Grade Eight

Classroom

Strategies

Blackline Masters

Cooperative Problem Solving with Patterns

Problem A
A porpoise is swimming and jumping in a motion that produces a pattern Sometimes he is above sea level and sometimes he is under the sea. The numbers show how high or deep he is as compared to sea level.

Problem A
At 1:00 pm, the porpoise is 9 feet above the ocean surface. At 1:02 pm, he is only 6 feet above sea level.

Find the height of the porpoise at 1:10 pm.

Problem A
At 1:01 pm, the porpoise is 1 foot under water. But at 1:04 he is 3 feet above the water.

Find the height of the porpoise at 1:10 pm.

Problem A
At 1:03 pm, the porpoise is 4 feet under water. And at 1:05 he is 7 feet under water.

Find the height of the porpoise at 1:10pm.

Problem B
John's calculator is broken. Every time he hits the enter key, the calculator does the same operation to the answer in the screen.

What number was on the screen after the enter key was hit three times?

Problem B
The number on the screen of the calculator before it was discovered to be broken was a -5. After the enter key is hit twice, the number on the screen is -20.

What number was on the screen after the enter key was hit three times?

Problem B
After the enter key was hit five times, the number on the screen is 160.

What number was on the screen after the enter key was hit three times?

Cooperative Problem Solving with Patterns

Problem C
An archaeologist found an ancient clay tablet on which students from long ago were writing a fraction pattern. The first fraction was broken off the tablet.
Find the first fraction.

Problem C
The first fraction visible on the tablet appears to be the second fraction in the pattern.
This second fraction is $\frac{7}{10}$.

Find the first fraction.

Problem C
The denominator of the third fraction is not clear, but the numerator is visible.
The third fraction looks like $\frac{9}{▩}$ and the fourth fraction is $\frac{11}{40}$.
Find the first fraction.

Problem C
The fifth and sixth fractions look like This:

$\frac{▩}{80}$ and $\frac{15}{160}$.
Find the first fraction.

Problem D
A hiking party wants to climb a path that winds 2700 feet up a mountain path that gets steeper and steeper. They begin at noon, and during the first hour they travel 1800 feet and have 900 feet left to go.
At what hour will they be within 10 feet of the top?

Problem D
At 2:00 pm they have traveled a total distance of 2400 feet, but they still have 300 feet of very steep terrain to cover.

At what hour will they be within 10 feet of the top?

Problem D
From 2:00 till 3:00 they travel another 200 feet, and there are 100 feet to go.
If their progress follows this same pattern, at what hour will they be within 10 feet of the top?

Problem D
Hint: Make a chart with columns for time, distance traveled, and distance remaining.

At what hour will they be within 10 feet of the top?

Cooperative Problem Solving with Patterns

Problem E
Joe's friends have a band. They want Joe to help them make CD copies of their music to sell to fans. After doing some research on the software he would need and the price for supplies, Joe finds that making ten CDs would cost him $80.

Problem E
The friends think they may want more than ten copies, so they ask Joe for some other prices. He tells them that 100 copies would cost him $350 and 1000 copies would cost him $3050.

Problem E

The friends decide to buy 50 copies from Joe. If they sell the CDs for $8 each, how many copies must they sell to have enough to pay Joe's bill?

Problem F
Mrs. Avonia has a door to door cosmetics business that she started in January. She has been looking for receipts so she can check on the number of customers she had. She finds that she had four customers in January.

Problem F
She remembers that she had 26 customers in May; however when she finds her receipts for February, she notices that she had only six customers that month.

Problem F
She finally finds her receipts for March and April and finds that she had ten customers in March and 16 the month after that.

Problem F
"Aha!" cries Mrs. Avonia. "I see a pattern here!" How many customers should she predict for the months of June and July?

Cooperative Problem Solving with Patterns

Problem G
A local baseball stadium is trying to plan for an upcoming exhibition game. Records show that when they had a crowd of 20,000 fans, they sold 16,000 hotdogs.

Problem G
Last year they had a crowd of 32,000, and they sold 25,600 hotdogs. The lowest turnout they ever had for this event was 15,000 and they sold 12,000 hot dogs that year.

Problem G

They buy hot dogs in bulk packages of 64. The buns come 48 in a pack.

Problem G

This year they expect a record turnout of 48,000 fans. How many packages of hot dogs and buns should they buy?

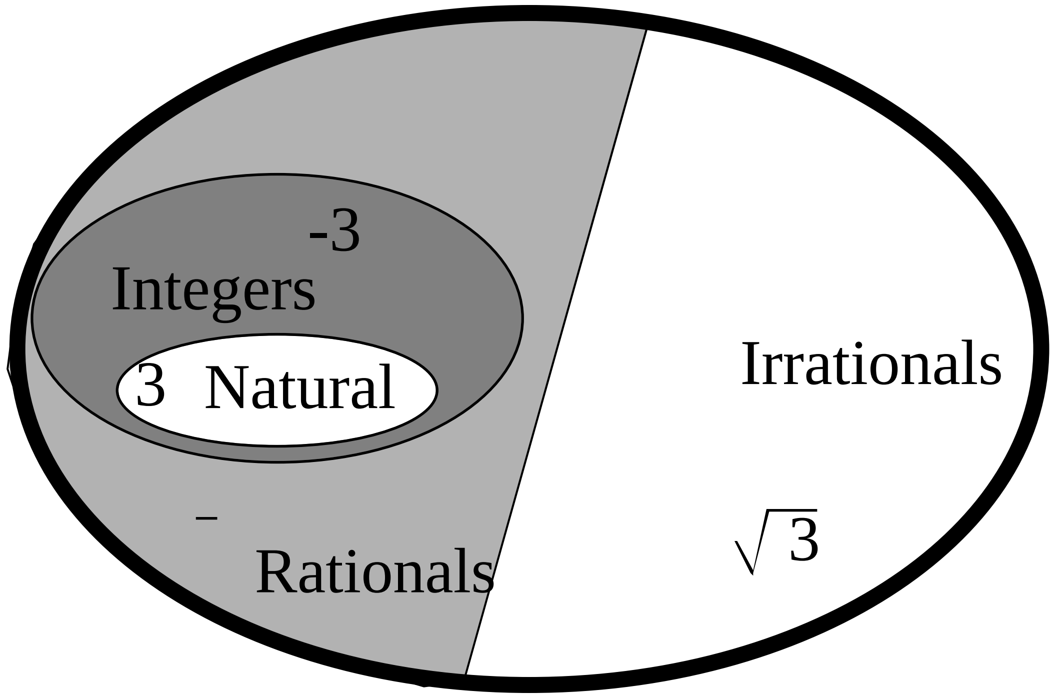
Problem H
The band is planning a bake sale to raise money for a trip. In years past, the parents signed up to contribute cakes and the band set up the tables and conducted the sale.

The first year of the sale, 24 parents signed up and they made a total of 30 cakes to sell.

Problem H
The second year of the sale more parents participated. Forty signed up, and they contributed 50 cakes.

Problem H
In the third year, the PTA got involved. Sixty parents signed up and they baked 75 cakes for the sale.

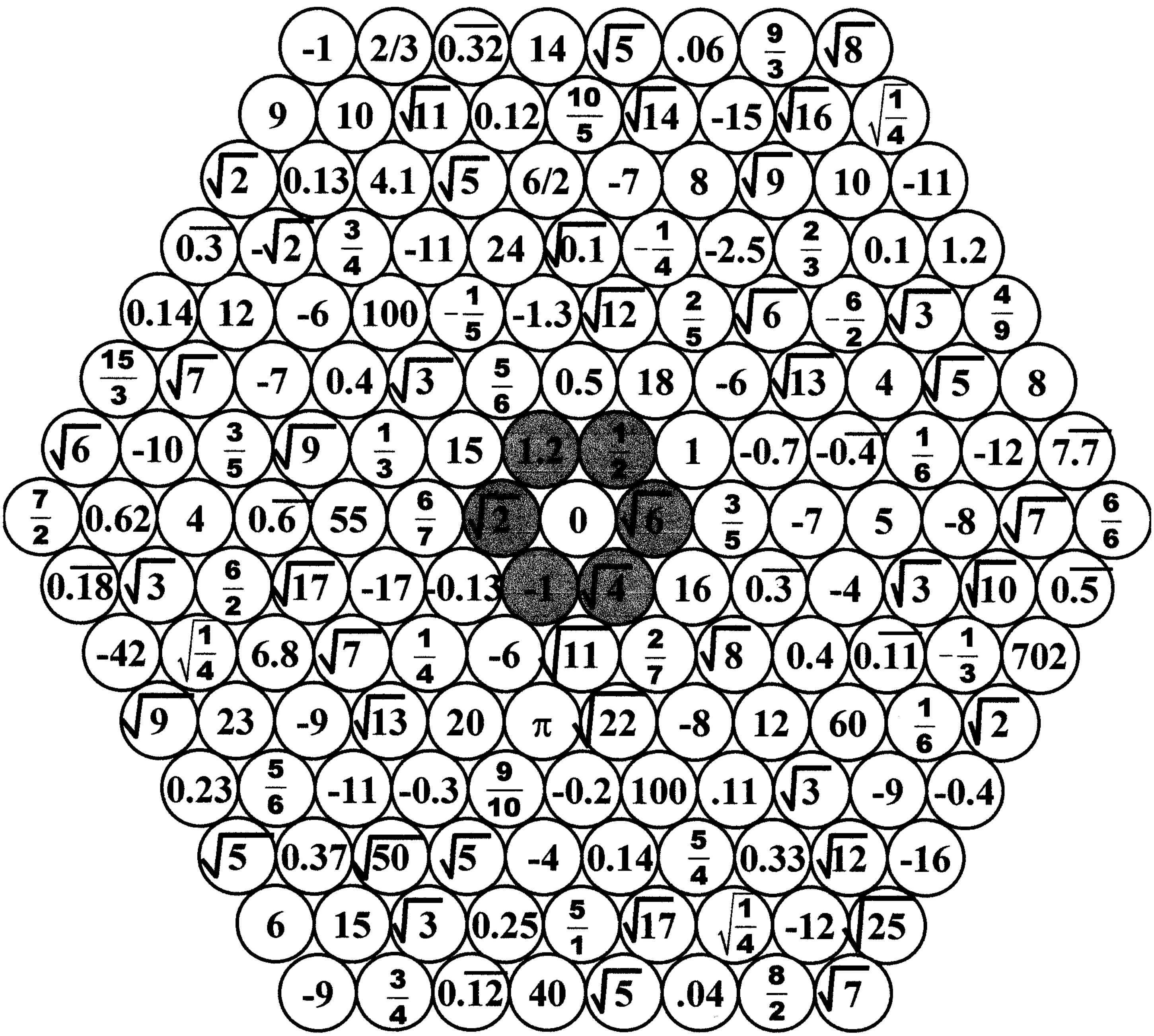
Problem H
This year the entire community is involved. The number of adults signing up to bake cakes is 160. If the tables can hold 25 cakes each, how many tables should the band set up for the sale?



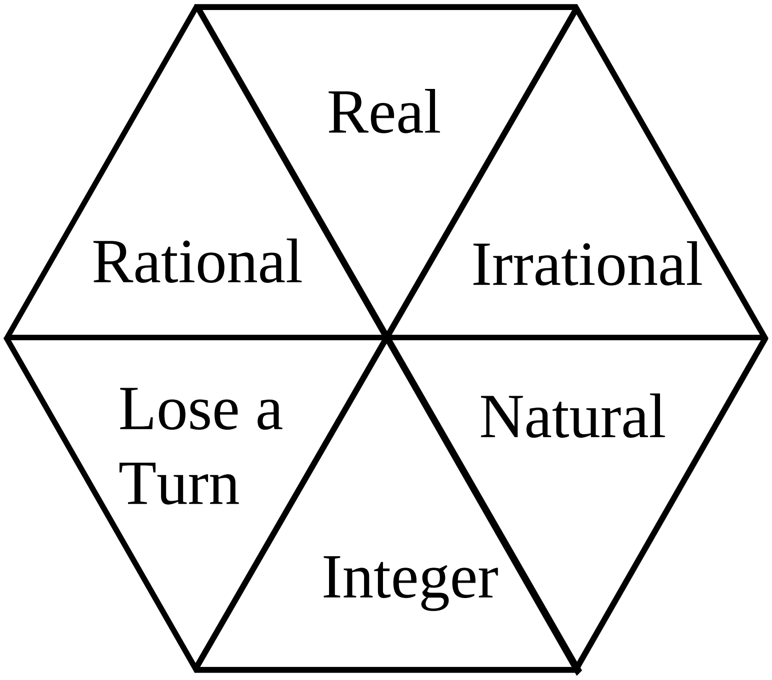
Real numbers

Real numbers: the set of rational and irrational numbers
Natural numbers: the counting numbers: {1,2,3 …}
Whole numbers: the set of counting numbers plus zero: {0,1,2,3, …}
Integers: the set of counting numbers and their opposites plus zero {… -3,-2,-1, 0, 1, 2, 3 …}
Rational numbers: numbers that can be expressed as the ratio of two integers
Decimal representations of rational numbers either terminate or repeat. Ex. 2.375 , 4, -.25, -.14
Irrational numbers: numbers that cannot be expressed as a ratio of two integers. Their decimal representations neither terminate nor repeat.
Ex. $\sqrt{3}$, π, 0.14114111411114 …

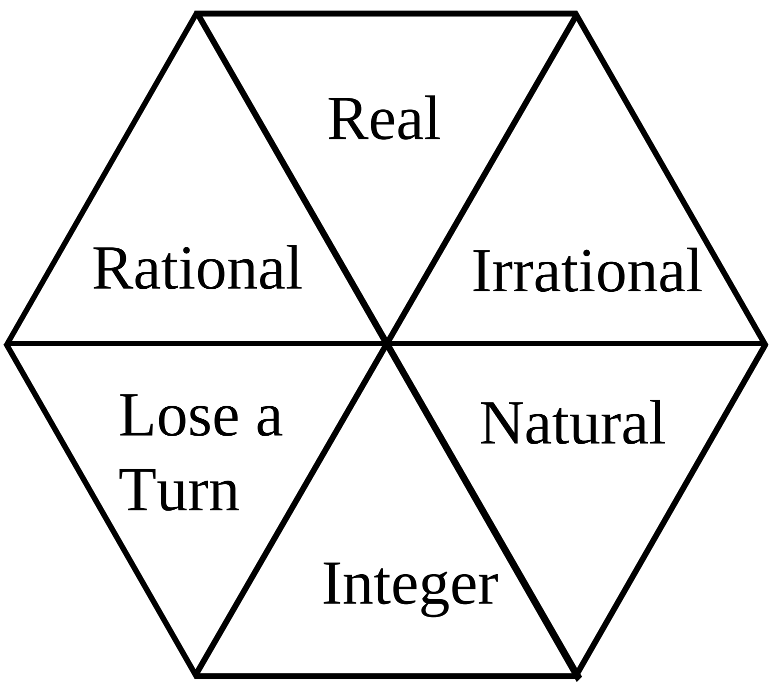
Real Number Hexagon



Spinner for Real Number Hexagon



Spinner for Real Number Hexagon



A fair number cube labeled 1 to 6 can also be used in place of the spinner above.
1 = Rational; 2 = Real; 3 = Irrational; 4 = Natural; 5 = Integer; 6 = Lose a turn

Number	Real	Rational	Irrational	Integer	Natural
4					
$\sqrt{4}$					
-3					
$\frac{1}{2}$					
$\sqrt{\frac{1}{9}}$					
$0.33\overline{3}$					
0.25					
0.171771777...					
$\sqrt{7}$					
π					

Number	Real	Rational	Irrational	Integer	Natural
4					
$\sqrt{4}$					
-3					
$\frac{1}{2}$					
$\sqrt{\frac{1}{9}}$					
$0.33\overline{3}$					
0.25					
0.171771777...					
$\sqrt{7}$					
π