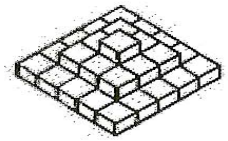
HOMEWORK PROBLEMS

9. A train traveling at 30 miles/hour reaches a tunnel which is 9 times as long as the train. If the train takes 2 minutes to completely clear the tunnel, how long is the train? (1m=5280ft)

11. 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 of these cubes have exactly 3 faces painted?



15. A certain slow clock loses 15 minutes every hour. Suppose the clock is set to the correct time at 9 am. What will be the correct time when the slow clock first shows 10 am?

17.

A		7	12
	4	9	
	5	16	
8	11		B

The figure shown is a "magic square" with missing entries. When complete, the sum of the 4 entries in each column, each row, and each diagonal is the same. Find the value of A and the value of B.

20. Consecutive numbers are whole numbers that follow in order such as 3, 4, 5. Find the smallest of the 5 consecutive numbers whose sum is 100.

Objectives

- To discover how to estimate and find the sum of large numbers
- To discover how to subtract large numbers
- To add and subtract signed whole numbers (integers)
- Review math olympiad problems

Page 33, Whole Number Sums

1. Objective for this lesson is to estimate and find the sum of large numbers

Great Lake	Rounded values(mi)	Estimated length (miles)
Superior	350	400
Huron	206	200
Erie	241	200
Ontario	193	200

2b. Estimated length in miles of the journey from Lake superior to lake Ontario is about 1000 mi.

Page 33 Whole Number Sums

3. When you add the actual lengths of the lakes, the sum of the numbers in the ones place before regrouping is 10.
4. You can represent 10 ones with the digit 0 in the ones place and the digit 1 in the tens place.
5. The sum of the numbers in the tens place before regrouping is 19
6. You can regroup 19 tens by writing the digit 9 in the tens place and the digit 1 in the hundreds place.
7. The sum of the numbers in the hundreds place is 9

page 34, Whole Number sums

8. The actual length of the journey, 990 miles is reasonably close to the estimated length 1000 miles.
9. The commutative property of addition states that when 2 or more numbers are added, if the position of the numbers is changed, the sum remains the same. What other operation has the commutative property?
10. To check an addition problem, you can change the order of the addends and see if you get the same sum.

Page 34, Whole Number Sums

11. Add:

ten thousands	Thousands	Hundreds	Tens	Ones
3	1	7	0	0
2	2	3	0	0
2	3	0	0	0
	9	9	1	0
+	7	3	4	0
9	4	2	5	0

12. To find the sum of the large numbers: start by adding the digits in the ones place. If the sum in the ones place is greater than 9, regroup it as a number of ones and tens. Continue to add the numbers in each place.

page 37 Differences between large numbers

1. Objective: Learn to subtract large numbers

2a. Use the place value grid to show 1953-1921.

2b. To subtract, the greater number is written above the lesser number.

2c.

	Thousands	Hundreds	Tens	Ones
	1	9	5	3
-	1	9	2	1
			3	2

page37, Difference between large numbers

3. When subtracting 2 whole numbers, start with the ones place.
4. How to check that 32 is the correct difference between 1953 and 1921? ADD 32 to 1921, or 32+1921=1953
5. To check any subtraction problem, the sum of the difference and the lesser number (the subtrahend) should equal the greater number (the minuend).
6. 1980-1953=?

   A) to subtract 3 from 0 in the ones place first, regroup 8 tens. B) Eight tens can be regrouped as 7 tens and 10 ones.

page 38, Difference between large numbers

6C) You can regroup the tens place because 8 tens = 8x10 = 80, and 7 tens and 10 ones = 7x10+10 = 80. D) The difference between 1980 and 1953 = 27.

7. 29,035 – 28,250 = ?

a) The difference in the ones place is 5.

b) You can't subtract the digits in the tens place or the digits in the hundreds place yet because 3 is less than 5 and 0 is less than 2.

c) To regroup in the tens place and the hundreds place, you need to regroup the thousands place.

d) Regroup 9 thousands as 8 thousands and 10 hundreds

e) Then regroup 10 hundreds as 9 hundreds and 10 tens

f) Next, add 10 tens to the 3 in the tens place to get 13

g) The difference between 29035 and 28250 is 785.

10/17 Homework (Due 10/31)

No class 10/24

Math III

- Finish upto page 48 in the reader (Addition and Subtraction of Integers)
- Slides 14 & 15 (from PowerPoint). Now You Try problems (bottom of page).
- In the back of the reader, try Div E, Mathematical Olympiad Contest 1 (November 18, 2008). 5 problems.

Math IV

- Finish upto page 48 in the reader (Addition and Subtraction of Integers)
- Slides 14 & 15 (from PowerPoint). Now You Try problems (bottom of page).
- In the Contests section of the (about 2/3 into the reader), try the Div E Mathematical Olympiad Contest 1 (November 18, 2008). 5 problems.

Page 45, Integer Sums

1. Objective: to add integers (signed whole #)
2. Zero is not a signed number (neither + nor -)
3. The integers are the positive and negative whole numbers AND zero.

4a. 

0 1 2 3 4 5 6 7 8

4b.The number +3 is 3 units to the right of zero on the number line. To add +5, start at +3 and move 5 units to the right.

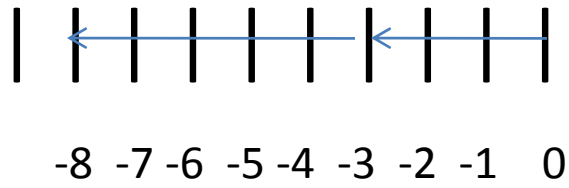
4C. The sum of the integers is 8.

Page 45-46, Integer Sums

5. The integer -3 is read negative three.

6. The minus signs in the expression -3 +(-5) represent the signs of the numbers and the plus sign between the numbers represents the sum of -3 and -5. Example: -2 + (-4) = -6

7. Add: -3 + (-5) =

8a. 

8b. To add -5 to -3, move 5 units to the left of -3.

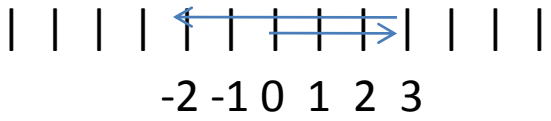
8c. The sum of the integers is -8

Page 46, Integer Sums

9. Sum of two positive numbers is always positive. The sum of two negative numbers is always negative.

10. When adding numbers with like signs, the sum has the same sign as the numbers being added. Example 2+2=4, -3+(-4)=-7

11. Add different signs: +3+ (-5) =?



11b. To add -5 to +3, you need to move 5 units to the left of +3.

11c. The sum of the integers is -2

12a. The sum of 2 numbers that are different distance from zero and have unlike signs is either positive or negative.

12b. The sign of the non-zero sum of two numbers with unlike signs is the sign of the greater number (further away from zero).

Summary: Rules for Adding Integers

Do they have the SAME sign?

YES - Same Signs

Find the SUM, keep same sign

- Examples:

(+4)+(+5) =(+9)usually written without + sign

4 + 5 = 9

- -4 + (-2) = -6

- Now You try:

3+5 =?

-2 + (-5) = ?

-3 + (-8)

NO- Different Signs

Find the DIFFERENCE, take the sign of the number further from zero. Examples:

-10 + 2 = -8, since -10 is further away from 0

7+ (-5) = 2, since 7 is further away from zero.

Now You try:

+4 + (-7) = ?

-3 + 6 =?

-9 + 3 = ?

Summary: Subtraction of Integers

First, change the SUBTRACTION problem to an *ADDITION* problem (known as Change & Switch);
Then, follow the rules (for Addition) for solving the new *ADDITION* problem.

Example: (-6) – (-2) = ?

1. The first number stays the same	(-6)
2. Chang the operation	(-6) +
3. Switch the NEXT SIGN	(-6) + (-2)
4. Follow the rules for *ADDITION*	(-6) + (-2) = (-8), since adding same signs = keep sign

- REMEMBER, Subtract means: *Add the opposite.* 2 – (-6) =
  2 + (+6) = 8
- REMEMBER, Subtract means: *Add the opposite.* -7 – (-3) =
  -7 + (+3) = -4
- REMEMBER, Subtract means: *Add the opposite.* 4 – 9 = 4 - (+9) =
  4 + (-9) = -5
- REMEMBER, Subtract means: *Add the opposite.* 2 – (5) = 2 - (+5) =
  2 + (-5) = -3

Now you try:

a. 3 – (-8) = b. 4 – 7 = c. -2 – (-5) = d. -6 – (-7) =