

TOOWOOMBA EDUCATION CENTRE
MATHEMATICS TEAM CHALLENGE 2002

TEAM EVENT: Junior Secondary
(Calculators are allowed)

Time: 45 mins
Total: 150 points

Please write answers on the answer sheet.

T1. (10 points)

A 100 kg watermelon is 95% water. It is dehydrated until it is 90% water. What is its weight after dehydration?

T2. (20 points)

The integers greater than one are arranged in five columns as follows:

columns	1 st	2 nd	3 rd	4 th	5 th
		2	3	4	5
	9	8	7	6	
		10	11	12	13
	17	16	15	14	

(Four consecutive integers appear in each row: in the first, third and other odd numbered rows, the integers appear in the last four columns and increase from left to right; in the second, fourth and other even numbered rows, the integers appear in the first four columns and increase from right to left.)

In which column will the number 1,000 fall?

T3. (20 points)

A set of consecutive positive integers beginning with 1 is written on a whiteboard. One number is erased. The average (arithmetic mean) of the remaining numbers is $35\frac{7}{17}$. What number was erased?

T4. (15 points)

A six digit number is *squarish* if it satisfies the following conditions:

- (i) none of its digits is zero;
- (ii) it is a perfect square; and
- (iii) the first two digits, the middle two digits and the last two digits of the number are all perfect squares when considered as two digit numbers.

Find a *squarish* number.

T5. (10 points)

What is the rate of the current of a river if a person can row downstream at 10 km/h and upstream at 6 km/h?

T6. (20 points)

Goldbach's conjecture states that any even integer greater than 7 can be written as the sum of two different prime numbers. For such representations of the even number 126, what is the largest possible difference between the two primes?

T7. (10 points)

Three fair dice are tossed (all faces have the same probability of coming up). What is the probability that the three numbers turned up are consecutive integers.

T8. (15 points)

A twenty-five-question mathematics test is scored by allowing 5 points for each correct answer and -4 points for each wrong answer. A student loses 3 points if the answer is left blank. If a student scored a total of 64 points, how many answers were wrong?

T9. (10 points)

Find the value of $x + y$ if $x^y = 49$ and $y^x = 128$.

T10. (20 points)

The opposite sides of a regular hexagon are 12 cm apart. Find the length of a side.

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MATHEMATICS TEAM CHALLENGE**

**JUNIOR SECONDARY
TEAMS CONTEST**

STUDENT ANSWER SHEET

Question	Mark	Answer
T1	10	
T2	20	
T3	20	
T4	15	
T5	10	
T6	20	
T7	10	
T8	15	
T9	10	
T10	20	

School: _____

Team 1: Team 2:

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TEAMS CONTEST**

STUDENT ANSWER SHEET

Question	Mark	Answer
T1	10	50kg
T2	20	2 nd column
T3	20	7
T4	15	646416 or 166464
T5	10	2 km/h
T6	20	100
T7	10	24/216 or 1/9 or 0.111111111...
T8	15	5 wrong
T9	10	$x + y = 9$
T10	20	$4\sqrt{3}$ cms or 6.93 cms

School: _____

Team 1: Team 2: