- Jamie counted the number of edges of a cube, Jimmy counted the number of corners, and Judy counted the number of faces. They then added the three numbers. What was the resulting sum?

(A) 12 **(B)** 16 **(C)** 20 **(D)** 22 **(E)** 26

2003 AMC 8, Problem #1—"Draw a picture"

- **Solution (E)** A cube has 12 edges, 8 corners and 6 faces. The sum is 26.

Difficulty: Medium-easy

NCTM Standard: Geometry Standard for Grades 6–8: Use two-dimensional representations of three-dimensional objects to visualize and solve problems.

Mathworld.com Classification:
Geometry > Solid Geometry > Polyhedra > Cubes > Cube

- Which of the following numbers has the smallest prime factor?

(A) 55 **(B)** 57 **(C)** 58 **(D)** 59 **(E)** 61

2003 AMC 8, Problem #2—"What is the smallest prime?"

- **Solution (C)** The smallest prime is 2, which is a factor of every even number. Because 58 is the only even number, it has the smallest prime factor.

Difficulty: Medium

NCTM Standard: Number and Operations Standard for Grades 6–8: Use factors, multiples, prime factorization, and relatively prime numbers to solve problems.

Mathworld.com Classification:
Number Theory > Factoring > Least Prime Factor

- A burger at Ricky C's weighs 120 grams, of which 30 grams are filler. What percent of the burger is not filler?

(A) 60% **(B)** 65% **(C)** 70% **(D)** 75% **(E)** 90%

2003 AMC 8, Problem #3—"How many grams are not filler?"

- **Solution (D)** Since 30 of the 120 grams are filler, $\frac{30}{120} = 25\%$ of the burger is filler. So $100\% - 25\% = 75\%$ of the burger is not filler.

Difficulty: Medium-easy

NCTM Standard: Number and Operations Standard for Grades 6–8: Understand and use ratios and proportions to represent quantitative relationships.

Mathworld.com Classification:
Number Theory > Arithmetic > Fractions > Percent

- A group of children riding on bicycles and tricycles rode past Billy Bob's house. Billy Bob counted 7 children and 19 wheels. How many tricycles were there?

(A) 2 **(B)** 4 **(C)** 5 **(D)** 6 **(E)** 7

2003 AMC 8, Problem #4—"Write a pair of equations"

- **Solution (C)** Let b equal the number of bicycles and t equal the number of tricycles. Then the number of vehicles is $b + t = 7$, and the number of wheels is $2b + 3t = 19$. Because $b = 7 - t$, it follows that

$$\begin{aligned} 2(7 - t) + 3t &= 19 \\ 14 - 2t + 3t &= 19 \\ 14 + t &= 19 \\ t &= 5. \end{aligned}$$

Difficulty: Medium-easy

NCTM Standard: Algebra Standard for Grades 6–8: Use symbolic algebra to represent situations and to solve problems, especially those that involve linear relationships.

Mathworld.com Classification:
Algebra > Linear Algebra > Linear Systems > Linear System of Equations

- If 20% of a number is 12, what is 30% of the same number?

(A) 15 **(B)** 18 **(C)** 20 **(D)** 24 **(E)** 30

2003 AMC 8, Problem #5—"Solve for the number"

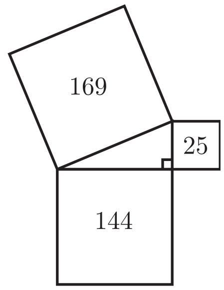
- **Solution (B)** If 20% of the number is 12, the number must be 60. Then 30% of 60 is $0.30 \times 60 = 18$.

Difficulty: Medium-easy

NCTM Standard: Number and Operations Standard for Grades 6–8: Work flexibly with fractions, decimals, and percents to solve problems.

Mathworld.com Classification:
Number Theory > Arithmetic > Fractions > Percent

- Given the areas of the three squares in the figure, what is the area of the interior triangle?



(A) 13 **(B)** 30 **(C)** 60 **(D)** 300 **(E)** 1800

2003 AMC 8, Problem #6— "What are the side lengths of the triangles?"

- **Solution**

  (B)

$$A = \frac{1}{2}(\sqrt{144})(\sqrt{25})$$
$$A = \frac{1}{2} \cdot 12 \cdot 5$$
$$A = 30 \text{ square units}$$

Difficulty: Medium

NCTM Standard: Geometry Standard: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.

Mathworld.com Classification: Geometry > Plane Geometry > Squares > Square

- Blake and Jenny each took four 100-point tests. Blake averaged 78 on the four tests. Jenny scored 10 points higher than Blake on the first test, 10 points lower than him on the second test, and 20 points higher on both the third and fourth tests. What is the difference between Jenny's average and Blake's average on these four tests?

(A) 10 **(B)** 15 **(C)** 20 **(D)** 25 **(E)** 40

2003 AMC 8, Problem #7—"How many more points did Jenny score overall?"

- **Solution (A)** Blake scored a total of $4 \times 78 = 312$ points on the four tests. Jenny scored $10 - 10 + 20 + 20 = 40$ more points than Blake, so her average was $\frac{352}{4} = 88$, or 10 points higher than Blake's.

Difficulty: Medium

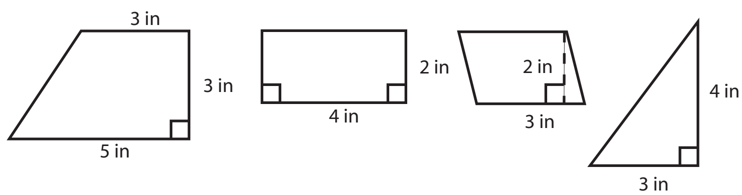
NCTM Standard: Data Analysis and Probability Standard for Grades 6–8: Find, use, and interpret measures of center and spread, including mean and interquartile range.

Mathworld.com Classification:
Calculus and Analysis > Special Functions > Means > Arithmetic Mean

- Bake Sale

Four friends, Art, Roger, Paul and Trisha, bake cookies, and all cookies have the same thickness. The shapes of the cookies differ, as shown.

- Art's cookies are trapezoids:
- Roger's cookies are rectangles:
- Paul's cookies are parallelograms:
- Trisha's cookies are triangles:



Each friend uses the same amount of dough, and Art makes exactly 12 cookies.

Who gets the fewest cookies from one batch of cookie dough?

(A) Art **(B)** Paul **(C)** Roger **(D)** Trisha **(E)** There is a tie for fewest

2003 AMC 8, Problem #8— "Since all of the cookies have the same thickness, consider only the surface area of their shapes."

- Solution

(A) Because all of the cookies have the same thickness, only the surface area of their shapes needs to be considered. The surface area of each of Art's trapezoid cookies is $\frac{1}{2} \cdot 3 \cdot 8 = 12$ in^2. Since he makes 12 cookies, the surface area of the dough is $12 \times 12 = 144$ in^2.

Roger's rectangle cookies each have surface area $2 \cdot 4 = 8$ in^2; therefore, he makes $144 \div 8 = 18$ cookies.

Paul's parallelogram cookies each have surface area $2 \cdot 3 = 6$ in^2. He makes $144 \div 6 = 24$ cookies.

Trisha's triangle cookies each have surface area $\frac{1}{2} \cdot 4 \cdot 3 = 6$ in^2. She makes $144 \div 6 = 24$ cookies.

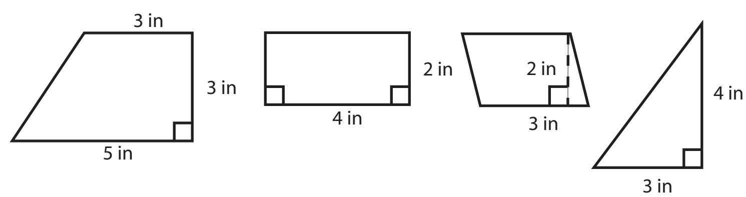
So Art makes the fewest cookies.

Difficulty: Medium
NCTM Standard: Geometry Standard: Use visualization, spatial reasoning, and geometric modeling to solve problems
Mathworld.com Classification: Geometry > Plane Geometry > Miscellaneous Plane Geometry > Area

- Bake Sale

Four friends, Art, Roger, Paul and Trisha, bake cookies, and all cookies have the same thickness. The shapes of the cookies differ, as shown.

- Art's cookies are trapezoids:
- Roger's cookies are rectangles:
- Paul's cookies are parallelograms:
- Trisha's cookies are triangles:



Each friend uses the same amount of dough, and Art makes exactly 12 cookies.

Art's cookies sell for 60 ¢ each. To earn the same amount from a single batch, how much should one of Roger's cookies cost?

(A) 18 ¢ **(B)** 25 ¢ **(C)** 40 ¢ **(D)** 75 ¢ **(E)** 90 ¢

2003 AMC 8, Problem #9— "How much should Roger spend on his entire batch of cookies?"

- Solution

(C) Art's 12 cookies sell for $12 \times \$0.60 = \$7.20$. Roger's 18 cookies should cost $\$7.20 \div 18 = \$.40$ each.

OR

The trapezoid's area is 12 in^2 and the rectangle's area is 8 in^2. So the cost of a rectangle cookie should be $\left(\frac{8}{12}\right) 60¢ = 40¢$.

Difficulty: Medium

NCTM Standard: Number and Operations Standard: Understand numbers, ways of representing numbers, relationships among numbers, and number systems

Mathworld.com Classification: Applied Mathematics > Business > Economics > Marginal Analysis

- **Bake Sale**

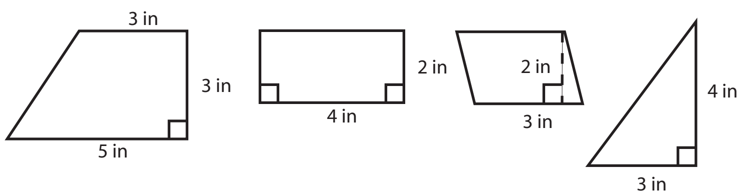
Four friends, Art, Roger, Paul and Trisha, bake cookies, and all cookies have the same thickness. The shapes of the cookies differ, as shown.

- Art's cookies are trapezoids:

- Roger's cookies are rectangles:

- Paul's cookies are parallelograms:

- Trisha's cookies are triangles:



Each friend uses the same amount of dough, and Art makes exactly 12 cookies.

How many cookies will be in one batch of Trisha's cookies?

(A) 10 **(B)** 12 **(C)** 16 **(D)** 18 **(E)** 24

2003 AMC 8, Problem #10— "How does the area of her triangle compare to the area of the trapezoid?"

- **Solution**

(E) The triangle's area is 6 in^2, or half that of the trapezoid. So Trisha will make twice as many cookies as Art, or 24.

Difficulty: Medium-hard

NCTM Standard: Geometry Standard: Use visualization, spatial reasoning, and geometric modeling to solve problems

Mathworld.com Classification: Geometry > Plane Geometry > Triangles > Special Triangles > Other Triangles > Right Triangle

- Business is a little slow at Lou's Fine Shoes, so Lou decides to have a sale. On Friday, Lou increases all of Thursday's prices by 10%. Over the weekend, Lou advertises the sale: "Ten percent off the listed price. Sale starts Monday." How much does a pair of shoes cost on Monday that cost $40 on Thursday?

(A) $36 **(B)** $39.60 **(C)** $40 **(D)** $40.40 **(E)** $44

2003 AMC 8, Problem #11—"Find Friday's price"

- **Solution (B)** Thursday's price of $40 is increased 10% or $4, so on Friday the shoes are marked $44. Then 10% of $44 or $4.40 is taken off, so the price on Monday is $\$44 - \$4.40 = \$39.60$.

Difficulty: Hard

NCTM Standard: Number and Operations Standard for Grades 6–8: Work flexibly with fractions, decimals, and percents to solve problems.

Mathworld.com Classification:
Number Theory > Arithmetic > Fractions > Percent

- When a fair six-sided die is tossed on a table top, the bottom face cannot be seen. What is the probability that the product of the numbers on the five faces that can be seen is divisible by 6?

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

2003 AMC 8, Problem #12—"Consider the products when 6 is visible and when it is not"

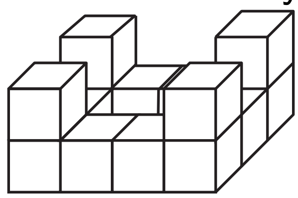
- **Solution (E)** If 6 is one of the visible faces, the product will be divisible by 6. If 6 is not visible, the product of the visible faces will be $1 \times 2 \times 3 \times 4 \times 5 = 120$, which is also divisible by 6. Because the product is always divisible by 6, the probability is 1.

Difficulty: Medium-hard

NCTM Standard: Number and Operations Standard for Grades 6–8: Use factors, multiples, prime factorization, and relatively prime numbers to solve problems.

Mathworld.com Classification:
Probability and Statistics > Probability > Probability;
Number Theory > Divisors > Divisor

- Fourteen white cubes are put together to form the figure on the right. The complete surface of the figure, including the bottom, is painted red. The figure is then separated into individual cubes. How many of the individual cubes have exactly four red faces?



(A) 4 **(B)** 6 **(C)** 8 **(D)** 10 **(E)** 12

2003 AMC 8, Problem #13—"Which cubes have four exposed faces?"

- **Solution (B)** A cube has four red faces if it is attached to exactly two other cubes. The four top cubes are each attached to only one other cube, so they have five red faces. The four bottom corner cubes are each attached to three others, so they have three red faces. The remaining six each have four red faces.

Difficulty: Medium

NCTM Standard: Geometry Standard for Grades 6–8: Use two-dimensional representations of three-dimensional objects to visualize and solve problems such as those involving surface area and volume.

Mathworld.com Classification:
Geometry > Solid Geometry > Polyhedra > Cubes > Polycube

- In this addition problem, each letter stands for a different digit.

$$\begin{array}{cccc} & T & W & O \\ + & T & W & O \\ \hline F & O & U & R \end{array}$$

If $T = 7$ and the letter O represents an even number, what is the only possible value for W?

(A) 0 **(B)** 1 **(C)** 2 **(D)** 3 **(E)** 4

2003 AMC 8, Problem #14—"Use a process of elimination"

- **Solution (D)** As given, $T = 7$. This implies that $F = 1$ and that O equals either 4 or 5. Since O is even, $O = 4$. Therefore, $R = 8$. Replacing letters with numerals gives

$$\begin{array}{cccc} & 7 & W & 4 \\ + & 7 & W & 4 \\ \hline 1 & 4 & U & 8 \end{array}$$

$W + W$ must be less than 10; otherwise, a 1 would be carried to the next column, and O would be 5. So $W < 5$. $W \neq 0$ because $W \neq U$, $W \neq 1$ because $F = 1$, $W \neq 2$ because if $W = 2$ then $U = 4 = O$, and $W \neq 4$ because $O = 4$. So $W = 3$.

The addition problem is

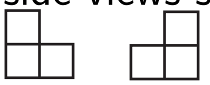
$$\begin{array}{cccc} & 7 & 3 & 4 \\ + & 7 & 3 & 4 \\ \hline 1 & 4 & 6 & 8 \end{array}$$

Difficulty: Medium-hard

NCTM Standard: Problem Solving Standard for Grades 6–8: Apply and adapt a variety of appropriate strategies to solve problems.

Mathworld.com Classification:
Recreational Mathematics > Cryptograms > Cryptarithmetic

- A figure is constructed from unit cubes. Each cube shares at least one face with another cube. What is the minimum number of cubes needed to build a figure with the front and side views shown?

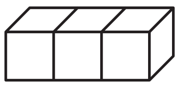


FRONT SIDE

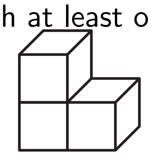
(A) 3 **(B)** 4 **(C)** 5 **(D)** 6 **(E)** 7

2003 AMC 8, Problem #15—"How many cubes are visible in the given views?"

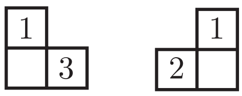
- **Solution (B)** There are only two ways to construct a solid from three cubes so that each cube shares a face with at least one other:



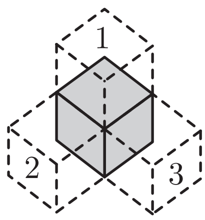
and



Neither of these configurations has both the front and side views shown. The four-cube configuration has the required front and side views. Thus at least four cubes are necessary.



FRONT SIDE



Difficulty: Medium-hard

NCTM Standard: Geometry Standard for Grades 6–8: Use two-dimensional representations of three-dimensional objects to visualize and solve problems such as those involving surface area and volume.

Mathworld.com Classification:
Geometry > Projective Geometry > Map Projections > Orthogonal Projection
Geometry > Solid Geometry > Polyhedra > Cubes > Polycube

- Ali, Bonnie, Carlo and Dianna are going to drive together to a nearby theme park. The car they are using has four seats: one driver's seat, one front passenger seat and two back seats. Bonnie and Carlo are the only two who can drive the car. How many possible seating arrangements are there?

(A) 2 **(B)** 4 **(C)** 6 **(D)** 12 **(E)** 24

2003 AMC 8, Problem #16—"Choose a driver and seat the others one at a time"

- **Solution (D)** There are 2 choices for the driver. The other three can seat themselves in $3 \times 2 \times 1 = 6$ different ways. So the number of seating arrangements is $2 \times 6 = 12$.

Difficulty: Medium

NCTM Standard: Problem Solving Standard for Grades 6–8: Apply and adapt a variety of appropriate strategies to solve problems.

Mathworld.com Classification:
Discrete Mathematics > Combinatorics > Permutations > Permutation

- The six children listed below are from two families of three siblings each. Each child has blue or brown eyes and black or blond hair. Children from the same family have at least one of these characteristics in common. Which two children are Jim's siblings?

Child	Eye Color	Hair Color
Benjamin	Blue	Black
Jim	Brown	Blond
Nadeen	Brown	Black
Austin	Blue	Blond
Tevyn	Blue	Black
Sue	Blue	Blond

(A) Nadeen and Austin **(B)** Benjamin and Sue **(C)** Benjamin and Austin
(D) Nadeen and Tevyn **(E)** Austin and Sue

2003 AMC 8, Problem #17— "What do Jim's characteristics say about who can be his sibling?"

- **Solution**

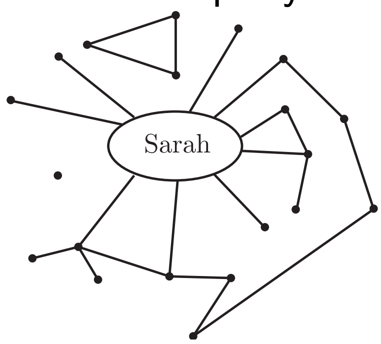
(E) Because Jim has brown eyes and blond hair, none of his siblings can have both blue eyes and black hair. Therefore, neither Benjamin nor Tevyn can be Jim's sibling. Consequently, there are only three possible pairs for Jim's siblings – Nadeen and Austin, Nadeen and Sue, or Austin and Sue. Since Nadeen has different hair color and eye color from both Austin and Sue, neither can be Nadeen's sibling. So Austin and Sue are Jim's siblings. Benjamin, Nadeen and Tevyn are siblings in the other family.

Difficulty: Medium

NCTM Standard: Data Analysis and Probability Standard: Develop and evaluate inferences and predictions that are based on data

Mathworld.com Classification: Foundations of Mathematics > Logic > General Logic > Logic

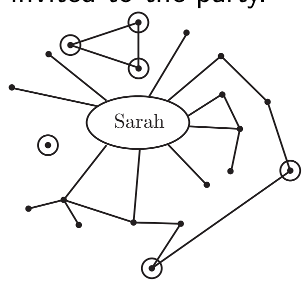
- Each of the twenty dots on the graph below represents one of Sarah's classmates. Classmates who are friends are connected with a line segment. For her birthday party, Sarah is inviting only the following: all of her friends and all of those classmates who are friends with at least one of her friends. How many classmates will not be invited to Sarah's party?



(A) 1 **(B)** 4 **(C)** 5 **(D)** 6 **(E)** 7

2003 AMC 8, Problem #18—"For each dot, count the lines back to Sarah"

- **Solution (D)** In the graph below, the six classmates who are not friends with Sarah or with one of Sarah's friends are circled. Consequently, six classmates will not be invited to the party.



Difficulty: Hard

NCTM Standard: Geometry Standard for Grades 6–8: Use visual tools such as networks to represent and solve problems.

Mathworld.com Classification:
Discrete Mathematics > Graph Theory > Graph Properties > Graph Distance

- How many integers between 1000 and 2000 have all three of the numbers 15, 20 and 25 as factors?

(A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **(E)** 5

2003 AMC 8, Problem #19—"Use the least common multiple"

- **Solution (C)** A number with 15, 20 and 25 as factors must be divisible by their least common multiple (LCM). Because $15 = 3 \times 5$, $20 = 2^2 \times 5$, and $25 = 5^2$, the LCM of 15, 20 and 25 is $2^2 \times 3 \times 5^2 = 300$. There are three multiples of 300 between 1000 and 2000: 1200, 1500 and 1800.

Difficulty: Medium-hard

NCTM Standard: Number and Operations Standard for Grades 6–8: Use factors, multiples, prime factorization, and relatively prime numbers to solve problems.

Mathworld.com Classification:
Number Theory > Number Theoretic Functions > Least Common Multiple

- What is the measure of the acute angle formed by the hands of a clock at 4:20 a.m.?

(A) 0° **(B)** 5° **(C)** 8° **(D)** 10° **(E)** 12°

2003 AMC 8, Problem #20—"What fraction of an hour has passed after 20 minutes?"

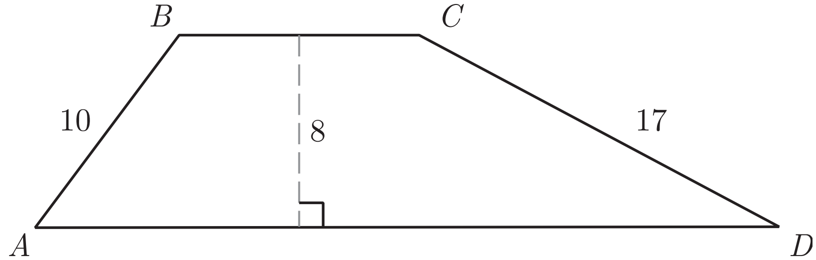
- **Solution (D)** As the minute hand moves $\frac{1}{3}$ of the way around the clock face from 12 to 4, the hour hand will move $\frac{1}{3}$ of the way from 4 to 5. So the hour hand will move $\frac{1}{3}$ of $\frac{1}{12}$ of 360°, or 10°.

Difficulty: Hard

NCTM Standard: Problem Solving Standard for Grades 6–8: Apply and adapt a variety of appropriate strategies to solve problems.

Mathworld.com Classification:
Geometry > Trigonometry > Angles > Angle

- The area of trapezoid $ABCD$ is 164 cm^2. The altitude is 8 cm, AB is 10 cm, and CD is 17 cm. What is BC, in centimeters?



(A) 9 **(B)** 10 **(C)** 12 **(D)** 15 **(E)** 20

2003 AMC 8, Problem #21— "Create two right triangles with hypotenuses $\overline{AB}$ and $\overline{CD}$"

- **Solution**

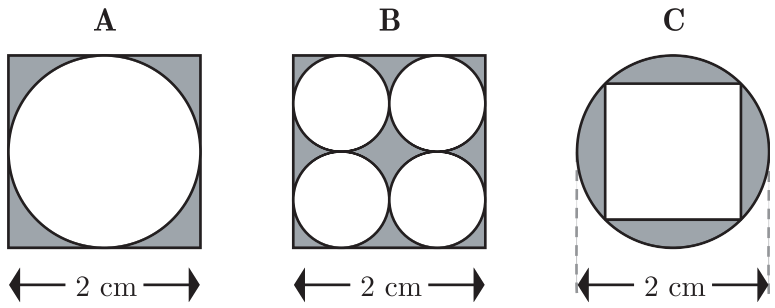
(B) Label the feet of the altitudes from B and C as E and F respectively. Considering right triangles AEB and DFC, $AE = \sqrt{10^2 - 8^2} = \sqrt{36} = 6$cm, and $FD = \sqrt{17^2 - 8^2} = \sqrt{225} = 15$cm. So the area of $\triangle AEB$ is $\frac{1}{2}(6)(8) = 24$cm^2, and the area of

Difficulty: Medium-hard

NCTM Standard: Geometry Standard: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.

Mathworld.com Classification: Geometry > Plane Geometry > Quadrilaterals > Trapezoid

- The following figures are composed of squares and circles. Which figure has a shaded region with largest area?



(A) A only **(B)** B only **(C)** C only **(D)** both A and B **(E)** all are equal

2003 AMC 8, Problem #22—"Use the diameters"

- **Solution (C)** For Figure A, the area of the square is $2^2 = 4$ cm^2. The diameter of the circle is 2 cm, so the radius is 1 cm and the area of the circle is π cm^2. So the area of the shaded region is $4 - \pi$ cm^2.

  For Figure B, the area of the square is also 4 cm^2. The radius of each of the four circles is $\frac{1}{2}$ cm, and the area of each circle is $\left(\frac{1}{2}\right)^2 \pi = \frac{1}{4}\pi$ cm^2. The combined area of all four circles is π cm^2. So the shaded regions in A and B have the same area.

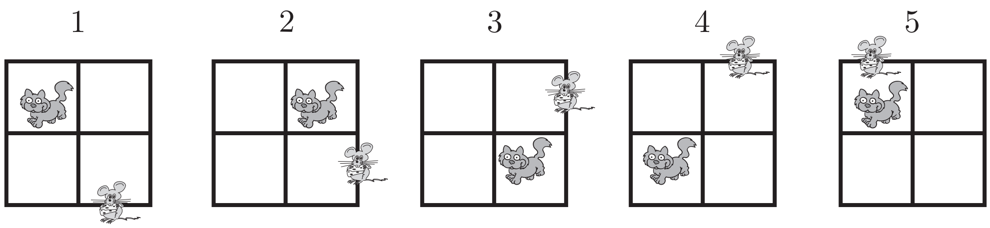
  For Figure C, the radius of the circle is 1 cm, so the area of the circle is π cm^2. Because the diagonal of the inscribed square is the hypotenuse of a right triangle with legs of equal lengths, use the Pythagorean Theorem to determine the length s of one side of the inscribed square. That is, $s^2 + s^2 = 2^2 = 4$. So $s^2 = 2$ cm^2, the area of the square. Therefore, the area of the shaded region is $\pi - 2$ cm^2. Because $\pi - 2 > 1$ and $4 - \pi < 1$, the shaded region in Figure C has the largest area.

Difficulty: Hard

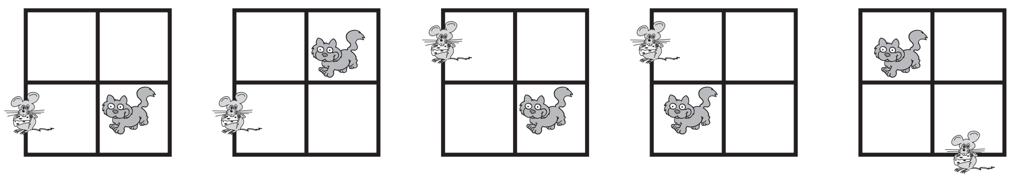
NCTM Standard: Measurement Standard for Grades 6–8: Develop and use formulas to determine the circumference of circles and the area of triangles, parallelograms, trapezoids, and circles and develop strategies to find the area of more-complex shapes.

Mathworld.com Classification:
Geometry > Plane Geometry > Miscellaneous Plane Geometry > Area

- In the pattern below, the cat moves clockwise through the four squares and the mouse moves counterclockwise through the eight exterior segments of the four squares.



If the pattern is continued, where would the cat and mouse be after the 247th move?

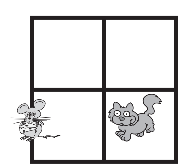


(A) **(B)** **(C)** **(D)** **(E)**

2003 AMC 8, Problem #23— "How many different positions can the cat be in? When is the cat in that position? The mouse?"

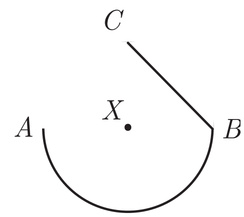
- **Solution**

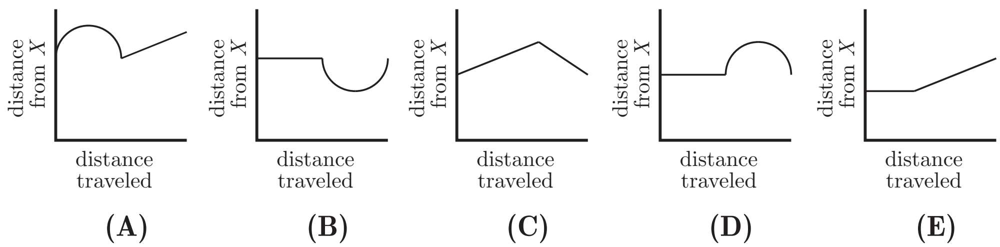
  (A) There are four different positions for the cat in the 2×2 array, so after every fourth move, the cat will be in the same location. Because $247 = 4 \times 61 + 3$, the cat will be in the 3rd position clockwise from the first, or the lower right quadrant. There are eight possible positions for the mouse. Because $247 = 8 \times 30 + 7$, the mouse will be in the 7th position counterclockwise from the first, or the left-hand side of the lower left quadrant.



Difficulty: Hard
NCTM Standard: Problem Solving Standard: Apply and adapt a variety of appropriate strategies to solve problems
Mathworld.com Classification: Discrete Mathematics > Graph Theory > Circuits > Graph Cycle

- A ship travels from point A to point B along a semicircular path, centered at Island X. Then it travels along a straight path from B to C. Which of these graphs best shows the ship's distance from Island X as it moves along its course?

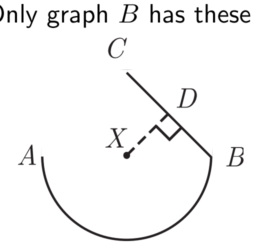




2003 AMC 8, Problem #24— "How far from X are the points along the semicircular part of the course?"

- **Solution**

  (B) All points along the semicircular part of the course are the same distance from X, so the first part of the graph is a horizontal line. As the ship moves from B to D, its distance from X decreases, then it increases as the ship moves from D to C. Only graph B has these features.

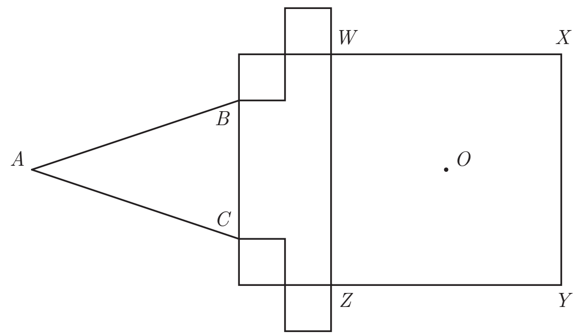


Difficulty: Medium-hard

NCTM Standard: Data Analysis and Probability Standard: Develop and evaluate inferences and predictions that are based on data

Mathworld.com Classification: Discrete Mathematics > Graph Theory > General Graph Theory > Graph

- In the figure, the area of square $WXYZ$ is 25 cm^2. The four smaller squares have sides 1 cm long, either parallel to or coinciding with the sides of the large square. In $\triangle ABC$, $AB = AC$, and when $\triangle ABC$ is folded over side $\overline{BC}$, point A coincides with O, the center of square $WXYZ$. What is the area of $\triangle ABC$, in square centimeters?

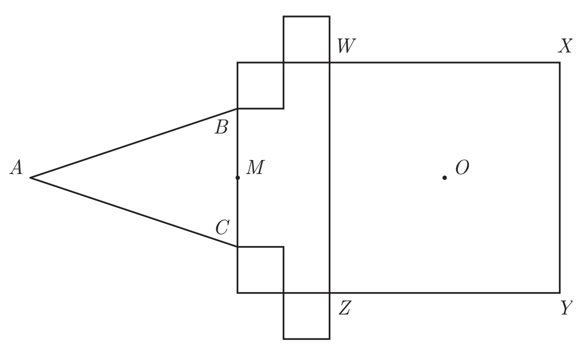


(A) $\frac{15}{4}$ **(B)** $\frac{21}{4}$ **(C)** $\frac{27}{4}$ **(D)** $\frac{21}{2}$ **(E)** $\frac{27}{2}$

2003 AMC 8, Problem #25— "Let M be the midpoint of $\overline{BC}$. Since $\triangle ABC$ is isosceles, what do we know about AM and MO?"

- **Solution**

(C) Let M be the midpoint of $\overline{BC}$. Since $\triangle ABC$ is isosceles, $\overline{AM}$ is an altitude to base $\overline{BC}$. Because A coincides with O when $\triangle ABC$ is folded along $\overline{BC}$, it follows that $AM = MO = \frac{5}{2} + 1 + 1 = \frac{9}{2}$ cm. Also, $BC = 5 - 1 - 1 = 3$ cm, so the area of $\triangle ABC$ is $\frac{1}{2} \cdot BC \cdot AM = \frac{1}{2} \cdot 3 \cdot \frac{9}{2} = \frac{27}{4}$ cm^2.



Difficulty: Medium-hard
NCTM Standard: Geometry Standard: Apply transformations and use symmetry to analyze mathematical situations
Mathworld.com Classification: Geometry > Plane Geometry > Miscellaneous Plane Geometry > Area