SYDNEY BOYS HIGH SCHOOL

YEAR 10 YEARLY EXAMINATION

MATHEMATICS 2001

Time Allowed: 2 hours

Examiner: D.M.Hespe

DIRECTIONS TO CANDIDATES

- Answer all questions in the spaces provided in this question paper.
- Full marks may not be awarded for careless or badly arranged work.
- Board-approved calculators may be used.
- If additional working space is needed, use the backs of the answer sheets.

Name: _____

Your Mathematics Class (Tick the Box)	
10MaA Mr Kourtesis	
10MaB Mr Harnett	
10MaC Mr Boros	
10MaD Mr Jordan	
10MaE Mr Choy	
10MaF Mr Bigelow	

For Teachers' Use Only	
Part A	/20
Part B	/20
Part C	/15
Part D	/15
Part E	/15
Part F	/15
Total	/100

Part A [20 marks total]

1. Express $^2/_3$ as a recurring decimal.

2. Simplify $5x^2+3x-3y-2x^2$.

3. Write four hundred and eighty million in scientific notation.

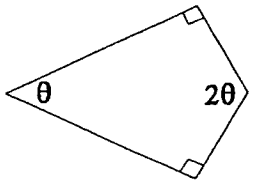
4. Put $\frac{2}{\sqrt{6}}$ into rational denominator form.

5. A room 6 m wide has an area of 50·4 m^2. What is its length?

8

6. Calculate $10^{2.301}$ correct to the nearest whole number.

7. Evaluate θ in this kite.



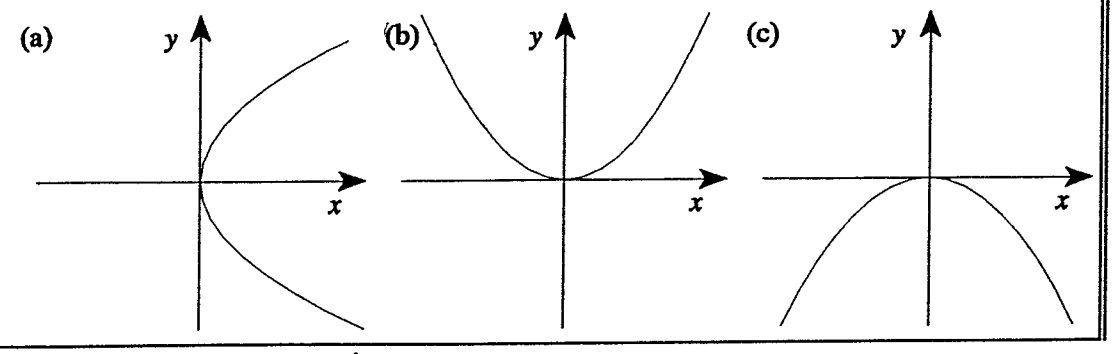
8. An estate agent claims she can get $370 000 for my flat. If her commission is 2½%, what must I pay her?

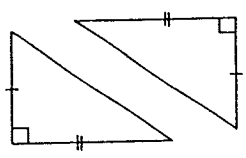
9. Which of these expressions is quadratic?

(a) $2w+3$, (b) $5-2w^2+7w$, (c) w^2+4w^3-8.

10. The speed of sound is about 335 m/s. Write this as kilometres per hour.

11. Which of these graphs matches $y=x^2$?



12.  Why are these triangles congruent?

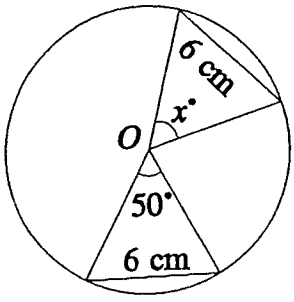
13. Write down the midpoint of (-1, 4) and (-3, 2).

14. $\cos\beta = 0{\cdot}3$. Calculate β correct to the nearest minute.

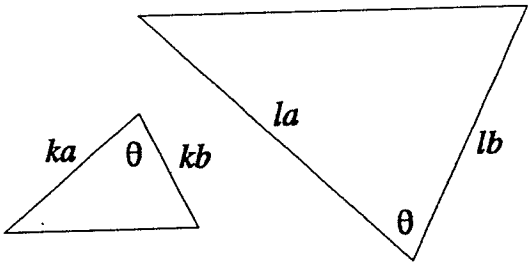
15. Use the stem and leaf plot to find the median of these data.

Stem	Leaf
2	1 4
3	1 2 5 7
4	2 2 6 9 9
5	3 3 3 4

16. Find the value of x. (O is the centre)



17. Why are these two triangles similar?



18. If I invest $5000 for three years at 7% p.a. simple interest, how much interest will I get upon maturity?

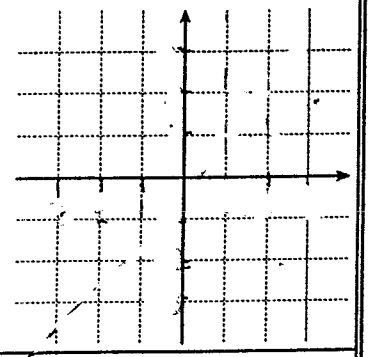
19. A spherical weather balloon has a radius of 1 m when fully inflated. What is its volume?

20. Write down the exact value of $\dfrac{\sin 60^\circ}{\cos 60^\circ}$.

End of Part A

21. When tossing a coin, three out of the last seven throws have been heads. What is the probability of throwing a tail on the next throw?

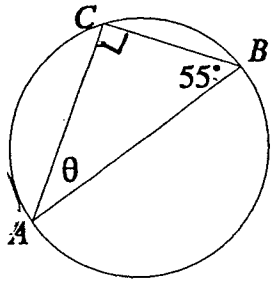
22. Sketch $y = 2x$ on the graph.



23. Factorise a^2+2a+1.

24. Solve $3(2x-1)(x-5) = 0$.

25. AB is a diameter. Find θ.



26. Solve $2x+5 \geq -17$.

27. A business is allowed to depreciate its durable assets at 10% p.a. What is the value, after 5 years, of a deep-fryer for fish and chips which cost $10 000?

28. My granddaughter is half my height but has a similar figure to mine. If I weigh 80 kg, how much does she weigh?

29. Calculate the angle sum of a nonagon (9-sided figure).

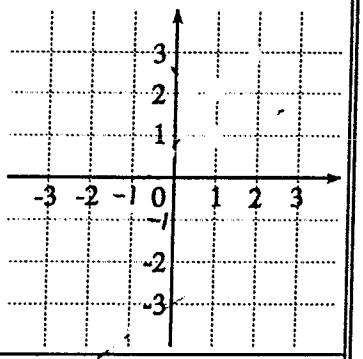
30. Write down the Sine Rule for non-right-angled triangles.

31. A card is drawn from a well shuffled pack of 52 cards.

(a) What is the probability that it is a 5?

(b) If another card is then drawn out, what is the probability that it is also a 5?

32. Sketch $x^2+y^2=9$ on the graph.

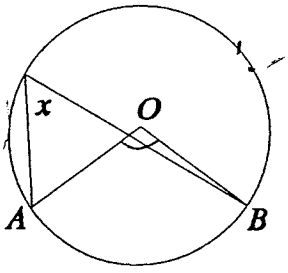


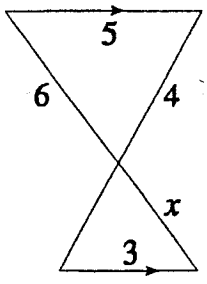
33. What number must be added to complete the square on g^2-6g?

34. If $a>b$, which of the following statements is always true?

(a) $\frac{1}{a}<\frac{1}{b}$ (b) $a^2>b^2$ (c) $ak>bk$ (d) $a+k>b+k$

35. $\angle AOB = 120^\circ$ and O is the centre of the circle. Find x.



36. 

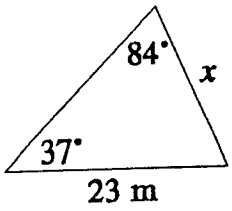
Calculate the value of x.

End of Part B

37. Find the interest on \$10 000 invested at 5% p.a. compounded annually, for 5 years.

38. Find x if $\begin{cases} y = 2x + 6, \\ y = 3x. \end{cases}$

39. Find x to the nearest metre.

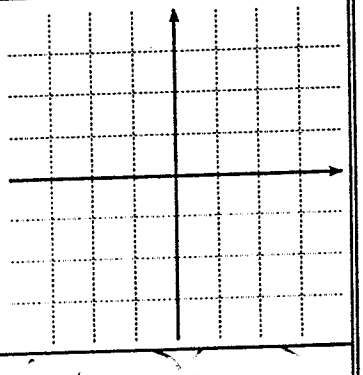


40. A raffle has 100 tickets numbered 1 to 100. Determine the probability that:

(a) The ticket drawn ends in 3.

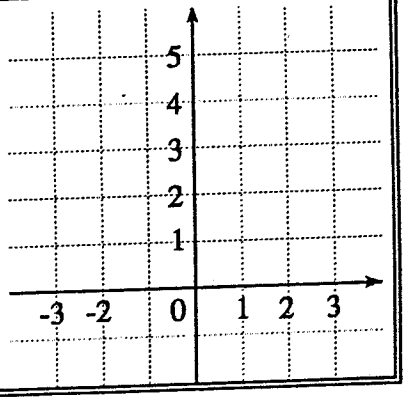
(b) The ticket drawn is also divisible by three.

41. Sketch the hyperbola $y = \frac{2}{x}$.

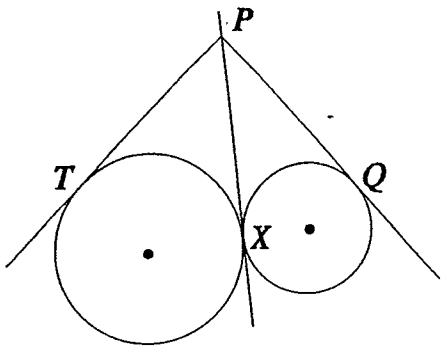


42. For the parabola with equation $y = x^2 + 7x - 30$, find the x-intercepts (in surd form if appropriate).

43. Sketch the curve $y = 4^x$.

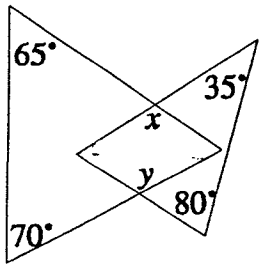


End of Part C

44. 

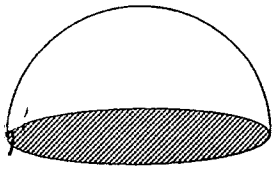
The two circles touch externally at X. If P is any point on the common tangent, prove that the tangents PQ and PT are equal in length.

45. Find the value of $x+y$.



46. A loan of \$5000 is arranged through a credit card company with repayments of \$200 per month for 36 months. What was the simple interest rate per annum?

47. Find the total surface area of a solid hemisphere with a radius of 10 cm.



48. In a triangle ABC, $b = 2$, $c = 5$, $\angle A = 124°$. Find a.

49. Find the probability of a left-handed person not wearing glasses.

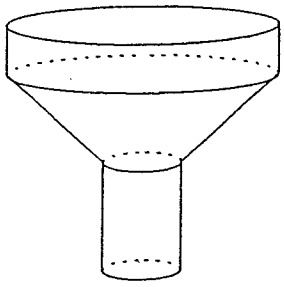
		Glasses		
		Yes	No	Total
Writing Hand	Left	15	35	50
	Right	32	98	130
	Total	47	133	180

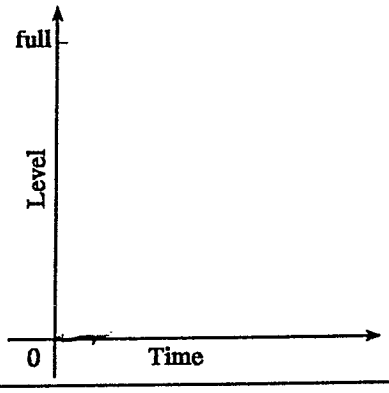
50. Simplify $\dfrac{x^2-16x-17}{x^2-1}$.

End of Part D

Part E [15 marks total]

51. A petrol funnel shape, as shown, is capped at the bottom and then filled at a constant rate. Show on the graph how the fluid level would rise.



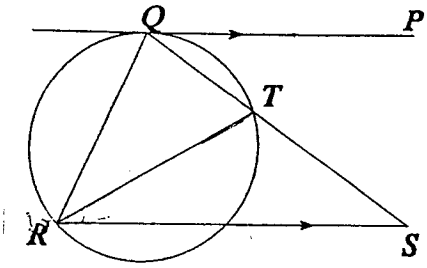


52. Show, by a suitable diagram or otherwise, that the area of a parallelogram is the same as the area of a rectangle of the same base and altitude.

53. Two sides of a triangle are 51 m and 92 m and its area is 980 m^2. Calculate all the possible sizes of the included angle (to the nearest degree).

54. PQ is a tangent, QTS is a straight line and $PQ \parallel RS$.

Prove $\angle QRS = \angle QTR$.



55. Radio Rentals advertises a washing machine at a rental of \$8.75 per week with the option to buy after a year at the reduced price of \$592. David Jones will sell the same machine new at \$689 plus \$25 for delivery; after one year of credit card payments of \$32 per month, \$456 would still be owing.

(a) How much would be paid to Radio Rentals in the first year?

(b) How much would be paid to David Jones' credit depatrment in the first year?

(c) Which would be the better course of action: to rent and then buy from Radio Rentals or to buy on credit from David Jones?

End of Part E

Part F [15 marks total]

56. The digits 1, 3, 5, and 8 are written on four cards. The cards are shuffled and then laid out so that the digits form a four-figure number. Find the probability that the number is

(a) odd,

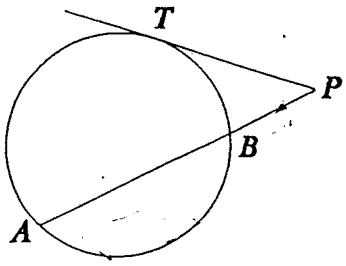
(b) greater than 5000,

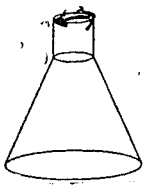
(c) both odd and greater than 5000.

57. A certain line is written in general form as $ax+by+c=0$. The line passes through the points (1, 2) and (3, -1). Find the value of the integers a, b, and c.

58. If x and y are positive integers and $x+y<9$, how many different values are there for the product xy?

59. TP is a tangent.
If $PA = 3 \times PT$, prove that
$AB = 8 \times PB$.



60. 

The base of a conical flask is 15 cm in diameter. The total height is 20 cm. The diameter of the neck is 3 cm and its height is 5 cm. Find the volume if it is to be filled up to the base of the neck.

THIS IS THE END OF THE PAPER

ANSWERS TO SYDNEY BOYS HS – YR 10 - 2001 YEARLY EXAM

1	$0.\dot{6}$	**2**	$3(x^2+x-y)$	**3**	4.8×10^8	**4**	$\frac{\sqrt{6}}{3}$	**5**	8.4 m	**6**	200
7	60^0	**8**	\$9250	**9**	(b)	**10**	1206 m/s	**11**	(b)	**12**	S.A.S.
13	(-2,3)	**14**	$72^0\ 33'$	**15**	42	**16**	50^0	**17**	2 sides in same ratio, included angle	**18**	\$1050
19	4.189	**20**	$\sqrt{3}$	**21**	$\frac{1}{2}$	**22**	Sketch	**23**	$(a+1)^2$	**24**	$x=0.5$, $x=5$
25	35^0	**26**	$x \geq -11$	**27**	\$5904.90	**28**	40 kg	**29**	1260^0	**30**	$\frac{a}{\sin A}=\frac{b}{\sin B}=$
31	$\frac{1}{13}, \frac{1}{17}$	**32**	Circle, centre (0,0), rad. 3	**33**	9	**34**	(d)	**35**	60^0	**36**	3.6
37	\$2762.82	**38**	$x=6$	**39**	14 m	**40**	0.1, 0.04	**41**	Sketch	**42**	-10,3
43	Sketch	**44**	Proof	**45**	250^0	**46**	$14.\dot{6}\%$	**47**	942.5 m^2	**48**	6.34
49	$\frac{7}{36}$	**50**	$\frac{x-17}{x-1}$	**51**	Graph	**52**	Proof	**53**	25^0, 155^0	**54**	Proof
55 a	\$455	**55 b**	\$384	**55 c**	C/card from DJ's saving \$207	**56 a**	0.75	**56 b**	0.5	**56 c**	$\frac{5}{12}$
57	$a=3$ $b=2$ $c=-7$	**58**	12	**59**	Proof	**60**	$\frac{1485\pi}{4}$ cm^3 =1166.32				

19/09/03