Event 1 part 1
1)   35 / 50 = 7 / 10   14 / 20 is equivalent to 7 / 10 so ? = 14

2) 56 / 4 = 14 so ? = 14   undoing order of operations

3) 292 / 2 = 146   170 - 146 = 24   so ? = 24   undoing

4) 59 - 17 = 42 and 42 / 2 = 21 so ? = 21

5) 28 / 4 = 7 move the decimal over 2 places   .28/4 = .07

Event 1 part 2

1) (2 x 9)(9 - 3) = 18 x 6 = 108

2) (2 x 4) (4 - 5) = 8 x -1 = -8

3) (2 x 10)(10 - 5) = 20 x 5 = 100

4) (2 x C) (C - 4) = 42   without calculator and fastest may be trial and error: try 10 :   20x6 too big, try 5 10 x 1 = 42 must be 6 - 9 try 7: 14 x 3 = 42   C = 7

5) (2 x 6) (6 - C) = 36   12 (6 - C) = 36   36 / 12 = 3   6 - C = 3   so C = 3
Event 2 part 1
1) $\frac{60 \text{ sec} \times 60 \text{ min}}{1 \text{ min}}$ = 3600   2) $\frac{60\text{min} \times 24 \text{ hr}}{1 \text{ hr} \quad 1 \text{ day}}$ = 1440   3) $\frac{24 \text{ hr} \times 7 \text{ day}}{1 \text{ day} \quad 1 \text{ wk}}$ = 168

4) $\frac{3 \text{ hr} \times 60 \text{ min}}{1 \text{ hr}}$ = 180   5) $1.5 \text{ weeks} \times \frac{7 \text{ days}}{1 \text{ wk}} \times \frac{24 \text{ hours}}{1 \text{ day}}$ = 252 hours

Event 2 part 2
1) 3600 + 20 x 60 = 4800   2) 4 x 24 = 96 hours and 300/60 = 5 hours so 96 + 5 = 101

3) 14 days + 2 days = 16 days   16 x 24 = 384 hours and 180/60 = 3 hours so total is 387

4) 56 hours = 48 hours + 8 hours and 180/60 = 3 hours and 3600/3600 = 1 hour
    48 hours = 2 days and 8 + 3 + 1 = 12 hours or ½ day so total of 2 ½ days

5) 21 + 2 days = 3 weeks and 2 days and 72 hours + 8 hours = 80 hours   120/60 = 2 hours
            3 weeks and 2 days and 3 days + 8 hours - 2 hours
            3 weeks and 5 days and 6 hours   6 hours is 1/4 of a day
                5 1/4 days is 3/4 of a week so total is 3 3/4 weeks

Event 3 part 1   If the number is divisible by 4 (1st column) or 6 (2nd column) then it will be the
last square of the pattern. Otherwise count how many remainders and it
will be that pattern number.

1) | <*> | | ! |

2) | ///\\\ | | A |

3) | <*> | | A |
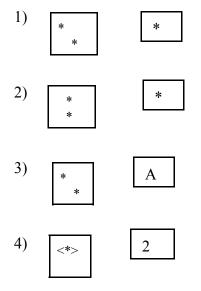
4) | ///\\\ | | ! |

part 2 Can do it a variety of ways. This is the same as the sum of integers problem. The row # is
k and the answer is the term number or the square position. $\dfrac{k(k+1)}{2}$

For example: k = 5   5 (6) = 30 / 2 = 15 so what
would the 15th square look like, and go from there
as you did in part 1.

1) | *
   * | | * |

2) | *
  * | | * |

3) | *
  * | | A |

4) | <*> | | 2 |

Event 4 mental math

Example: 6 + 21 = 27

1) 8 x 16   could think of as 10 x 16 = 160 - (2 x 16) = 160 - 32 = 128

2) 70 + 30 + 40 + 60 = 100 + 100 = 200 / 5 = 40

3) 8 + 12 + 10 + 14 + 16 + 18 = 20 + 10 + 30 + 18 = 30 + 30 + 18 = 78

4) 10 - 9 + 8 - 7 + 6 - 5 is 1 + 1 + 1 = 3

5) 9 + 16 - 25 = 25 - 25 = 0

6) (2) (4 + 15 + 1) = 2 (20) = 40

7) (10 + 12 + 8 + 3 +7 + 5 + 2) - (3 + 7 + 9 + 1 + 5) = (10 + 20 + 10 + 7) - (10 + 10 + 5)

$$27 - 5 = 22$$

8) 2 + 6 + 12 = 20/ 5 = 4

9) 59 + 11 + 43 + 77 + 21 + 16 = 70 + 120 + 37 = 190 + 37 = 227

10) (9-4) + (36 - 25) = 5 + 11 = 16

Event 5 problem 1

1) 10% (40% x 328) = .1(131.20) = $13.12

2) ½ (200) = 100 and .40(100) = $40 so a total of $140.00

3) 240(.30) = $72.00 and 240(.60) = $144.00 and 240 (.10) = $24.00

4) (64) (.7) = $44.80

5) 600 (1.70) = $1020.00 because you pay 100% and 70% more which is 170%

Event 5 problem 2

part 1

1)

6 / (6 + 8 + 3 + 3) = 6/20 = 3/10

3/(6 + 8 + 3 + 3) = 3/20

(6 + 8) / 20 = 14/20 = 7 / 10

3/6 = ½

6 /20 = 3 / 10

2)

6/20 = 3/10

4/20 = 1/5

8 / 20 = 2/5

6/16 = 3/8

3)

(6/14) (2/6) = 12/84 = 1/7

(6/14)(4/6) = 24/84 = 2/7

(8/14) (4/6) = 32/84 = 8/21

4)

$(\frac{1}{2})(\frac{1}{2}) = 1/4$ ½ of the numbers are even

$(1/6)(1/6)(1/6) = 1/216$ in that order must have only one choice per roll. 2 is the only option for roll #1, and so on.

$(3/6)\ (2/6)\ (1/6) = 6/216 = 1/36$ 1st roll could be 3,4,5 so 3 choices out of 6 numbers, 2nd roll could be 2 of those numbers out of 6 numbers, 3rd roll could be 1 of those numbers out of 6

$(1/3)(1/3)(1/3) = 1/27$ only 1 choice per roll and only 3 odd numbers to choose from.

$(3/3)(2/3)(1/3) = 6/27 = 2/9$ 1st roll 3 choices out of 3 odd numbers available, 2nd roll could be 2 of those numbers out of 3 odd numbers available, 3rd roll 1 number was left out of the 3 odd numbers available.

Event 5 problem 3
1) 3 shirts + 3 shirts = 6 shirts total
2) 3 + 5 = 8
3) 9 + 3 + 3 = 15
4) 3 + 5 + 5 = 13
5) $60, want to use the $25 sale as many times as possible, so $25 + $25 = 50, have $10 left
9 + 9 + 3 = 21
6) $80 can use the $25 3 times = 27 shirts or $25 2 times = 18 shirts and the $30 could be used $15 and $15 so 18 shirts + 5 + 5 = 28 shirts best deal
7) $105 best to use the $25 3 times so 27 shirts and $30 left use the $15 twice (10 shirts) = total of 37 shirts
Event 5 problem 4
1) 2n + 3 or n + n + 3 so 9 + 9 + 3 = 21
2) 2x16 + 3 = 35
3) ? x 2 + 3 = 61   61 -3 = 58   58 / 2 = 29   ? = 29
4) 2 x ? + 3 = 119   2 x ? = 116   ? = 58
part 2
1) flip the ones and tens positions don't forget the tens position could be zero
71
2) 32
3) 10
4) 87
part 3
1) perfect squares 36
2) 81
3) take the square root of 144 = 12
4) square root of 256 = 16