

J.M.J.Ch

MARCELLIN COLLEGE RANDWICK



YEAR 10

HALF YEARLY EXAM

ADVANCED MATHEMATICS

2008

STUDENT NAME: _____

MARK: _____ /80

Time Allowed: 90 minutes

Weighting: 30%

Directions:

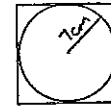
- Answer all questions.
- Begin each question on a new page.
- Show working where necessary.
- Marks may not be awarded for answers only.

Surface Area

1. Consider a cube with side n cm long. Which of the following expressions will give the surface area of the cube? 1

- A. $SA = n^3$ B. $SA = 6n^3$ C. $SA = n^2$ D. $SA = 6n^2$

2.

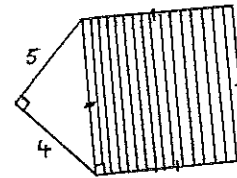


A circle of radius of 7 cm is drawn inside a square as shown in the diagram. 1

The area of the square is:

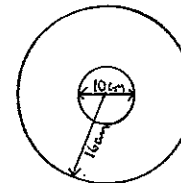
- A. 49cm^2 B. 196cm^2 C. 56cm^2 D. 147cm^2

3.



What is the area of the shaded square? 2

4. A pipe has an inner diameter of 10cm and an outer radius of 16cm as shown in the diagram. 3



Find the area of the annulus correct to 3 significant figures.

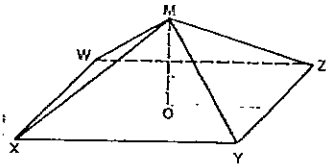
5. A sphere has a diameter of 10cm . It is sliced through the centre and one half is discarded. Find the surface area of the remaining half.

3

6. A cylinder has a surface area of 351.9cm^2 . If the radius of the cylinder is 4cm , find the height of the cylinder to the nearest whole number.

2

7.



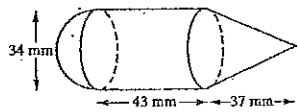
$MO = 3\text{cm}$
 $XY = 11\text{cm}$

4

Calculate the surface area of the square pyramid correct to one decimal place.

8. Calculate the surface area of the following solid.

4



Consumer Arithmetic

1. If Diana earns \$115 or less in a week, she will be below the tax threshold. She earns \$9.60 an hour. How many hours can she work in a week and still stay under the tax threshold?

1

A. 10 hours B. 11 hours C. 12 hours D. 13 hours

2. Dave buys a TV set for \$1000. He borrows the money at 8.5% p.a. simple interest for 2 years. How much will he pay back per month?

1

A. \$7.08 B. \$14.17 C. \$45.21 D. \$48.75

3. A couple bought a block of land at the beginning of 1995 for \$74500. If the land appreciates at 4% p.a., what will the land be worth at the beginning of 2008?

3

4. How many years does it take for a home entertainment system valued at \$4800 take to halve in value if it depreciates at a rate of 10% per year?

3

5a. Use the table to find the monthly repayment on a loan of \$80000 taken over 20 years at 7.5% p.a.

2

Interest rate p.a.	Approximate monthly payments per \$100 of loan						
	1 year	2 years	3 years	4 years	5 years	20 years	25 years
6.0	14.32	10.33	8.61	7.40	6.49	5.16	4.34
6.5	14.33	10.32	8.60	7.39	6.48	5.16	4.34
7.0	14.37	10.30	8.59	7.38	6.47	5.15	4.33
7.5	14.40	10.28	8.58	7.37	6.46	5.14	4.32
8.0	14.43	10.26	8.57	7.36	6.45	5.13	4.31
8.5	14.46	10.24	8.56	7.35	6.44	5.12	4.30
9.0	14.48	10.22	8.55	7.34	6.43	5.11	4.29

b. How much will be repaid over the 20 years?

1

6. Belinda's bank offers her a loan at 11.6% p.a. reducible monthly. She borrows \$6500 and repays \$380 per month. Calculate:

a. the amount of interest paid during the first month.

2

b. the amount still owing on the loan after 3 months.

3

c. the total interest paid over the first 3 months of the loan.

2

d. how much interest would have been paid over these 3 months if the loan had been charged at a flat rate?

2

Statistics

1. You are given the mean of 15 scores. Which one of the following can you calculate? 1

- A. the median B. the range C. the sum of the scores D. the mode

2. The following stem and leaf plot represents the results of a class project. 1

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

Find the difference in the median scores of boys and girls.

- A. 5 B. 6 C. 7 D. 8

3. Find the range, mode, median and mean of the following set of scores: 4

54, 57, 53, 54, 55, 56, 55, 48, 50, 51,
55, 52, 49, 50, 57, 53, 55, 52, 49, 48.

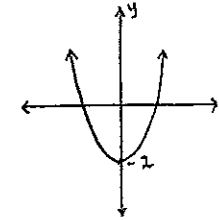
4. For the set of scores in question 3,

a. draw a frequency distribution table with frequency column and a relative frequency column. 2

b. draw a cumulative frequency histogram and polygon for the set of scores. 2

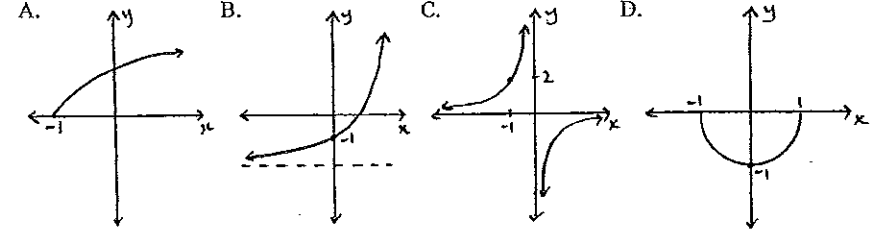
Number Plane

1. Given the following diagram, which of the following equations is the equation for the parabola? 1

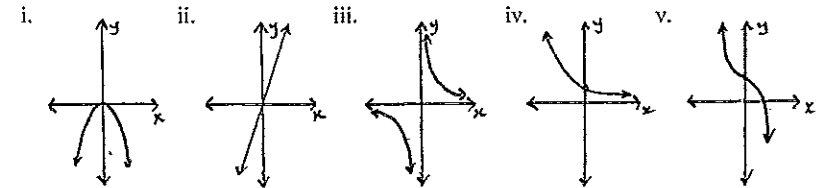


- A. $y = x^2 - 2x - 2$ B. $y = -x^2 - 2$ C. $y = x^2 + 2x - 2$ D. $y = x^2 - 2$

2. Which of the following sketches represents the equation $y = 2^x - 2$? 1



3. Match each graph with its equation. 5



- a. $xy = 3$ b. $y = -x^3$ c. $-3x + y = 0$ d. $y = -3x^2$ e. $y = 3^{-x}$

5. Consider the following stem and leaf plot.

Stem	Leaf
4	0 1 7
5	2 3 3 3 4 6
6	1 8 9 9
7	2 4 5
8	7
9	1 2 4

a. Find the inter-quartile range.

b. Draw a box and whisker plot showing the five point summary.

6. Use your calculator to determine the mean and the standard deviation of the set of scores.

Score	Frequency
6	4
7	7
8	9
9	11
10	10
11	3

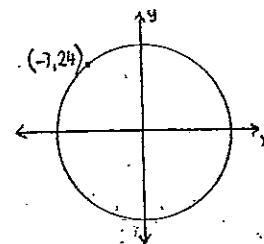
7. John scores the following in two different exams.

History exam: His score = 54, Mean = 48, SD = 4

English exam: His score = 57, Mean = 52, SD = 6

Which exam has he performed better in and give reasons for your answer?

4. Find the equation of the following:



5. Sketch the parabola $y = 2x^2 + 5x - 12$.
On your sketch include:

- x-intercepts
- y-intercept
- axis of symmetry
- vertex

6. What is the maximum value for the curve $y = \sqrt{9 - x^2}$?

7. Find the point/s of intersection of the curve $y = x^2 + 2$ and the line $y = 5 - 2x$.

Andrew Tzannoy 10.4 Surface Area Mr Capizzi

1. D. SA = 6m² 1

2. B. 196 cm² 1

3. ~~(square of triangle)~~ $\pi r^2 = 4$

~~SA = 6.28~~ A = 41 2

4. $\pi \times 16^2 = \pi \times 5^2 = 726 \text{ cm}^2$ 3

5. $2\pi r^2 + \pi r^2$

$2 \times \pi \times 5^2 + \pi \times 5^2 = 235.62 \text{ cm}^2$ (to 2 dec. pt.) 3

6. $2\pi r \times r \times h + 2\pi r^2$

$2 \times \pi \times 4 \times h + 2 \times \pi \times 16 = 351.9$

~~SA = 351.9~~ $8\pi \times h + 32\pi = 351.9$

$8\pi \times h = 351.9 - 32\pi$

$h = 10 \text{ cm}$ 2

7. $c^2 = 3^2 + 5^2$

$c^2 = 34$

$c = 6.26$

SA = $4 \times \frac{1}{2} \times 11 \times 6.26 + 11^2$

= 258.72 cm² 4

8. $2\pi r^2 + 2\pi r \times r \times h + \pi \times r \times L$

$2 \times \pi \times 17^2 + 2 \times \pi \times 17 \times 43 + \pi \times 17 \times 40.72$

SA = 8583.59 mm² (to 2 d.p.) 4

$L^2 = 37^2 + 17^2$
 $L = 40.72$

Andrew Tzannoy 10.4 Consumer Arithmetic Mr Capizzi

B. 11 hours 1

2. ~~WAS 10.00~~ A = \$7.08 0

3. $A = 74500(1 + \frac{4}{100})^n$

= \$98036.92 (to the nearest cent) 2

4. $2400 = 4800(1 - \frac{10}{100})^n$

~~WAS 2400~~ $2400 = 4320^n$

~~SA = 2400~~ $\frac{\log 2400}{\log 4320} = n$

$n = 2.82$ years 2

MC

~~SA = 606 x 88~~ 6.06×88

= \$644.8 2

5) ~~SA = 912.00~~

\$912.00 0

a) $6500 \times \frac{0.116}{12}$

= \$62.83 1

b) $6437.17 \times \frac{0.116}{12}$

= 62.23 1

$6374.94 \times \frac{0.116}{12}$

= 61.62

\$6313.32

c) $62.83 + 62.23 + 61.62$

= \$186.68 1

d) $\frac{0.116}{12} \times 6500 \times 3$

\$188.50 2

(18)

C: the sum of the scores ✓ 1

2. B. 6 ✓

3. Range: 57 - 48 ✓
= 9.

48, 48, 49, 49, 50, 50, 51, 52, 52, 53, 53, 54, 54, 55, 55
55, 55, 56, 57, 57

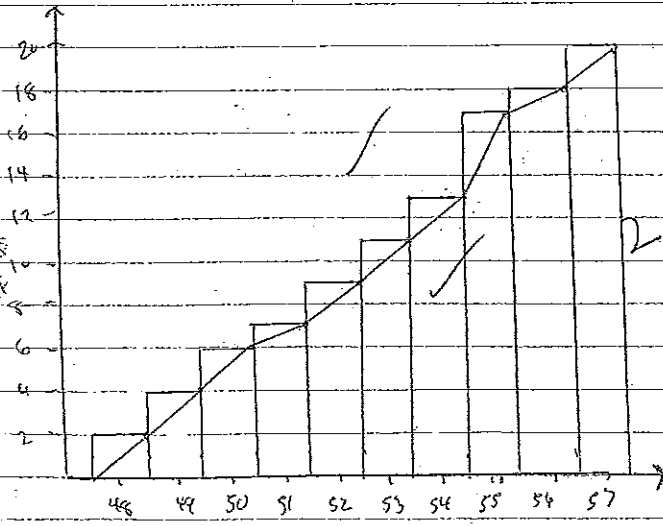
Mode: 55 ✓ 4

Median: 53 ✓

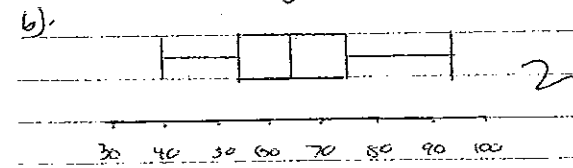
Mean: 52.65 ✓

x	f	cf	rf
48	2	2	2/20
49	2	4	4/20
50	2	6	6/20
51	1	7	7/20
52	2	9	9/20
53	2	11	11/20
54	2	13	13/20
55	4	17	17/20
56	1	18	18/20
57	2	20	20/20

x	f	cf
48	2	2
49	2	4
50	2	6
51	1	7
52	2	9
53	2	11
54	2	13
55	4	17
56	1	18
57	2	20



5. a) $745 - 53$ ✓
 $= 21.5$ ✓ 3



Mean: 52.65 ✓
SD: 1.40 ✓ 2

7. History 2 - score: $54 - 48 = 6$
English 2 - score: $57 - 52 = 5$
 $= 1.5$ ✓ $= 0.83$ ✓ 2

John did better in history because he is higher above the average in the history test ✓

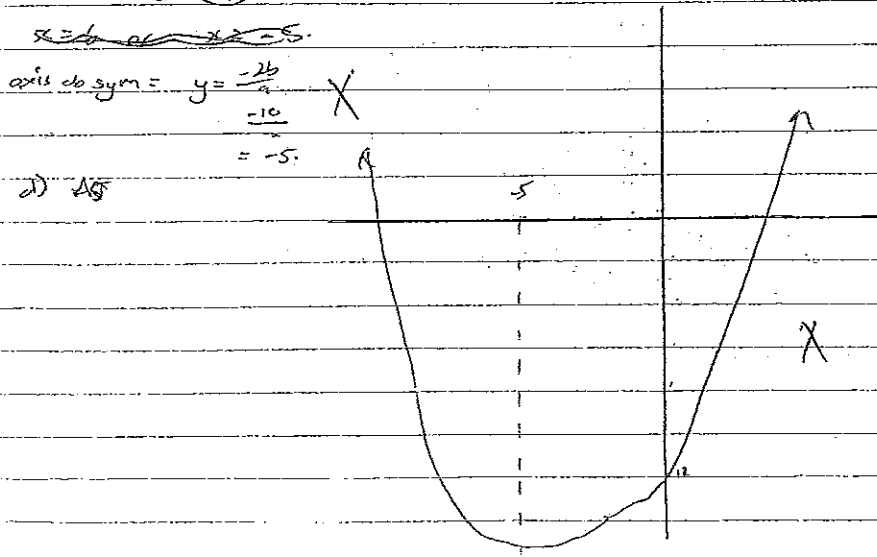
D. $y = x^2 - 2$ ✓
 2

(10)

3. B. ✓
 i. $y = -3x^2$ (a) ✓
 ii. $3x + y = 0$ (c) ✓
 iii. $xy = 3$ (a) ✓ 5
 iv. $y = 3^{-x}$ (c) ✓
 v. $y = -x^3$ (b) ✓

f. ~~$y = (x-h)(y-k)$~~ $y = (x-h)(y-k)$
 $y = (-7-h)(24-k)$ X
 $y = -168 + 7k - 24h + hk$ -2.

5. $y\text{-int} = -12$ ✓
 $x\text{-int} = 12 = 2x^2 + 5x$
 $6 = x^2 + 5x$
 ~~$x = 1$~~ $x = 1.2$ $x = -6$



6. $y = \sqrt{9 - x^2}$
 max value = 3 ✓ 2

7. X