MATHCOUNTS® SHOWCASE October Challenge

Name _____

Calculators may be used for these problems.

1. _____ blue jellybeans

Sami's Candy Store has six bins containing jellybeans. These bins contain 10, 13, 19, 8, 13 and 9 blue jellybeans. What is the mean (average) number of blue jellybeans per bin?

2. _____

Jacque and Emily work in a shoe store. Emily was trying to carry too many boxes and dropped all of them, spilling four different pairs of shoes into a pile on the floor. Jacque picked up one shoe from the pile, and then Emily picked up one shoe from the pile. What is the probability that the shoe Emily's holding does not belong in the same box as the shoe Jacque's holding? Express your answer as a common fraction.

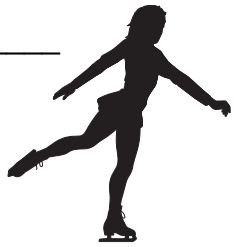
3. _____ farthings

In the 19th century, Britain used a money system which included pence, farthings, shillings and pounds. The following conversions were used:

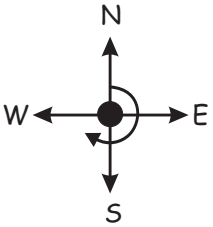
4 farthings = 1 pence
12 pence = 1 shilling
20 shillings = 1 pound

How many total farthings were equivalent to 1 pound and 5 pence?

4. _____



A figure skater is facing north when she begins to spin to her right. She spins 2250 degrees. Which direction (north, south, east or west) is she facing when she finishes her spin?



5. _____

Suppose that a # b = a + b + ab. Therefore, 2 # 3 = 2 + 3 + 2(3) = 11. If ☐ # 1 = 5, what value should be placed in the ☐ ?

MATHCOUNTS® SHOWCASE October Challenge

Name Answer Key

Calculators may be used for these problems.

1. **12** blue jellybeans

Sami's Candy Store has six bins containing jellybeans. These bins contain 10, 13, 19, 8, 13 and 9 blue jellybeans. What is the mean (average) number of blue jellybeans per bin?

2. **$\frac{6}{7}$**

Jacque and Emily work in a shoe store. Emily was trying to carry too many boxes and dropped all of them, spilling four different pairs of shoes into a pile on the floor. Jacque picked up one shoe from the pile, and then Emily picked up one shoe from the pile. What is the probability that the shoe Emily's holding does not belong in the same box as the shoe Jacque's holding? Express your answer as a common fraction.

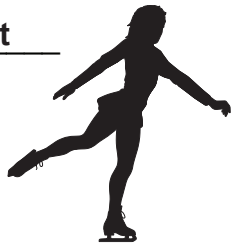
3. **980** farthings

In the 19th century, Britain used a money system which included pence, farthings, shillings and pounds. The following conversions were used:

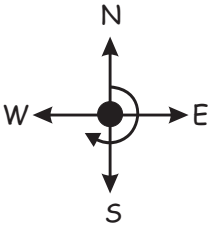
4 farthings = 1 pence
12 pence = 1 shilling
20 shillings = 1 pound

How many total farthings were equivalent to 1 pound and 5 pence?

4. **east**



A figure skater is facing north when she begins to spin to her right. She spins 2250 degrees. Which direction (north, south, east or west) is she facing when she finishes her spin?



5. **2**

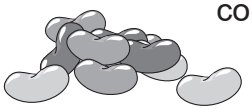
Suppose that a # b = a + b + ab. Therefore, 2 # 3 = 2 + 3 + 2(3) = 11. If $\square$ # 1 = 5, what value should be placed in the $\square$?

MATHCOUNTS® SHOWCASE October Challenge

Name Solutions

Calculators may be used for these problems.

1. **12** blue jellybeans



Sami's Candy Store has six bins containing jellybeans. These bins contain 10, 13, 19, 8, 13 and 9 blue jellybeans. What is the mean (average) number of blue jellybeans per bin?

The mean = the sum of the values/the number of values. Thus, the mean number of blue jellybeans is (10 + 13 + 19 + 8 + 13 + 9)/6 = 72/6 = 12.

2. $\frac{6}{7}$

Jacque and Emily work in a shoe store. Emily was trying to carry too many boxes and dropped all of them, spilling four different pairs of shoes into a pile on the floor. Jacque picked up one shoe from the pile, and then Emily picked up one shoe from the pile. What is the probability that the shoe Emily's holding does not belong in the same box as the shoe Jacque's holding? Express your answer as a common fraction.

Four pairs of shoes is 8 individual shoes. Regardless of which shoe Emily is holding, only 1 of the other 7 belongs in the same box. Thus, the probability is 6/7 that the shoe Jacque is holding does not belong in the same box.

3. **980** farthings

In the 19th century, Britain used a money system which included pence, farthings, shillings and pounds. The following conversions were used:

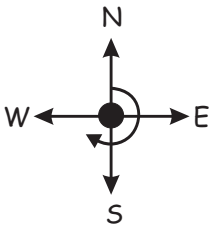
4 farthings = 1 pence
12 pence = 1 shilling
20 shillings = 1 pound

How many total farthings were equivalent to 1 pound and 5 pence?

We have 1 pound + 5 pence, so lets first convert the 1 pound to pence. Our 1 pound + 5 pence = 20 shillings + 5 pence = 20 × 12 pence + 5 pence = 240 pence + 5 pence = 245 pence. Finally, we can determine that our 245 pence = 245 × 4 farthings = 980 farthings.

4. **east**

A figure skater is facing north when she begins to spin to her right. She spins 2250 degrees. Which direction (north, south, east or west) is she facing when she finishes her spin?



By dividing 2250 degrees by 360 degrees we see that the skater goes through 6 full revolutions plus an additional $\frac{1}{4}$ of a revolution. Thus, if the skater started facing north and spins to her right, she'll end up facing east.

5. **2** Suppose that a # b = a + b + ab. Therefore, 2 # 3 = 2 + 3 + 2(3) = 11. If $\square$ # 1 = 5, what value should be placed in the $\square$?

If a # b = a + b + ab, then $\square$ # 1 = $\square$ + 1 + ($\square$ × 1) = $\square$ + 1 + $\square$. We've been told that $\square$ # 1 = 5, so $\square$ + 1 + $\square$ = 5. Once this is changed into an addition problem, you might see that "2" should be placed in the $\square$ since 2 + 1 + 2 = 5. With algebra, the equation $\square$ + 1 + $\square$ = 5 would be rewritten as 2($\square$) + 1 = 5; subtracting 1 from both sides gives us 2($\square$) = 4; and then dividing by 2 on both sides results in $\square$ = 2.