Name: _____

Teacher: _____

Sydney Technical High School

2010 Year 10 Mathematics August Common Test

General Instructions

- Working Time : 2 hours
- There will be a short break between Section 1 and Section 2
- Write using black or blue pen
- You may use pencil to draw or complete diagrams
- Attempt all questions
- Calculators may be used in Section 2 only

Section I (Non Calculator Section)

25 marks

Time allowed for this section is 30 minutes

Answer Questions 1 — 25 in the spaces provided

Calculators are **NOT** to be used in this section

There will be a short break between Section 1 and Section 2

Section 1 Non Calculator Section

25 marks

Answer Questions 1 to 25 in the spaces provided.

1. Round $3726 \cdot 4957$ to 3 significant figures .....

2. Write the *fraction* that is halfway between $\frac{1}{2}$ and $\frac{1}{3}$.

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3. Evaluate $1+\dfrac{1}{1+\frac{1}{3}}$

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4. $0.00825 = 8.25 \times 10^{x}$.

What is the value of x?

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5. Evaluate $0 \cdot 9 \div \frac{1}{2}$

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6. A pedestrian, walking at a speed of 5 km/h travels x km in 10 minutes. Find x.

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7. What is the equation of a circle with radius 4 units and centre at the origin ?

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8. A rectangular carpet has dimensions 3.5m by 2m and an area of $7m^2$.
Express this area in cm^2.

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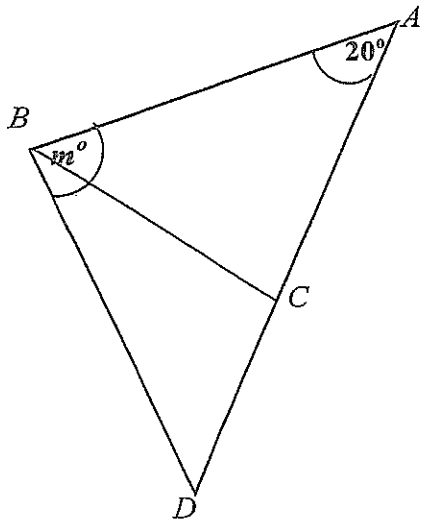
9. Triangle ABC is isosceles with $AB = AC$ and $\angle BAC = 20°$. Triangle BCD is also isosceles with $BC = CD$.



NOT TO SCALE

What is the value of m in this diagram?

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10. Solve $4x^2 - 2x = 0$

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11. Rationalise the denominator of $\frac{5}{\sqrt{3}}$

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12. A(0,0) , B(3,5) , C(8,6) and D are the four vertices of a parallelogram. D is opposite B.

Find the coordinates of D.

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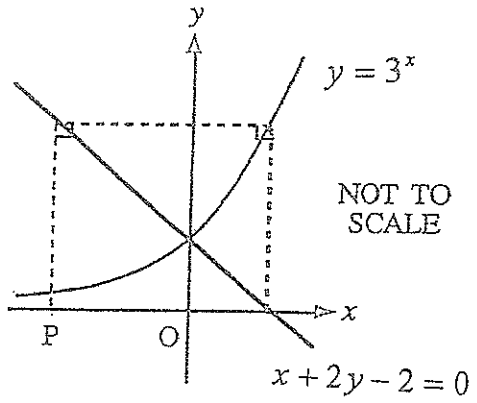
13. What are the co-ordinates of P ?



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14. The average quantity of water in Jenny's two water bottles is 20 *mL*.
The average quantity of water in Ian's three water bottles is 25 *mL*.

What is the average quantity of water in the 5 water bottles?

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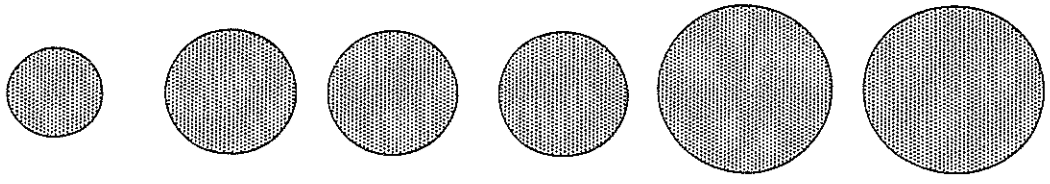
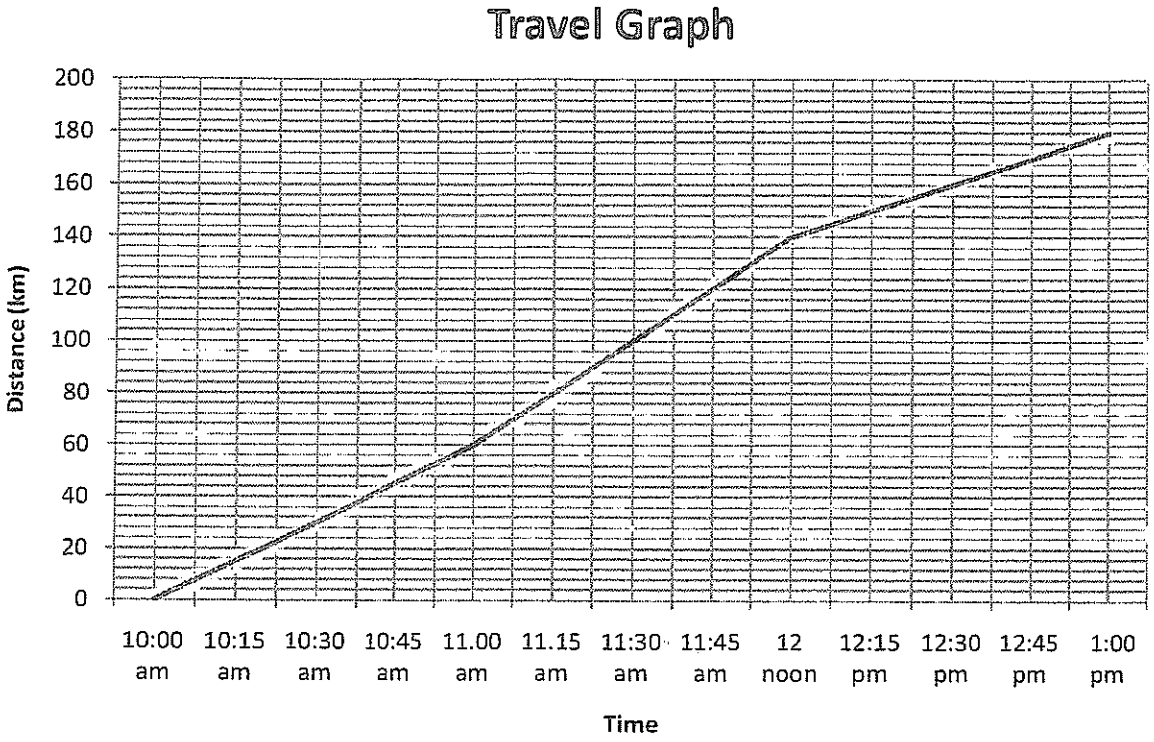
15. Data regarding the length of the radius of the following 6 circular discs was collected by students.



Another disc with a radius equal to the smallest of the 6 discs is added to the set.
Which of the following measures will change with the addition of the new disc?

Range, Mode, Median or Mean .....

16. A car leaves Town P at 10:00 am and travels to Town Q that is 180 *km* away, arriving at 1:00 pm. The graph below shows the car's journey.



A truck leaves Town Q at 10:30 am travelling towards Town P.
For the first 1 *hour* and 30 *minutes* the truck averaged 80 *km/hr* and did not make any stops.

Use the above graph, to determine what time the truck passes the car.

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17. Solve $\dfrac{1}{x-5} = 0.01$

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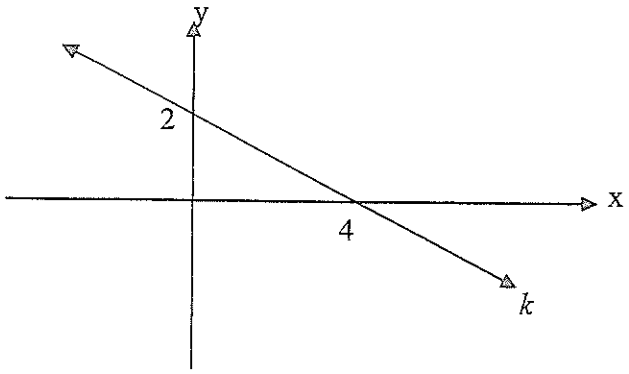
18. Write the equation of the line k shown in the diagram below.



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19. The following stem-and-leaf plot represents the results of a class project.

What is the difference between the median for the boys and girls ?

Boys		Girls
0 0	5	0
9 8 6 4	4	2 4
8 7 5	3	3 4 7
6	2	6 7
8	1	2 4
	0	7

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20. Evaluate $\dfrac{1001^2 - 999^2}{101^2 - 99^2}$

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21. In a store freezer, there are a number of cartons of milk.

The ratio of the cartons containing chocolate, vanilla and strawberry milk is:

3: 2: 1

If half of the cartons of chocolate milk are sold, what fraction of the cartons remaining in the freezer are chocolate?

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22. If $x+\frac{1}{x}=5$, what is the value of $x^2+\frac{1}{x^2}$?

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23. Find the co-ordinates of the vertex of the parabola $y = x^2-6x+10$.

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24. $x=\frac{3\pm\sqrt{41}}{8}$ is the solution to an equation. What is the equation?

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25. What is the 150th number in the sequence: 11, 15, 19, 23, ...?

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Section 1 Non Calculator Section

ANSWERS

25 marks

Answer Questions 1 to 25 in the spaces provided.

1 Round 3726·4957 to 3 significant figures ..... 3730 .....

2 Write the *fraction* that is halfway between $\frac{1}{2}$ and $\frac{1}{3}$.

..... 5/12 .....

.....

3. Evaluate $1+\dfrac{1}{1+\frac{1}{3}}$

..... $1\frac{3}{4}$ .....

.....

4. $0.00825 = 8.25 \times 10^{x}$.

What is the value of x?

..... -3 .....

.....

5. Evaluate $0\cdot9 \div \frac{1}{2}$

..... 1·8 or $1\frac{4}{5}$ .....

.....

6. A pedestrian, walking at a speed of 5 km/h travels x km in 10 minutes. Find x.

..... 5/6 km (accept 0·83) .....

.....

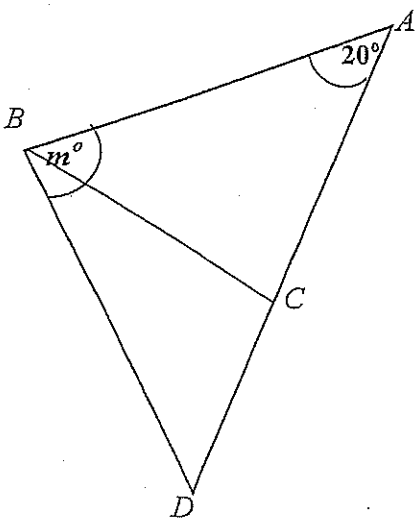
7. What is the equation of a circle with radius 4 units and centre at the origin ?

$x^2 + y^2 = 16$

8 A rectangular carpet has dimensions 3.5m by 2m and an area of $7m^2$.
Express this area in cm^2.

$70000\ cm^2$

9. Triangle ABC is isosceles with $AB = AC$ and $\angle BAC = 20°$. Triangle BCD is also isosceles with $BC = CD$.



NOT TO SCALE

What is the value of m in this diagram?

$120°$

10 Solve $4x^2 - 2x = 0$

$2x(2x - 1) = 0$

$x = 0$ or $\frac{1}{2}$ (must have both)

11. Rationalise the denominator of $\frac{5}{\sqrt{3}}$

$\frac{5\sqrt{3}}{3}$

.....

.....

12. $\overline{AB}$

A(0,0) , B(3,5) , C(8,6) and D are the four vertices of a parallelogram. D is opposite B.

Find the coordinates of D.

D(5,1)

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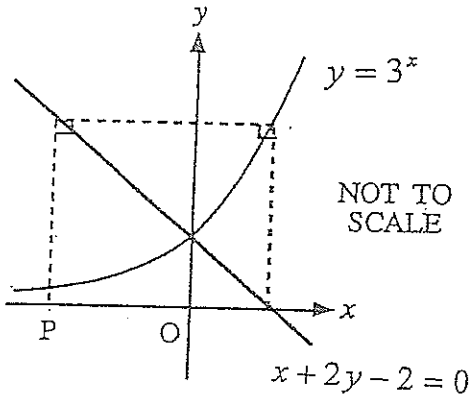
13. What are the co-ordinates of P ?



(-16,0)

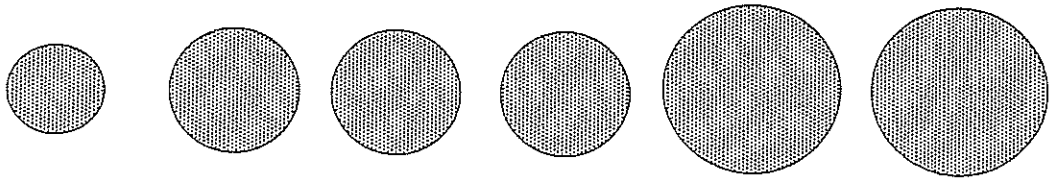
14 The average quantity of water in Jenny's two water bottles is 20 *mL*.
The average quantity of water in Ian's three water bottles is 25 *mL*.

What is the average quantity of water in the 5 water bottles?

.....

23 mL

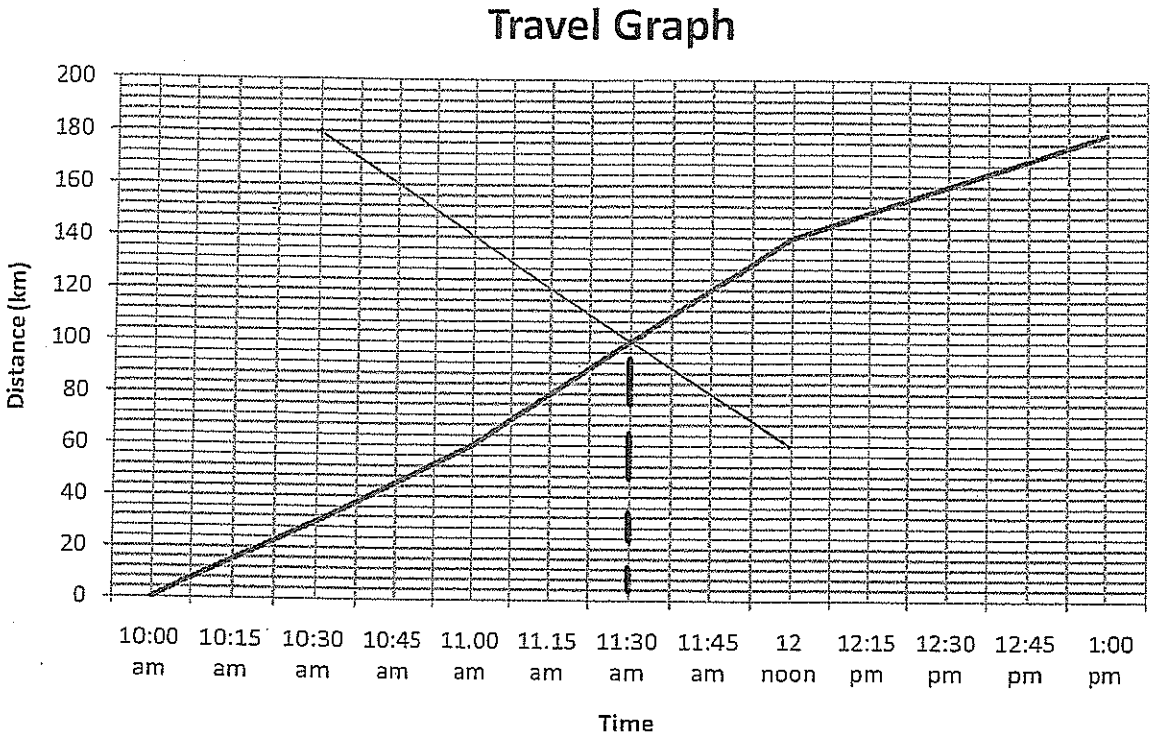
15. Data regarding the length of the radius of the following 6 circular discs was collected by students.



Another disc with a radius equal to the smallest of the 6 discs is added to the set.
Which of the following measures will change with the addition of the new disc?

Range, Mode, Median or Mean Mean

16. A car leaves Town P at 10:00 am and travels to Town Q that is 180 *km* away, arriving at 1:00 pm. The graph below shows the car's journey.



A truck leaves Town Q at 10:30 am travelling towards Town P.
For the first 1 *hour* and 30 *minutes* the truck averaged 80 *km/hr* and did not make any stops.

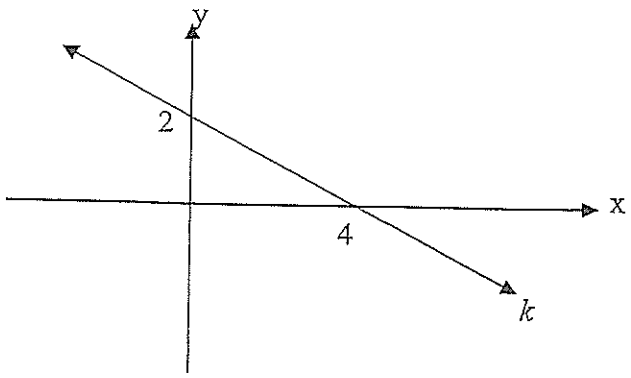
Use the above graph, to determine what time the truck passes the car.

11·30 am

17. Solve $\dfrac{1}{x-5} = 0.01$

$x = 105$

18. Write the equation of the line k shown in the diagram below.



$y = -\frac{1}{2}x + 2$ or $x + 2y - 4 = 0$.

19. The following stem-and-leaf plot represents the results of a class project.

What is the difference between the median for the boys and girls ?

Boys		Girls
0 0	5	0
9 8 6 4	4	2 4
8 7 5	3	3 4 7
6	2	6 7
8	1	2 4
	0	7

$44 - 33 = 11$

20. Evaluate $\dfrac{1001^2 - 999^2}{101^2 - 99^2}$

$\dfrac{(1001+999)(1001-999)}{(101+99)(101-99)} = \dfrac{2000 \times 2}{200 \times 2}$

$= 10$.

21. In a store freezer, there are a number of cartons of milk.

The ratio of the cartons containing chocolate, vanilla and strawberry milk is:

3 : 2 : 1

If half of the cartons of chocolate milk are sold, what fraction of the cartons remaining in the freezer are chocolate? accept

$1\frac{1}{2} : 2 : 1 = 3 : 4 : 2 \quad \therefore \frac{3}{9} = \frac{1}{3}$

22. If $x + \frac{1}{x} = 5$, what is the value of $x^2 + \frac{1}{x^2}$?

$x^2 + \frac{1}{x^2} = \left(x + \frac{1}{x}\right)^2 - 2$

$= 25 - 2$

$= 23$

23. Find the co-ordinates of the vertex of the parabola $y = x^2 - 6x + 10$.

$(3, 1)$ must have both

24. $x = \frac{3 \pm \sqrt{41}}{8}$ is the solution to an equation. What is the equation?

$4x^2 - 3x - 2 = 0$ (accept $4x^2 - 3x - 2$)

25. What is the 150th number in the sequence: 11, 15, 19, 23, ...?

$T_n = 4n + 7$

$T_{150} = 607$