)** 30

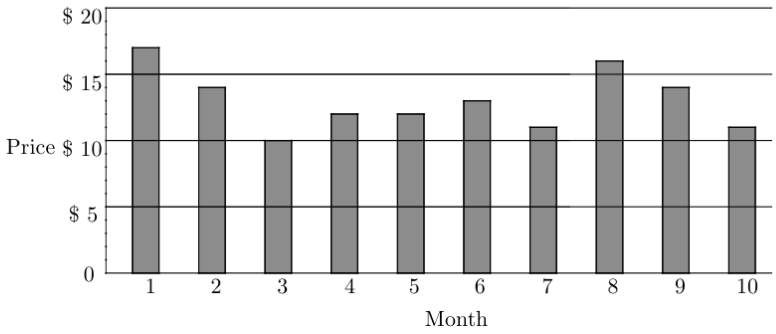
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2 If $a@b = \frac{a \times b}{a+b}$, for a, b positive integers, then what is $5@10$?

(A) $\frac{3}{10}$ **(B)** 1 **(C)** 2 **(D)** $\frac{10}{3}$ **(E)** 50

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3 The graph shows the price of five gallons of gasoline during the first ten months of the year. By what percent is the highest price more than the lowest price?



(A) 50 **(B)** 62 **(C)** 70 **(D)** 89 **(E)** 100

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4 What is the sum of the mean, median, and mode of the numbers, $2, 3, 0, 3, 1, 4, 0, 3$?

(A) 6.5 **(B)** 7 **(C)** 7.5 **(D)** 8.5 **(E)** 9

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5 Alice needs to replace a light bulb located 10 centimeters below the ceiling of her kitchen. The ceiling is 2.4 meters above the floor. Alice is 1.5 meters tall and can reach 46 centimeters above her head. Standing on a stool, she can just reach the light bulb. What is the height of the stool, in centimeters?

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AoPS Community 2010 AMC 8

(A) 32 **(B)** 34 **(C)** 36 **(D)** 38 **(E)** 40

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6 Which of the following has the greatest number of line of symmetry?

(A) Equilateral Triangle **(B)** Non-square rhombus **(C)** Non-square rectangle **(D)** Isosceles Triangle **(E)** Square

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7 Using only pennies, nickels, dimes, and quarters, what is the smallest number of coins Freddie would need so he could pay any amount of money less than one dollar?

(A) 6 **(B)** 10 **(C)** 15 **(D)** 25 **(E)** 99

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8 As Emily is riding her bike on a long straight road, she spots Ermenson skating in the same direction $1/2$ mile in front of her. After she passes him, she can see him in her rear mirror until he is $1/2$ mile behind her. Emily rides at a constant rate of 12 miles per hour. Ermenson skates at a constant rate of 8 miles per hour. For how many minutes can Emily see Ermenson?

(A) 6 **(B)** 8 **(C)** 12 **(D)** 15 **(E)** 16

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9 Ryan got 80% of the problems on a 25-problem test, 90% on a 40-problem test, and 70% on a 10-problem test. What percent of all problems did Ryan answer correctly?

(A) 64 **(B)** 75 **(C)** 80 **(D)** 84 **(E)** 86

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10 6 pepperoni circles will exactly fit across the diameter of a 12-inch pizza when placed. If a total of 24 circles of pepperoni are placed on this pizza without overlap, what fraction of the pizza is covered with pepperoni?

(A) $\frac{1}{2}$ **(B)** $\frac{2}{3}$ **(C)** $\frac{3}{4}$ **(D)** $\frac{5}{6}$ **(E)** $\frac{7}{8}$

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11 The top of one tree is 16 feet higher than the top of another tree. The height of the 2 trees are at a ratio of $3:4$. In feet, how tall is the taller tree?

(A) 48 **(B)** 64 **(C)** 80 **(D)** 96 **(E)** 112

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12 Of the 500 balls in a large bag, 80% are red and the rest are blue. How many of the red balls must be removed so that 75% of the remaining balls are red?

(A) 25 **(B)** 50 **(C)** 75 **(D)** 100 **(E)** 150

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13 The lengths of the sides of a triangle in inches are three consecutive integers. The length of the shorter side is 30% of the perimeter. What is the length of the longest side?

(A) 7 **(B)** 8 **(C)** 9 **(D)** 10 **(E)** 11

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14 What is the sum of the prime factors of 2010?

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