Please show your work for all problems. If you work is not present, no partial credit will be given in the case of incorrect answers.

1. (4 points) Identify each of the following as inductive or deductive reasoning.
    a. All freshmen must live on campus, Joe is a freshman, therefore Joe must live on campus.
        Deductive, (General rule, all freshmen must live on campus, to specific conclusion)
    b. Historical data shows that a person with a college education will earn an average of $0.9 million more than someone with just a high school education, therefore you should complete your degree.
        Inductive (many observations, you make more if you get a degree, to general rule)
    c. All books by Stephen King have made the best-seller list, *Carrie* is a novel by Stephen King, therefore *Carrie* is a best seller.
        Deductive, (General rule about all novels written applied to a novel that has been written)
    d. All books by Stephen King have made the best-seller list, Stephen King is writing a new novel, this novel will be a best-seller.
        Inductive (Observation of all novels written, predicting future behavior)

2. (2 points) Provide a counter-example for each:
    a. If a number is multiplied by itself, the result is even.
        1x1 = 1, which is odd
    b. The sum of two single digit numbers is a two digit number (ex 5+8 = 13).
        1+1 = 2 which is a single digit number

3. (6 points) Find the next item in the following sequences and state the conjecture you used to determine this number.
    a. 1, 2, 1, 4, 1, 8, 1, 16, 1, 32
        For odd numbers use 1, for even, double the previous even number starting at 2
    b. 64, -16, 4, -1, 1/4
        Multiply the previous number by -1/4
    c. line, triangle, square,
        Any answer is acceptable for this question. I messed up.

4. (4 points) Use deductive reasoning to show that the procedure produces the original number.
    Select a number, multiply it by 4, add 8 to the product, divide this sum by 2 and subtract 4 from the result, divide the result by 2.
    Let n be the number,   (multiply by 4) 4n,   (add 8) 4n+8
    (divide by 2) (4n+8)/2 = 2n+4
    (subtract 4)   2n+4-4 = 2n
    (divide by 2) 2n/2 = n

5. (4 points) In 2004, Microsoft settled a class action lawsuit in California for $1.1billion in benefits to consumers. If there were 21,982,341 consumers claiming damages, estimate the amount each consumer was paid. (Please show your work and explain what you did)

Round $1.1 billion to 1 billion, Round 21 million to 20 million
$1,000,000,000/20,000,000 = 100/2 = $50

6. (4 points) You lease a car for $605 per month for 4 years, estimate the total cost of the lease.

Round $605 to $600

$$\frac{\$600}{1 \text{ month}} \times \frac{12 \text{ months}}{1 \text{ year}} \times 4 \text{ years} = 600 \times 12 \times 4 = \$28,800 \quad (but \$30,000 \text{ was fine})$$

7. (4 points) Estimate the salary of a worker who works 78 hours at $6.87 per hour.

Round 78 to 80 and $6.87 to $7

$7 x 80 = $560

8. (4 points) A parking garage charges $2.50 for the first hour and $.50 for each additional hour. A customer with a $5, $10 and two $20 bills gives the attendant one of the $20 bills for parking from 10 am to 3 pm. The attendant spent $3.50 on lunch, while the customer spent $50.25 for a pair of shoes. What was the charge for parking?

Find out hours in garage
10 - 11 (1 hour) 2.50
*11 - 12 (1 hour)   .50*
12 - 1 (1 hour)   .50   *Total: $2.50 + $2.00 = $4.50*
1 - 2 (1 hour) .50
2 - 3 (1 hour)   .50

9. (4 points) At the beginning of the year, an odometer on a car reads 25,124. At the end of the year it reads 37,364. If the car averages 24 miles per gallon, and gas averages $2.35 per gallon, how much was spent on gas during the year?

Total miles: 37,364　　　　　　　　　　　　*1 gallon* 　　*$2.35*

　　　　　-25,124 　　*12,240 miles* x ------------ x ----------- = *12,240x2.35/24 = $1,198.50*

　　　　　---------- 　　　　　　　　　*24 miles* 　　*1 gallon*

　　　　　12,240

10. (4 points) Charlene decided to ride her bike from home to visit her friend Dan. Three miles away from home, her bike got a flat tire, and she had to walk the remaining two miles to Dan's house. They repaired her tire and she rode back home. How many miles did she walk and how many miles did she rid+e?

　　　　3 　　　*2*

C-------->flat ----> D

C<------------------D 　　*She rode 5+3 = 8 miles*

　　　　　5 　　　　　　*She walked 2 miles.*
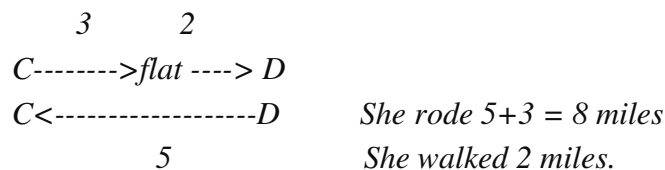
11. (4 points) A farmer has 17 sheep. All but 12 died. How many are left alive?

　　12.

　　You might consider this a trick question, but it is from the box on page 29.

12. (4 points) Describe the process of dimensional analysis. Demonstrate this process by converting 450,000 seconds into days.

　　Any reasonable answer accepted for the first part.

　　　　　　　　1 min 　　　*1 hour* 　　*1 day* 　　　*450,000*

　450,000 seconds x --------------- x ----------- x ------------ = ------------- = *5.2 days*

　　　　　　60 seconds 　　*60 min* 　　*24 hours* 　　*60x60x24*

13. (8 points) 1 mile = 1.6 km.

   a. Convert 776 km to mi.

776km x $\dfrac{1\ mile}{1.6\ km}$ = $\dfrac{776}{1.6}$ = *485 miles*

   b. Convert 23 mi to km.

23 mi x $\dfrac{1.6\ km}{1\ mi}$ = *23 x 1.6 =   36.8 km*

   c. Convert 65 mi/hour to km/hour.

$\dfrac{65\ mi}{hour}$ *x* $\dfrac{1.6\ km}{1\ mi}$ = $\dfrac{65x1.6\ km}{hour}$ = *104 kmph*

   d. How long, in miles, is a 5 km race?

5 km x $\dfrac{1\ mi}{1.6\ km}$ = *3.12 mi*

14. (4 points) 1 rod is about 5.5 yards.   1 mile is about 8 furlongs. 1 mile is 5280 feet. How many rods in a furlong?

1 furlong x $\dfrac{1\ mile}{8\ furlong}$ *x* $\dfrac{5280\ ft}{1\ mile}$ *x* $\dfrac{1\ yd}{3\ ft}$ *x* $\dfrac{rod}{5.5\ yd}$ = $\dfrac{5280}{8x3x5.5}$ = *40 rod*

15. (4 points) If you jog 6 times around a 700 meter track, how many miles have you jogged?

Total Distance 6 x 700 = 4200 meters
1000 m = 1km

4200 m x $\dfrac{1\ km}{1000\ m}$ *x* $\dfrac{1\ mile}{1.6\ km}$ = $\dfrac{4200}{1000x1.6}$ *miles = 2.6 miles.*

16. (4 points) 1 cubit = 1.5 foot. 1 foot = 30.5 cm. 1 kiloliter (kL) = 1 m³. In the Bible, Noah built an ark that was 300 cubits long by 50 cubits wide by 30 cubits tall. Find the volume of the ark in kL.

V=lxwxh   V = 300x50x30 = 450,000 cubits³

$$45000\text{cubits}^3 \times \frac{1.5\,ft}{\text{cubit}} \times \frac{1.5\,ft}{\text{cubit}} \times \frac{1.5\,ft}{\text{cubit}} \times \frac{30\,cm}{ft} \times \frac{30\,cm}{ft} \times \frac{30\,cm}{ft} \times \frac{1\,m}{100\,cm} \times \frac{1\,m}{100\,cm} \times \frac{1\,m}{100\,cm} \times \frac{kl}{m^3} = 41,006kL$$

Ok, so this one was hard, you needed to keep everything straight to make it through this.

17. (4 points) A square inch of property on the moon sells for $100. Find the price per acre. (1 acre is about 4820 square yards)

$$\frac{\$100}{in^2} \times \frac{12\,in}{1\,ft} \times \frac{12\,in}{1\,ft} \times \frac{3\,ft}{1\,yd} \times \frac{3\,ft}{1\,yd} \times \frac{4280\,yd^2}{acre} = \frac{\$624,672,000}{acre}$$

18. (4 points) Convert 140 mL to kL.

kilo
hecto   1 kL = 1,000,000 mL
deka
-                    1 kL
deci   140 mL x ----------------- = .000014 KL
centi   1000000 mL
mili

19. (4 points) Convert 3.7 dg to dag.

100 dg = 1 dag

              1 dag
3.7 dg x -------- = .037 dag
          100 dg