

TOOWOOMBA EDUCATION CENTRE
MATHEMATICS TEAM CHALLENGE 1998

TEAM EVENT: Junior Secondary
(Calculators are allowed)

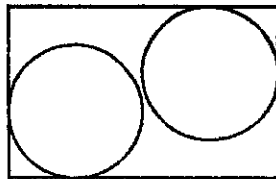
Time: 45 mins
 Total: 150 points

T1. (10 points)

A list consisting of seven positive but not necessarily distinct integers has an arithmetic mean of 8 and a median of 11. What is the largest value that the range can assume for this list? What is the smallest possible value of the range?

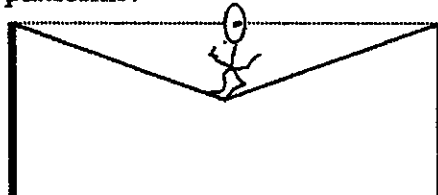
T2. (20 points)

Two congruent circles are to be cut from a 9 cm × 12 cm sheet of paper. What is the maximum possible radius (to two decimal places) of these circles?



T3. (20 points)

A slackwire artist who is 155 cm tall with a 5 cm forehead (i.e., her forehead is 5 cm above eye level), is walking between two platforms. Halfway across, she notices that the platform she is approaching is at eye level. If the rope has stretched 60 cm, how far apart are the platforms?



T4. (15 points)

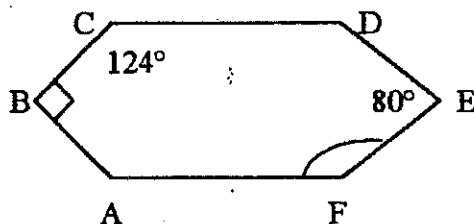
Find k given that:

$$17 + 19 + 21 + 23 + \dots + k = 1700 + k$$

T5. (10 points)

Determine the measure of $\angle AFE$. (i.e. Find the measure of angle AFE.)

Given $CD = AF$, $\angle CBA$ is a right angle and $\angle CDE = \angle BAF$.

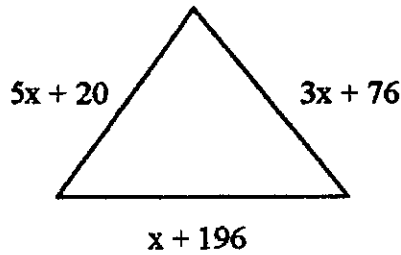


T6. (20 points)

Find a and b if $2^a \times 9^b$ equals the four-digit number $2a9b$.

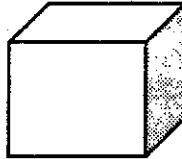
T7. (15 points)

What is the greatest possible perimeter of this triangle given that the triangle is isosceles?



T8. (20 points)

How many distinct triangles can be constructed by connecting three different vertices of a cube? (Note: Triangles can be made from the 8 vertices both internally and externally)



T9. (10 points)

The Bell System was first planned in the 1940s for ten-digit telephone numbers, with the first three digits forming the area code. In the plan, the first digit could be a number from 2 through 9, the second digit could be either 0 or 1, and the third digit could be any number other than 0. How many different area codes are possible under this plan?

T10. (10 points)

In a group of a dozen horses, some are 9 years old and the remainder are 11 years old. The total of their ages is 122 years. How many horses are 9 years old?

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**JUNIOR SECONDARY
TEAMS CONTEST**

ANSWERS

Question	Mark	Answer
T1	10	7 and 19 (5 points each)
T2	20	$R = 3.15 \text{ cm}$
T3	20	720 cm or 7.2 m
T4	15	$K = 85$
T5	10	$\angle AFE = 134^\circ$
T6	20	$a = 5; b = 2$ (10 points each)
T7	15	832 units
T8	20	56
T9	10	144
T10	10	5

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STUDENT ANSWER SHEET

Question	Mark	Answer
T1	10	Smallest Value = Largest Value =
T2	20	
T3	20	
T4	15	
T5	10	
T6	20	a = b =
T7	15	
T8	20	
T9	10	
T10	10	

School: _____