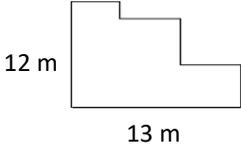


5 POINTS

- The product of all the factors of 10 is equal to _____. $1 \times 2 \times 5 \times 10 = 100$
 A. 17 **B. 100** C. 50 D. 200 E. 10
- Mathew has made a circular spinner. If he spins this spinner 1000 times, how many times approximately can he expect to get a 1?

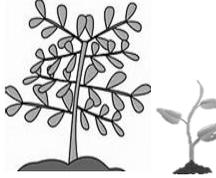
 $\frac{1}{4}$ of 1000 = 250 times
 A. 100 times B. 500 times C. 650 times D. 750 times **E. 250 times**
- The distance from Amit's house to the school is 4 times the distance from the post office to the school. The distance from the school to his house is 2 km. What is the distance from his house to the post office?

 Post office to school: $2 \text{ km} / 4 = 0.5 \text{ km}$. Amit's house to post office: $3 \times 0.5 \text{ km} = 1.5 \text{ km}$.
 A. 1.75 km **B. 1.5 km** C. 2.2 km D. 2.5 km E. 8 km
- The sum of nine of the first ten positive whole numbers is 50. Which of these ten whole numbers I did not add?
 The sum of all of the first ten positive whole numbers is 55. I did not add 5.
 A. 1 B. 3 **C. 5** D. 7 E. 6
- Edna lists all the natural numbers from 1 to 50. She then erases 20 even numbers from this list. What fraction of the numbers left are even numbers?
 There are 25 even numbers and 25 odd numbers from 1 to 50. After she erased 20 even numbers, there were 5 even numbers left and 25 odd numbers: 5 out of the remaining 30 numbers are even numbers $\rightarrow 5/30 = 1/6$.
 A. $\frac{1}{2}$ B. $\frac{5}{6}$ C. $\frac{2}{7}$ **D. $\frac{1}{6}$** E. $\frac{3}{8}$
- The perimeter of the figure on the right is equal to _____.
 $12 + 13 + 12 + 13 = 50 \text{ m}$

 A. 48 m **B. 50 m** C. 52 m D. 54 m E. 56 m
- A snail fell into a hole that was 10-feet deep. It started climbing up. Every day it would climb 3 feet up but then it would fall 2 feet down while sleeping during the night. After how many days would the snail climb out of the hole?

 Each 24 hour period the snail will climb up only 1 ft. It does that for 7 days, but on the 8th day it climbs out of the hole before it falls asleep.
 A. 8 days B. 7 days C. 6 days D. 5 days E. 9 days
- Ashley and Hailey go into a restaurant. There are 4 hooks on a wall. Each one hangs her hat on one of the hooks. How many different ways can they hang their hats?

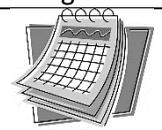
 When Ashley hangs her hat, she has a choice of 4 hooks. Hailey will only have a choice of 3 hooks when she hangs hers. They can hang their hats in (3×4) 12 different ways.
 A. 4 **B. 12** C. 8 D. 24 E. 16

7 POINTS

- In Mrs. Saumya's garden, there are two plants. One is 44 inches tall, and it grows 3 inches every 2 years. The other is 80 inches tall, and it grows 5 inches every 6 years. In how many years will the two plants have the same height?

 The difference between the two plants' height is 36 inches currently. The smaller plant grows 9 inches in 6 years, and the taller plant grows 5 inches in 6 years. Thus, the smaller plant can make up 4 inches in each 6 years. Hence, it will take $36/4=9$ times 6 years, that is, 54 years for the two plants to have the same height.
 A. 36 years B. 40 years C. 48 years D. 52 years **E. 54 years**
- If I start with \$100, increase my money by 50%, then decrease that amount by 50%, how much money will I have?
 Increasing \$100 by 50%, I would get \$150. If \$150 then decreased by 50%, I would have \$75.

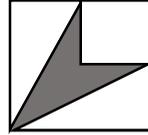
 A. \$50 B. \$100 C. \$110 D. \$125 **E. \$75**
- A piece of paper is 0.1 mm thick. How many times must it be folded in half so that the folded paper is more than $\frac{1}{2}$ mm thick?
 With 0 fold, the thickness is 0.1 mm; one fold, the thickness is 0.2 mm; two folds, the thickness is 0.4 mm, and with 3 folds, the thickness is 0.8 mm.

 A. 1 B. 2 **C. 3** D. 4 E. 5
- The figure below shows some identical triangles. How many unshaded triangles must be removed so that unshaded triangles make $\frac{2}{3}$ of the shaded triangles?

 To have unshaded triangles to be $\frac{2}{3}$ of the shaded triangle: for every 2 unshaded triangles there must be 3 shaded triangles (or 4 unshaded and 6 shaded, 6 unshaded and 9 shaded, and so on). Since there are 9 shaded triangles already, you only need 6 unshaded. So you need to remove 5 unshaded triangles
 A. 6 **B. 5** C. 4 D. 3 E. 2
- Marko has lost $\frac{2}{5}$ of his weight during the summer. Rounded to the nearest kg, what was his weight at the beginning of the summer if his weight at the end of the summer was 100 kg?
 $\frac{3}{5}$ of his previous weight is 100 kg, therefore his previous weight was $\frac{5}{3} \times 100 = 166.67 \approx 167$.
 A. 160 kg B. 140 kg C. 188 kg **D. 167 kg** E. 171 kg
- The fourth day of a month is a Monday. The last day of this month cannot be a Wednesday, a Tuesday, or a _____.
 Feb has 28 or 29 days, others have either 30 or 31 days. So the last day cannot be a Wed, a Tue, nor a Mon.

 A. Saturday B. Sunday **C. Monday** D. Thursday E. Friday
- A recent survey of 54 superheroes revealed that 14 of them still wear capes and 41 of them continue to wear a mask. If $\frac{1}{6}$ of all the superheroes wear both a mask and a cape, how many do not wear either a cape or a mask?
 $\frac{1}{6}$ of 54 = 9; 9 wear both so only 5 wear just a cape $(14 - 9)$ and 32 wear just a mask $(41 - 9)$. $9 + 5 + 32 = 46$ of the 54 accounted for; the remaining 8 must wear neither. Or draw Venn Diagram
 A. 9 **B. 8** C. 5 D. 4 E. 3

10 POINTS

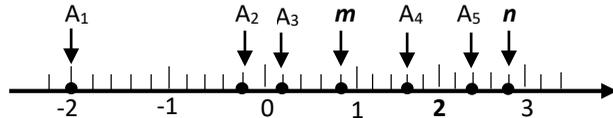
16. Nora cut a grey shape from a square paper that is 6 inches by 6 inches. Two vertices of the grey quadrangle are the midpoints of the square's sides, and the third vertex is in the center of the square. What is the area of the grey quadrilateral?



Let us count the area of the non-grey parts. In the bottom left corner, a 3 by 3 inch square is dropped, whose area is 9 square inches. The other two dropped triangles make a 3 by 6 inch rectangle, whose area is 18 square inches. Hence, the area of the gray quadrangle is $6 \times 6 - 9 - 18 = 9$ square inches.

- A. 6 in^2 B. 8 in^2 **C. 9 in^2** D. 10 in^2 E. 11 in^2

17. Which point on the number line is 4 times farther from point m than from point n ?



The point on the number line which is 4 times further from point m than from point n is point A_5 . Indeed, A_5 is at a $2/10$ of one unit distance measure from n and at a $8/10$ of one unit distance measure from m .

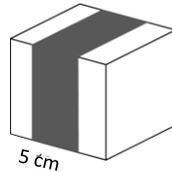
- A. A_1 B. A_2 C. A_3 D. A_4 **E. A_5**

18. A pathway measuring 5 ft. by 2 ft. is paved with stones measuring 2 ft. by 1 ft. One way in which the pathway could be paved is as follows: How many different ways can the path be laid? *The pathways can be paved as:*



- A. 10 B. 6 **C. 8** D. 7 E. 9

19. Ashley painted part of a wooden cube (10 cm x 10 cm x 10 cm). She applied a coat of paint perpendicular to four edges of the cube (all around the cube) that looks like a strip of ribbon 5 cm wide. What fraction of the cube's total surface did she paint?



The area of one of the cube's faces is 100 cm^2 , so the total area of the surface is 600 cm^2 . On each face, Ashley applied 50 cm^2 of paint. She painted that on 4 surfaces: $4 \times 50 = 200 \text{ cm}^2$, which translates to $200/600 = 1/3$ of the total surface.

- A. $1/3$** B. $1/5$ C. $2/7$ D. $1/4$ E. $3/10$

20. A cheetah is jogging along at 5 miles per hour for ten seconds until it spots an impala it wants to catch. The cheetah then speeds up and averages 60 miles per hour for the next 40 seconds while it chases the impala. Its prey gets away and the cheetah slows back down to an average of 5 miles per hour for ten seconds. Rounded to the nearest mile per hour, what is the cheetah's average speed for the entire minute?



Find total distance traveled first; at 60 mph you travel at 1 mile/minute, but the cheetah only was at that speed for $2/3$ of a minute so it traveled $2/3$ mile; at 5 mph you travel $5/60$ miles per minute or $1/12$ of a mile, but the cheetah was only at that speed for $1/3$ of a minute so it traveled $1/36$ of a mile; $2/3 + 1/36 = 25/36$ of a mile traveled in a minute; multiply by 60 to convert to miles per hour = $1500/36 = 41.6666$ which rounds to 42 mph.

- A. 54 mph B. 50 mph C. 46 mph **D. 42 mph** E. 35 mph

MATH CHALLENGE TOURNAMENT

FALL 2016



Problem Solving Challenge

Grade 5

Problems 1-20

Do not begin until you are instructed to do so.

KEY

Problem Solving Challenge (40 minutes)

Mark your answers on the ANSWER SHEET.
You may use scratch paper to do any calculation to reach final answers.