Answer Key for 7th/8th grade Math Meet '09

Event 1: Part 1

1) 2000 - ? = 110 x 8 + 40   2000 - ? = 880 + 40   2000 - ? = 920   2000 - 1000 = 1000 - 80
                                                        so ? = 1080
2) .27 (45) = ?(81)   divide by 9 .03 (45) = ?(9)   divide by 9 again .03 (5) = ?   So, 15 or 15%
3) 6/30 + 5/30 + 6/30 + 10/30 + x = 1   27/30 + x/30 = 1   3/30 or 1/10
4) 0.54/x = 9   54/9 = 6 so x = 0.06
5) 21/56 = x/72   21/56 is 3/8   3/8 = x/72   So multiply by 9/9   x = 27

Event 1: Part 2

1) 1 x (3-5) + 1 x (3 + 5) =   1 x -2 + 1 x 8   =   -2 + 8 = 6
2) 3 x (0 - 1) + 3 x (0 + 1) = -3 + 3 = 0
3) 2 x (2 - 2) + 2 x (2 + 2) = 2x0 + 2x4 = 8
4) A x(B - C) + A x (B + C)   Can try with sample numbers or
   A x B - A x C + A x B + A x C
   A x B + A x B yes
5) A x (B - C) + A x (B + C) is A x B + A x B from #4   can also try with samples
and B x (A - C) + B x (A + C)
      BxA - BxC + BxA + BxC is B x A + B x A and by commutative property yes

Event 2 Part 1:

1) 1 sq mile x 2.59 sq km/1 sq mile   = 2.59 sq km so 1sq mile is bigger
2) 14 ft x .3048m/1ft = 4.2672 meters so 14 feet is bigger
3) 6 miles x 1.609 km/1mile = 9.654 km so 6 miles is bigger
4) 63 cm x 1in/2.54cm = 24.80 in so 25 inches is bigger
5) 38.75 sq ft x .0929 sq m/1 sq ft = 3.60 sq m so 38.75 sq ft is bigger

Event 2 Part 2:

6) 63 cm x 1in/2.54 cm x 1 ft/12 in = 2.07 ft so 63 cm is bigger
7) 6.5 miles x 1.609 km / 1 mile x 1000m / 1 km = 10,458.5m so 6.5 miles is bigger
8) 15840 ft x 1yd/3 feet x 1 mile/1760 yd x 1.609 km / 1 mile = 4.827 km so 15840 ft is bigger
9) 14 sq yd x 9 sq ft/1 sq yard x 0.0929 sq m/ 1 sq ft = 11.71 sq m so 14 sq yard is bigger
10) 2 sq ft x .0929 sq m/1 sq ft x 10,000 sq cm / 1 sq m = 1858 sq cm so 1860 sq cm is bigger

Event 3 Part 1:

You start with 4 friends. Can use equation y = x + 4 so you are subtracting 4 friends to find out the number of handshakes or adding 4 to the number of handshakes to find the number of friends.
1) 10 + 4 = 14
2) 20 + 4 = 24
3) 10 - 4 = 6
4) 50 - 4 = 46

Event 3 Part 2:

The handshake problem can be solved in other ways but number of people x number of people - 1 take this result and divide by 2 $\frac{n (n - 1)}{2}$

5) 8 (7) / 2 = 28
6) 10 (9) /2 = 45
7) 20 (19) / 2 = 190
8) 100 (99) / 2 = 4950

Event 4 : mental math
1)8 + 25 = 33
2) 16 + 14 + 15 - 18   30 - 3 = 27
3) 4(5) + 2(5) + 3(10) = 20 + 10 + 30 = 60
4) 7/3 + 10/6 = 14/6 + 10/6 = 24/6 = 4
5) 45 + 55 + 16 + 4 = 100 + 20 = 120   120/ 8 = 15
6) 1/12 + 4/12 + 2/12 = 7/12   4/12 = 1/3
7) 3 because there are three 3's
8) 6 + 9 + 5 + (3 + 4) is 15 + 5 + 7 = 20 + 7 = 27
or 1 + 5 + 2(2 + 4) + 3(3) = 6 + 12 + 9 = 27
9) 4 + 16 + 1 + 9 = 30   30/25 = 6/5
10) 16 + 4 + 27 + 8 + 9 = 20 + 35 + 9 = 55 + 9 = 64   64 / 16 = 4

Event 5 Problem 1
1) 14 hours x 1/3 = 14/3 = 4 hours and 2/3 of an hour or 20 + 20 minutes = 4 hours 40 min
2) She slept ½ of #1 answer or 2 hours 20 minutes
3) 2 days = 48 hours   48 x 2/3 = 96/3 = 32 hours
4) 1/6 (32) = 32/6 = 5 1/3 = 5 hours 20 min
   1/5 (32) = 32/5 = 6 2/5 = 6 hours 24/60 = 6 hours 24 minutes
   32 - (5hr + 6 hr + 20 min + 24 min) = 31 hr + 60 min - 11 hr - 44 min = 20 hr 16 min
5) 4 days = 96 hours
   1/3 (96) = 32 hours
   1/4 (96) = 24 hours
   1/5 (96) = 19 1/5 hours or 19 hours 12 min
   1/6 (96) = 16 hours
total is 91 hours 12 min
time left is 95 hours - 91 hours + 60 min - 12 min = 4 hours 48 min
Event 5 Problem 2
1)   4 out of 5 is 80%
2) (.8)(.8) = .64 = 64%
3) (.8)(.8)(.8) = .512 = 51.2%   Use expanded form or raise it to a power
4) (.8) ^ 5 = .32768 = 32.77%
5) (.8) ^ 10 = .10737 = 10.74%
using 1-5 to solve the rest subtracting them from 100%
6) 100% - 64 % = 36%
7) 100% - 51.2% = 48.8%
8) 100% - 32.77% = 67.23%
9) 100% - 10.74% = 89.26%
10) 9 losers like problems 1-5 and 1 winner on the tenth pick
    (.8) ^ 9 (.2) = 2.68%

Event 5 Problem 3

1) 750 miles x 1 gal/27 mil = 27.78 gallons

2) 27.78 gallons x $1.83/1 gallon = $50.84

3) $50 x 1 gallon/ $1.83 x 27 miles/1 gallon = 737.70 miles

4) $\underline{\$1.58 + ?}$ = the average (mean) $1.83
       2

   Multiply both sides of the equation by 2 and subtract 1.58
     1.58 + ? = 3.66
         ? = 3.66 - 1.58 = $2.08/gallon

 Since both stops fill the tank, ignore the 15 gallons. The mean is the sum divided by the amount of items (2). Since we are given the mean, 1.83, we need to work backwards to find the item.

5) Could try both prices: $75 x 1gal/1.83 x 27 miles/1 gallon = 1106.56 miles
                               $75 x 1gal/1.68 x 27 miles/1 gallon = 1205.36 miles

   This is a difference of 98.80 miles

Event 5 Problem 4

1) G = 7 $1/7^7$ = 1/(7 x 7 x 7 x 7 x 7 x 7 x 7) = 1 / 823543

2) $1 \wedge 3 = 1$ 1/1 = 1

3) $4 \wedge E$ Z = 26 so E = 5 $1/4^5$ = 1/1024

4) $0 \wedge T = 0$ flipping it would put 0 in the denominator, so there is no solution 1/0 is undefined

5) $2 \wedge EE$ Z = 26 so counting forward EE is 31 $1/2^{31}$ = 1/2147483648

6) $-4 \wedge D = 1/-4^4$ 1/ (-4 x -4 x -4 x -4) = 1/256

7) $1/3 \wedge B$ B = 2   so $1/3^2$ = 1/9   1/(1/9) = 9