## PROBLEM ONE

The set of stairs shown at the right is constructed by placing layers of cubes on top of each other.



WHAT IS THE TOTAL NUMBER OF CUBES CONTAINED IN THE STAIRCASE?

## PROBLEM FOUR

My age this year is a multiple of seven. Next year it will be a multiple of five. I am more than 20 years of age but less than 80.



## HOW OLD WILL I BE 6 YEARS FROM NOW?

## PROBLEM THREE

Each of the small boxes in the figure at the right is a square. The perimeter of square ABCD is 36 cm.



## WHAT IS THE PERIMETER OF THE FIGURE SHOWN WITH THE DARKENED OUTLINE?

## PROBLEM TWO

Bart has one of each of the following coins in his pocket: a penny, a nickel, a dime, a quarter, and a loonie. Four of these coins are taken out of the pocket and the sum of their values is calculated.



## HOW MANY DIFFERENT SUMS ARE POSSIBLE?

## **PROBLEM FIVE**

A group of 12 bears decided to spend some time in the forest. They had enough food to last for 8 days when they arrived at their camp. However, 4 more bears joined them without the amount of food being increased.





HOW LONG WILL THE FOOD LAST IF EACH BEAR IS GIVEN THE SAME DAILY RATION AS ORIGINALLY PLANNED?

#### ANSWERS:

- 1. 48
- 2. 5
- 3. 36
- 4. 55
- 5. 6

#### PROBLEM ONE

SAM'S TEACHER HAS GIVEN HIM TEN BOXES. FIVE BOXES CONTAIN PENCILS, FOUR BOXES CONTAIN PENS AND ONLY TWO BOXES CONTAIN BOTH PENCILS AND PENS.





## HOW MANY BOXES ARE EMPTY?

## PROBLEM TWO



The figure shown consists of 3 layers of cubes with no gaps. Suppose the complete exterior of the figure, including the bottom, is painted red and then separated into individual cubes.

## HOW MANY CUBES WILL HAVE EXACTLY 3 RED FACES?

### PROBLEM FOUR



LISA STARTED A MATH CLUB DURING THE FIRST WEEK OF SCHOOL. AS THE ONLY MEMBER, SHE DECIDED TO RECRUIT TWO NEW MEMBERS DURING THE FOLLOWING WEEK OF SCHOOL.

EACH NEW MEMBER, DURING THE WEEK FOLLOWING THE WEEK WHEN HE OR SHE BECAME A MEMBER, RECRUITS TWO NEW MEMBERS.

## HOW MANY MEMBERS WILL THE CLUB HAVE AT THE END OF FIVE WEEKS?

#### PROBLEM FIVE

A square piece of paper is folded in half and then cut into two rectangles along the fold. The perimeter of each of the two rectangles is 18 cm.



## WHAT IS THE PERIMETER OF THE ORIGINAL SQUARE?

## PROBLEM THREE

Ten ping-pong balls are numbered from one to ten and placed in a bag. Pairs of balls are drawn randomly.



WHAT IS THE MOST LIKELY SUM OF THE NUMBERS ON THE TWO BALLS?

## **ANSWER KEY**

PROBLEM ONE	-	3
PROBLEM TWO	-	16
PROBLEM THREE	-	11
PROBLEM FOUR	-	31
PROBLEM FIVE	-	24

## PROBLEM ONE

Sunnyvale School is having their annual lobster race. A team consists of five lobsters. The team score is the average of the five finishing place positions.



PETER'S TEAM HAS AN AVERAGE OF 18.

HIS SISTER SALLY'S TEAM HAS CONSISTENTLY FINISHED BEHIND HIS TEAM, HOWEVER, AN UNUSUAL PATTERN HAS BEEN NOTICED. FOR EXAMPLE, SALLY'S FIRST LOBSTER FINISHED RIGHT



BEHIND PETER'S FIRST LOBSTER. HER SECOND LOBSTER FINISHED 2 PLACES BEHIND PETER'S SECOND LOBSTER. HER THIRD LOBSTER FINISHED 3 PLACES BEHIND PETER'S THIRD, HER FOURTH WAS 4 PLACES BEHIND HIS

FOURTH AND HER FIFTH WAS 5 PLACES BEHIND HIS FIFTH.

## WHAT IS THE TEAM SCORE FOR SALLY'S TEAM?

#### 2007 MATH OLYMPIAD GRADE 9 ZONE COMPETITION

### PROBLEM TWO

Alvin the chipmunk has two older brothers, Simon and Theodore. The sum of the ages of all three chipmunks is 32. Simon, the oldest, is twice the age of Alvin. Simon and Theodore are three years apart in age.



#### HOW OLD IS ALVIN?

## 2007 MATH OLYMPIAD GRADE 9 ZONE COMPETITION PROBLEM THREE



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### WHAT DIGITS DO A, B, AND C REPRESENT?

## PROBLEM FOUR

When a natural number is multiplied by itself, the result is a square number. Some examples of square numbers are 1, 4, 9, 16, and 25.



## HOW MANY SQUARE NUMBERS ARE THERE BETWEEN 1000 AND 2000?

### PROBLEM FIVE

A train traveling at 30 kilometers per hour reaches a tunnel which is 9 times as long as the train. It will take the train 2 minutes to completely clear the tunnel.



## HOW LONG IS THE TRAIN? (NOTE: ANSWER MUST BE IN METERS)

#### ANSWER KEY

PROBLEM ONE	-	21		
PROBLEM TWO	-	7		
PROBLEM THREE	-	A = 7	B = 8	C = 3
PROBLEM FOUR	-	13		
PROBLEM FIVE	-	100		

## PROBLEM ONE

THE STAIRCASE AT THE RIGHT HAS FOUR STEPS AND CONTAINS 10 UNIT SQUARES. SUPPOSE THE STAIRCASE IS EXTENDED UNTIL IT HAS 12 STEPS.





### HOW MANY UNIT SQUARES WOULD IT THEN CONTAIN ALL TOGETHER?

### PROBLEM TWO

THE LORAX, DR. SEUSS'S CHAMPION OF THE ENVIRONMENT, WAS GIVEN THOUSANDS OF TREES TO PLANT. IT TOOK A TEAM OF FOUR BARBALOOTS 15 DAYS TO PLANT HALF OF THE TREES. THE LORAX WANTS THE JOB FINISHED SOONER SO HE HAS HIRED SIX ADDITIONAL BARBALOOTS TO HELP PLANT.



## HOW MANY DAYS WILL IT TAKE THE TEAM OF TEN BARBALOOTS TO FINISH PLANTING THE REMAINING TREES?

(Assume that all Barbaloots plant trees at the same rate.)

PROBLEM THREE

Find the sum of these fractions



# Write the sum in fractional form in lowest terms.

$$\frac{1}{2 + \frac{1}{2}} + \frac{1}{3 + \frac{1}{3}} =$$

## PROBLEM FOUR





FELIX IS NOT IMPRESSED WITH HIS FRIEND DILBERT AND HIS PET FROG, HOPPY. DILBERT HAS THE HICCUPS, AND IS MAKING A LOUD "HIC" EVERY TWO MINUTES. HOPPY IS MAKING FUN OF HIM BY CROAKING EVERY 3 ½ MINUTES. AT EXACTLY 12:00 NOON DILBERT AND

HOPPY "HICCED" AND "CROAKED" AT THE SAME TIME.

IF THEY CONTINUE TO HIC AND CROAK AT THE SAME RATE, WHAT IS THE FIRST TIME AFTER 1:00 PM THAT THEY WILL HIC AND CROAK TOGETHER?

## PROBLEM FIVE



THE COST OF AN ICE CREAM CONE IS \$1 AND A WHOLE NUMBER OF CENTS. THE TOTAL COST OF 6 ICE-CREAM CONES IS LESS THAN \$8. HOWEVER, THE TOTAL COST OF SEVEN ICE CREAM CONES AT THE SAME PRICE PER CONE IS MORE THAN \$8.

## WHAT IS THE LEAST A SINGLE ICE CREAM CONE COULD COST?

#### ANSWER KEY

- 1) 78
- 2) 6
- **3)**  $\frac{7}{10}$
- 4) 1:10
- 5) \$1.15 NOTE TO CHECKERS - 1.15 ALSO OKAY

### PROBLEM TWO

THIS IS A DIAGRAM OF THE DUMB DOG HOTEL OUTDOOR PLAY AREA.



THE OWNER OF THE DUMB DOG HOTEL, GARFIELD, WANTS TO PUT A FENCE AROUND PART OF THE OUTDOOR PLAY AREA. SQUARE ABCD AND RECTANGLE AEFG EACH HAVE AN AREA OF 36 SQUARE METERS. E IS THE MIDPOINT OF AB. GARFIELD WOULD LIKE TO PUT A FENCE AROUND THE RECTANGULAR AREA AEFG TO KEEP SOME DOGS IN.



## WHAT IS THE PERIMETER OF RECTANGLE AEFG?

## PROBLEM ONE

PETER HAS PERFECTED A NEW EXERCISE CRAZE, KING OF THE CASTLE! IN ORDER TO PROTECT HIS IDEA, HE NEEDS TO KNOW THE EXACT NUMBER OF BLOCKS HE USED TO BUILD THIS TOWER.



THE DIAGRAM SHOWS THAT IT IS MADE UP OF FIVE HORIZONTAL LAYERS OF BLOCKS WITH NO GAPS.

## HOW MANY INDIVIDUAL BLOCKS ARE IN THE TOWER?

### PROBLEM FOUR



## SUPPOSE TWO DAYS AGO WAS SUNDAY.



## WHAT DAY OF THE WEEK WILL 365 DAYS FROM TODAY BE?

#### PROBLEM THREE



YESTERDAY, PEPPERMINT PATTY TOLD WOODSTOCK A MATH RIDDLE THAT MADE HIS HEAD HURT. IT WENT LIKE THIS... "WHEN I ADD THE SAME WHOLE NUMBER TO BOTH THE NUMERATOR AND THE DENOMINATOR OF THE FRACTION TWO-FIFTHS I GET A NEW FRACTION EQUIVALENT TO FOUR-FIFTHS."

WHAT NUMBER DID PEPPERMINT PATTY ADD TO BOTH THE NUMERATOR AND THE DENOMINATOR TO MAKE THIS RIDDLE TRUE?





BUBBLES, A WELL-KNOWN CAT LOVER, WANTED TO RAISE SOME MONEY TO SUPPORT THE LOCAL ANIMAL SHELTER. ON SATURDAY, HE BOUGHT APPLES AT 3 FOR 25. ON SUNDAY HE SOLD ALL OF THEM FOR 2 FOR 25 AND MADE A PROFIT OF \$1.





## HOW MANY APPLES DID HE SELL?

#### ANSWERS:

- 1. 35
- 2. 30
- 3. 10
- 4. WEDNESDAY
- 5. 24

### Math Olympiad 2007 GRADE 8 REGIONAL COMPETITION PROBLEM ONE



You have been chosen to represent your class in the annual jelly bean guessing contest. These are your clues:



there are more than 40 but less than 80



when the number of beans is divided by 5, there is a remainder of 2



when the number of beans is divided by 7, there is a remainder of 4

HOW MANY JELLY BEANS ARE IN THE JAR?

## PROBLEM TWO

Sponge Bob is very wound up about today's math contest. His question was to divide a given number by 2  $\frac{1}{2}$ . Unfortunately, because of his excitement, Sponge Bob got confused and ended up multiplying the number by 2  $\frac{1}{2}$ . When he did this his answer was 50.



## WHAT IS THE CORRECT ANSWER TO THE DIVISION PROBLEM ?

## PROBLEM THREE

It's tournament time in Jungle Town. Six giraffes have entered the checker tournament. Each giraffe will play exactly three games with each of the other participants.



## HOW MANY GAMES WILL BE PLAYED IN TOTAL?

## PROBLEM FOUR

A jar filled with gummi bears has a mass of 10 kilograms. After half of the gummi bears are eaten, the jar and the remaining bears have a mass of 5 and threefourths kilograms.





WHAT IS THE MASS OF THE JAR IN FRACTIONAL FORM?

## PROBLEM FIVE

A pup is worth a pooch and a mutt. A pup and a pooch are worth one bird dog. Two bird dogs are worth three mutts.









HOW MANY POOCHES IS A PUP WORTH?

#### ANSWERS KEY:

- 1. 67
- 2. 8
- 3. 45
- 4. 1.5 OR  $1\frac{1}{2}$  OR one and one-half
- 5. 5

## PROBLEM ONE





The average age of Jimmy's







## HOW OLD WAS THE GOLDFISH THAT DIED?

## PROBLEM TWO



The Geico Gecko only had three dollars left in the bank when he finally got a job. He started earning seven dollars a week by walking dogs. After his first week on the job he wasn't paid, so he still only had three dollars in his bank account. His second week of

work he was paid and his bank account increased to ten dollars. At the end of the third week he had seventeen dollars in the bank. His goal is to save \$528 for car insurance.

## HOW MANY WEEKS WILL HE HAVE TO WORK TO REACH HIS GOAL?

## PROBLEM THREE

When A is divided by B, the result is  $\frac{3}{4}$ .

When B is divided by C, the result is  $\frac{5}{6}$ 



## WHAT IS THE RESULT WHEN A IS DIVIDED BY C? (NOTE: ANSWER MUST BE IN SIMPLIFIED FRACTIONAL FORM)

#### Math Olympiad 2007 GRADE 9 REGIONAL COMPETITION PROBLEM FOUR



A beam of light shines from point S, reflects off a reflector at point P, and reaches point T so that PT is perpendicular to RS.

## WHAT IS THE MEASUREMENT OF ANGLE X?



## PROBLEM FIVE

The digits of a two-digit number are interchanged to form a new two-digit number. The difference of the original number and the new number is 45.



## WHAT IS THE LARGEST TWO-DIGIT NUMBER THAT SATISFIES THESE CONDITIONS?

- 1) 2
- 2) 76
- 3) FIVE EIGHTHS  $\frac{OR}{8}$
- 4) 32 <mark>OR</mark> 32°
- 5) 94

#### PROBLEM ONE

Nova Scotia's provincial flower is the mayflower. The mayflower has five petals. Imagine that the petals are numbered 1, 2, 3, 4 and 5 in a clockwise  $\circlearrowright$  order. A ladybug has landed on petal number 1. She begins to jump in a counter clockwise direction  $\circlearrowright$  from one petal to another, around the flower. When she jumps from an odd-numbered petal, she skips a petal. When she jumps from an even-numbered petal, she jumps to the next petal. Since it is the year 2007, she has decided to make 2007 jumps.

## WHAT NUMBER PETAL WILL SHE BE ON WHEN SHE STOPS JUMPING?

#### PROBLEM TWO

Bertha has 6 daughters and no sons. Some of her daughters have 6 daughters, and the rest have none. Bertha has a total of 30 daughters and granddaughters, but she has no greatgranddaughters.



#### HOW MANY OF BERTHA'S DAUGHTERS AND GRANDDAUGHTERS HAVE NO DAUGHTERS?

#### PROBLEM THREE

Goofy wants to make the Disney Basketball Team. He attends practice on Monday, Tuesday, Wednesday, Thursday, and Friday. At each practice last week, he made twice as many free throws as he had made at the previous practice. At his fifth practice he made 48 free throws.



#### HOW MANY TOTAL FREE THROWS DID GOOFY MAKE DURING THE WEEK?

#### PROBLEM FOUR

The Pre-teen Super Heroes decided that is was time to take a vacation. During their vacation rain occurred on 13 days. When it rained in the morning the afternoon was sunny. Every rainy afternoon was preceded by a sunny morning. There were 11 sunny mornings and 12 sunny afternoons.



WHAT IS THE MINIMUM NUMBER OF DAYS THE PRE-TEEN SUPERHEROES WERE ON VACATION?

PROBLEM FIVE



Last night, Speedy Gonzales had a Mexican fiesta party at the O'Taco Mexican Food Restaurant. He invited all of his family. Three different dishes were served, fajitas, nachos and refried beans. Sixty-five dishes were served altogether. Every 2 mice shared fajitas, every 3 mice shared a plate of nachos, and every 4 mice shared a plate of refried beans.

## HOW MANY MICE ARE IN SPEEDY'S FAMILY?

Answer Key

PROBLEM ONE -	1	OR	PETAL 1
PROBLEM TWO -	26		
PROBLEM THREE -	93		
PROBLEM FOUR -	18		
PROBLEM FIVE -	60		