DKC^3 2014 WORD PROBLEMS

1. Oranges — 5 Points

Four people picked 126 oranges together. At the first tree they each picked the same number of oranges. At the second tree they picked 4 times as many as they picked at the first tree. When they finished at the third tree, the group had 3 times as many oranges as they had when they started at that tree. At the fourth tree the group picked just 6 oranges. How many oranges did each person pick at the first tree?

2. Arithmetic — 5 Points

Combine the integers 3, 4, 5, and 9 to yield the result 35, using only the arithmetic operators +, -, X, and / and one set of parentheses. You must use each number exactly once, and each of the arithmetic operators and parentheses may be used at most once.

3. Bugs — 5 Points

When John is programming he writes 130 lines of code per hour. When Bill is programming he writes 80 lines of code per hour. However, both programmers are prone to bugs in their code. John produces 8 bugs per 100 lines of code, and Bill produces 2 bugs per 100 lines of code. If they both start programming a 10:00am and work continuously without debugging their code, at what time will they have exactly 42 bugs in their codebase?

4. Festival — 5 Points

The Thief River Falls River Fest is held at the beginning of August each year. As part of this event, River Fest buttons are sold and act as tickets for raffles during the event. The buttons cost $5 when purchased in advance, and $10 when purchased at the time of the event. This past year, 1097 buttons were sold for a total value of $6800. How many buttons were sold before the event for $5, how many buttons were sold at the time of the event for $10?

5. Office Space — 5 Points

At Digi-Key there are 5 offices in a row, with 5 different colored name plates on the doors.
In each office there is a developer.
Each are on entirely different teams, have a different number of members on their team, and uses a different primary language.

The question: Who works with the Business Systems?

1. Tim's name plate is red.
2. Jay is a BuildMaster.
3. Jacob uses Java.
4. The office with the green name plate is next to, and on the left of the office with the white name plate.
5. The developer in the office with the green name plate uses SQL.
6. The developer on the team of 2 is on the Web Services team.
7. The developer with the yellow name plate is the only member on his team.
8. The developer in the center office uses C#.
9. Jason is in the first office.
10. The developer on the team of 3 has office next to the one who works on Batch.
11. The developer who works on Part Search has an office next to the developer who works alone.
12. The developer on the team of 4 uses C.
13. Kevin is on a team of 5.
14. Jason's office is next to the one with the blue name plate.
15. The developer on the team of 3 is neighbors with the developer who uses C++.

6. Dice — 5 Points

A solo dice game is played where, on each turn, a normal pair of dice is rolled. The score is calculated by taking the product, rather than the sum, of the two numbers shown on the dice.

On a particular game, the score for the second roll is five more than the score for the first; the score for the third roll is six less than that of the second; the score for the fourth roll is eleven more than that of the third; and the score for the fifth roll is eight less than that of the fourth. What was the score for each of these five throws?

7. Trains — 5 Points

Two trains travel toward each other on the same track, beginning 100 miles apart. One train travels at 40 miles per hour; the other travels at 60 miles an hour. A bird starts flight at the same location as the faster train, flying at a speed of 90 miles per hour. When it reaches the slower train, it turns around, flying the other direction at the same speed. When it reaches the faster train again, it turns around -- and so on. When the trains collide, how far will the bird have flown?

8. Squeegies — 5 Points

You've been asked to buy 100 squeegies, using 100 dollars to do so. You may buy no more or less than 100 squeegies, and the total price must be exactly 100 dollars. There is no sales tax. Red squeegies cost $6.00. Yellow squeegies cost $3.00. Blue squeegies cost $0.10. How many of each must you buy?

9. Vacation — 5 Points

Isaac and Albert wanted to take a vacation. They were debating how they could get to their hotel in the fastest manner. Isaac said, "We should go by train." But Albert said, "No, the train reaches the end of the line half way to the hotel -- we would have to walk the rest of the way. We should bike to the hotel instead." Isaac disagreed. So Albert biked the whole way to the hotel, while Isaac took the train for the first half of the journey and walked for the remainder.

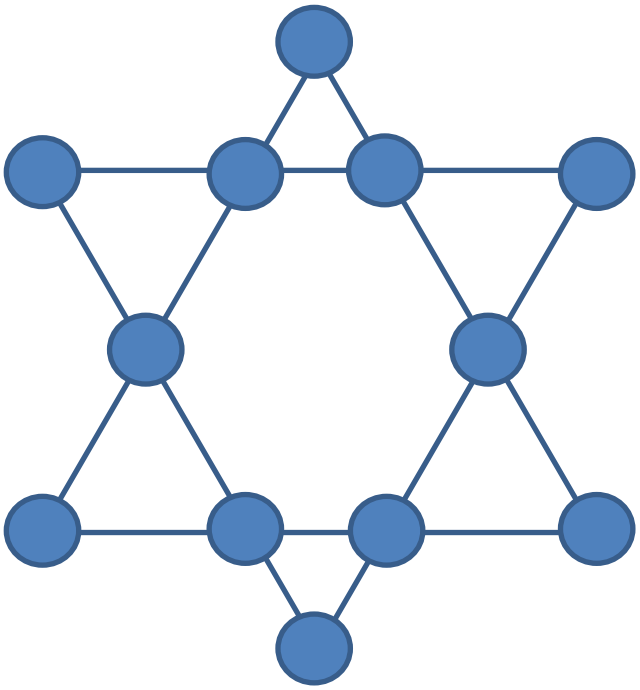
The speed of the train turned out to be four times that of the bike's speed. The bike's speed turned out to be two times faster than walking speed. Who got to the hotel first?

10. Doughnuts — 5 Points

You are given eight jelly doughnuts. The doughnuts all weigh the same amount except for one which is heavier. You have a balancing scale at your disposal. What's the minimum number of weighings required for you to pick out the heavy doughnut every time?

11. Star of David — 5 Points

Put the numbers 1 – 12 in the discs so the sum of each of the six rows comes to 26.



12. Farmer Bob **5 Points**

Bob has 42,000 bushels of corn left from last year's harvest. It was a little wet last fall, so Bob had to reduce the corn's moisture content before storing to prevent spoiling. He ran most of it through his drying bin, but propane was quite expensive (even more so than usual), so he decided to save some money and just store some of the last of it in an air bin instead. Running air through the corn prevents spoilage and costs a lot less, but does not dry it enough to sell.

Grain elevators require moisture content to be no greater than 15% or they charge steep prices to dry it for you. Bob has 30,000 bushels of dry corn (14% moisture content) and 12,000 bushels of wet corn (18% moisture content). He wants to blend the wet corn into the dry corn so he can avoid the extra charges when selling it at the elevator (if you mix 1 bushel of 10% moisture corn with 1 bushel of 20% bushel corn you get 2 bushels of 15% moisture corn). Bob has two augers that can be run at different speeds to blend his corn into his 1000 bushel truck so that they average 15% moisture content. How much wet corn will Bob have left to sell at a discount once he's done blending?

13. First and Second **5 Points**

How many ways can first and second place be awarded to 10 people?

14. Shift in Time **5 Points**

The Daleks somehow in attempt to eliminate the Doctor found a way to shift the order in how they appeared in time. Somehow they made a mistake and were only able to shift the order of only 4 of the doctors. How many different time orders could they have shifted doctors in? (12 Doctors)

15. Photographer **5 Points**

Photographer Phil leaves camp heading south at 8:00am. After walking for 4 miles he stops and turns to the east, proceeding to walk for 3 miles. Phil stops to take pictures of the wildlife, which included 6 birds, a bear, and an antlered animal unknown to Phil. After eating a quick lunch Phil continued to walk east for 1 more mile. Eager to get back to camp Phil turned and ran north 4 miles, where he was greeted by his friend Hunter Hank back at camp. What color was the bear?

16. Rectangle **5 Points**

One of the sides of a rectangle is 3cm shorter than the other side. If we increase every side 1cm, then the area of the rectangle would be increased $18cm^2$. Find the length of each side.

17. $80 **5 Points**

$80 is divided among three people so that the second will have twice as much as the first, and the third will have $5 less than the second. How much does each person have?

18. Kurt's Perfect Anniversary **5 Points**

Kurt just celebrated his 27th anniversary, which is perfect because it can be represented as n^n. How long will Kurt have to continue working to celebrate his next perfect anniversary?

19. Jeb Loves Sheep **5 Points**

Jeb likes to think about sheep. One day he notices that their cry is matched by the regular expression "b(a|baa)*". Jeb wonders how many different cries of the same length there are. If the cry "baa" has a duration of three, how many cries are there with a duration of 13?

20. The Fives Have It **5 Points**

The Celsius scale is based on the melting point (0°C) and boiling point (100°C) of water. You could think of this natural Celsius as $°C_{water}$. Based on this scale, Tungsten has a melting point of 3,422$°C_{water}$ and a boiling point of 5,555$°C_{water}$. What is the boiling point of water in $°C_{Tungsten}$ to 3 significant figures?

21. Math Puzzle **5 Points**

Assume 9 is twice 5. What is the answer to 6 times 5 in the same system of notation?

22. Logic Poem **5 Points**

The following verse spells out a word, letter by letter. "My first" refers to the word's first letter, and so on. What's the word that this verse describes?

My first is in fish but not in snail
My second in rabbit but not in tail
My third in up but not down
My fourth in tiara not in crown
My fifth in tree you plainly see
My whole a food for you and me

23. Puzzle Solving **5 Points**

If the puzzle you solved before you solved the puzzle you solved after you solved the puzzle you solved before you solved this one, was harder than the puzzle you solved after you solved the puzzle you solved before you solved this one, was the puzzle you solved before you solved this one harder than this one?

24. Word Problems **5 Points**

What word begins with 'h', ends with 'n', contains six letters, and contains eight words besides itself without transposing a single letter?

25. Day Before Yesterday **5 Points**

On the day before yesterday, Chris was 19 years old. Next year, Chris will turn 22. On what day of the year was Chris born?