NORTH SYDNEY GIRLS HIGH SCHOOL
YEAR 10 ADVANCED MATHEMATICS
## TERM 2 COMMON TEST 2001

TIME ALLOWED: 45 MINUTES

INSTRUCTIONS:
- Write all answers on your own paper, except for Part A
- Part A consists of 15 multiple choice questions.
  Choose the best alternative answer for each question and fill in the circle for that question on the Answer Sheet provided.
  Each of questions 13, 14 and 15 may have more than one correct answer. Fill in every correct answer for each of these questions.
- Part B consists of three questions requiring single answer responses for each part.
- Part C consists of three free response questions where all necessary working must be shown for both questions.
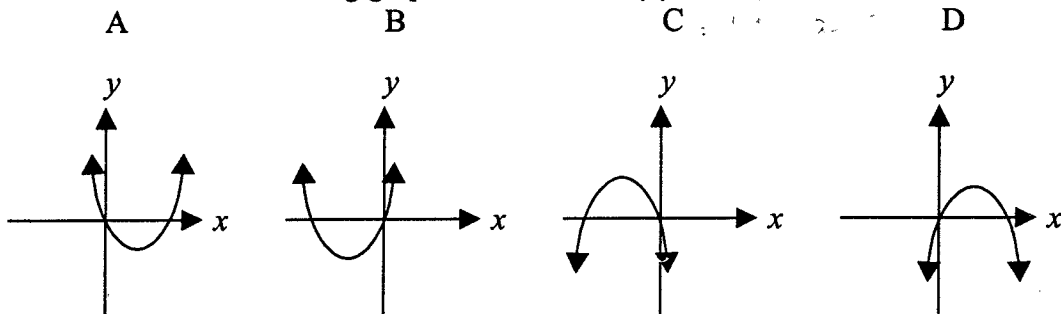
PART A

1. Which of the following could be the graph of $2x - 3y = 6$?
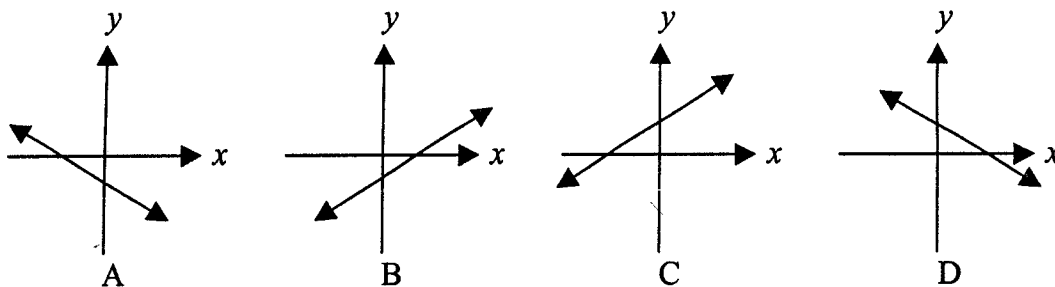
A   B   C   D

2. Which of the following is the y-intercept of the graph of $y = 3x^2 - x + 5$?

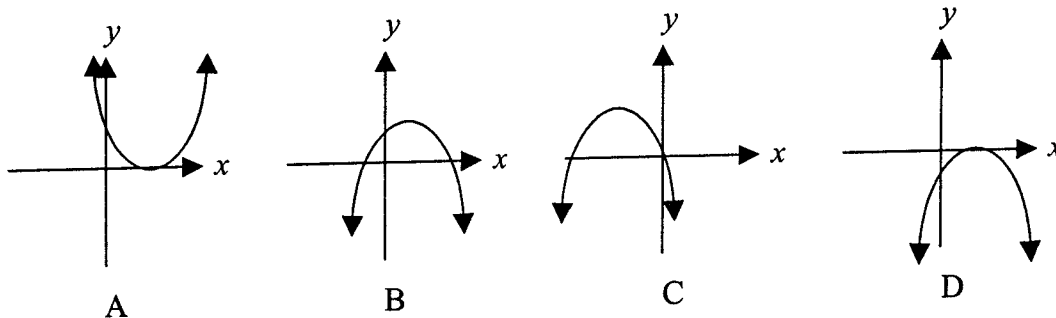| 3	0	−15	5
A	B	C	D

3. Which of the following graphs is described by $y = 3x(2 - x)$?

     A   B   C   D

4. Which of the following represents an exponential equation?

$y = 2x$

A

$y = \dfrac{2}{x}$

B

$y = 2^x$

C

$y = x^2$

D

5. Which of the following could represent the equation $y = 3 - (x + 2)^2$?

A   B   C   D

6. The surface area of a cube with side length 10 centimetres is

600 cm^2

A

1000 cm^2

B

600 cm^3

C

1000 cm^3

D

7. The graph of $y = \dfrac{3}{x}$ has a vertical asymptote at

$y = 0$

A

$x = 0$

B

$y = 3$

C

$x = 3$

D

8. The graph of $y = x^2 - 2x + 5$ has an axis of symmetry at

$x = -1$

A

$x = 1$

B

$x = -2$

C

$x = 2$

D

9. The equation of the circle with centre at the origin and radius 4 is

$x^2 + y^2 = 16$

A

$x^2 - y^2 = 16$

B

$x^2 - y^2 = 4$

C

$x^2 + y^2 = 4$

D

10. Which of the following describes the equation $y = 2^{-x}$?

A   B   C   D
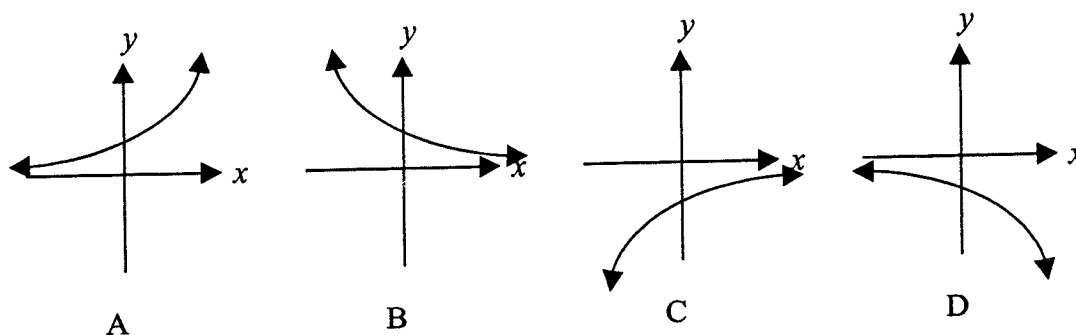
11. Michael thinks of a number and adds 30. He subtracts four fives and increases his answer by the square of the original number. Which expression correctly shows his calculation?
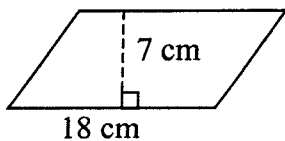
$n+(30-4)\times5 + n^2$ $n+30-(4\times5+n)^2$ $n+30-4\times5+n^2$ $n+(30-4)\times5-n^2$

A   B   C   D

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12. The area of the parallelogram is

7 cm

18 cm

50 cm^2 136 cm^2 63 cm^2 126 cm^2

A   B   C   D

The following questions may have **more than one** correct answer.
All correct answers must be shown on the answer sheet.

13. Which of the following equations does the point $(1, -2)$ satisfy?

$x + 2y = 1$ $y = x^2 + x - 4$ $y = -2^x$ $y = -\dfrac{1}{2x}$

A   B   C   D

---

14. The equation $(x-3)^2 + y^2 = 4$ describes a circle with

centre $(-3, 0)$ centre $(3, 0)$ radius 2   radius 4

A   B   C   D

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15. Which of the following equations represents a straight line?
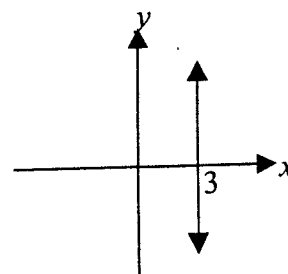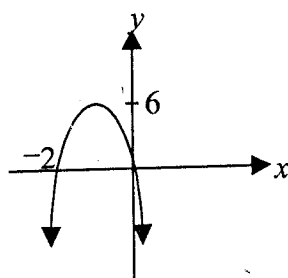
$y = 3$ $y = 2x + 1$ $y = x^2 + 1$ $x + 3y = 7$
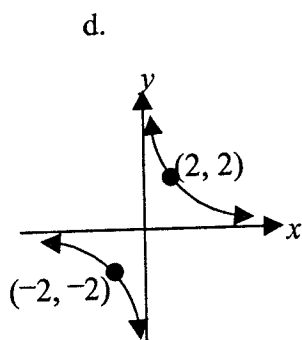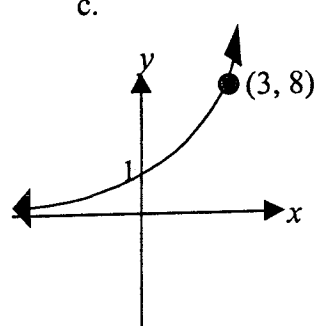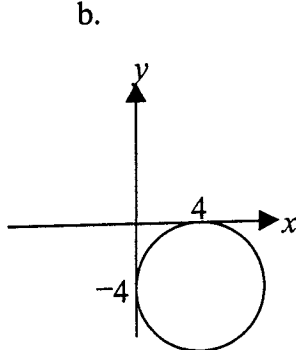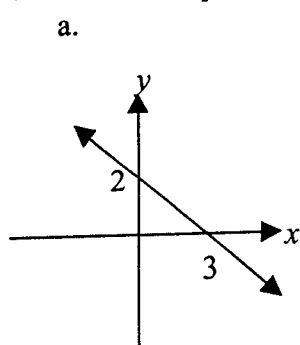
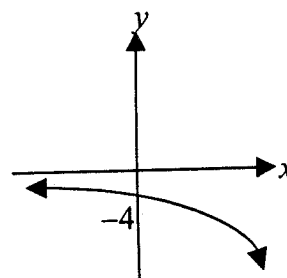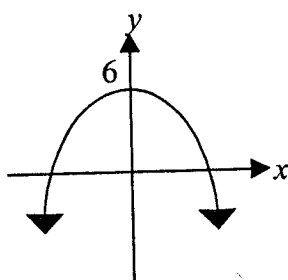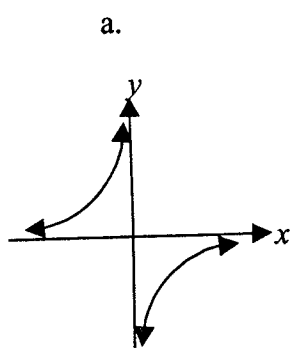A   B   C   D

END OF PART A

PART B

1. State the equation of each graph

a.

b.

c.

d.

e.

f.

2. From the list select the most appropriate equation for each given graph

a.

b.

c.

i. $y = -4^x$

ii. $xy = -5$

iii. $y = 6 + 5x^2$

iv. $x + 2y = 6$

v. $y = 6 - 2x^2$

vi. $y = \dfrac{2}{x}$

vii. $y = -4 \times 3^x$

viii. $x^2 + y^2 = 36$

3. a. Given that $A = \frac{1}{2}h(a + b)$ find b if $A = 120$, $a = 5$ and $h = 20$
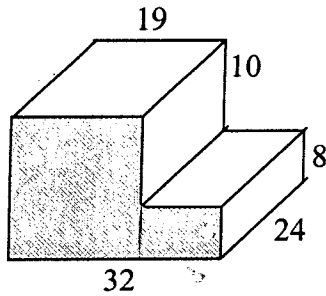
   b. A five cent coin has a diameter of two centimetres.
   What will be the value of a one kilometre line of five cent coins?

END OF PART B

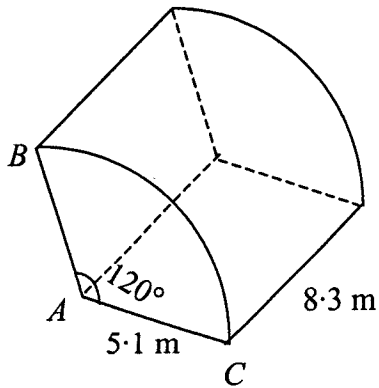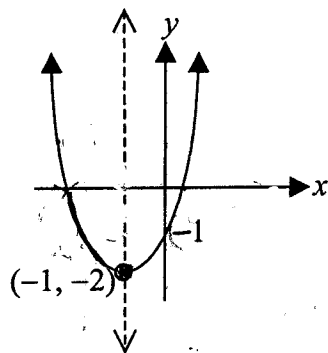# PART C

Show all working

1.

a. Find the shaded area (all measurements are in centimetres)

b. Calculate the surface area of the solid.

2.

a. Find the area of sector *ABC* (in terms of π)

b. Find the <u>exact</u> length of the arc *BC*

c Find the surface area of the solid correct to 4 significant figures.

3. Find the equation of the given parabola.

$\times$ **END OF TEST**

MATHEMATICS - ADVANCED

BLOCK LETTERS

LAST NAME ....

FIRST NAMES ....

CLASS ....

Read the question.

Choose your answer A,B,C or D.

Fill in one answer circle only.

If you change your mind, rub out your first answer completely, then fill in your new answer.

SAMPLE: 6 + 3 =
A. 11   B. 9
C. 10   D. 8

Ⓐ ● © Ⓓ

USE PENCIL ONLY
START HERE

✳ 1   Ⓐ ⬤ © Ⓓ ✓

2   Ⓐ Ⓑ © ⬤ ✓

3   Ⓐ Ⓑ ⬤ ⓓ ✗

4   Ⓐ Ⓑ ⬤ Ⓓ ✓

5   Ⓐ Ⓑ ⬤ Ⓓ ✓

6   Ⓐ Ⓑ ⬤ Ⓓ ✗

7   Ⓐ Ⓑ © ⬤ ✗

8   Ⓐ ⬤ © Ⓓ ✓

9   ⬤ Ⓑ © Ⓓ ✓

10   Ⓐ ⬤ © Ⓓ ✓

11   Ⓐ Ⓑ ⬤ Ⓓ ✓

12   Ⓐ Ⓑ © ⬤ ✓

13   Ⓐ ⬤ ⬤ Ⓓ ✓

14   Ⓐ ⬤ ⬤ Ⓓ ✓

15   ⬤ ⬤ © ⬤ ✓   (12)

A 11+1

B 12
   3+7

C 25 + 8

Maths Common Test – Term 2

① a) $y = mx + b$
$\quad = -\frac{2}{3}x + 2$ ✓

b) $r^2 = (x-a)^2 + (y-b)^2$
$\quad 16 = (x-4)^2 + (y+4)^2$ ✓

c) $y = a^x$
$\quad 8 = a^3$
$\quad a = 2$
$\quad y = 2^x$ ✓

d) $xy = k$
$\quad 4 = k$
$\therefore xy = 4$
$\therefore y = \frac{4}{x}$ ✓

e) $y = ax^2 + bx + c$
$\quad c = 0$
$(-2,0)\quad 0 = 4a - 2b$
$\qquad 2b = 4a$
$① \Rightarrow b = 2a$
$(-1,6)\quad 6 = a - b$
$② \Rightarrow b = a - 6$
$\Rightarrow① \quad a - 6 = 2a$
$\qquad a = -6$
$\Rightarrow② \quad b = -12$
$\therefore y = -6x^2 - 12x$ ✓

f) $x = 3$ ✓

② a) ⅱ   b) v ✓   c) vii ✓

③ a) $A = \frac{1}{2}h(a+b)$
$\quad 120 = \frac{1}{2} \times 20(5+b)$
$\quad 120 = 10(5+b)$
$\quad 120 = 50 + 10b$
$\quad 70 = 10b$
$\quad b = 7$ ✓

b) $\dfrac{100\,000 \text{ cm}}{2} = 50\,000 \times 5c$

Value $= 250\,000$ cents
$\quad = \$2500$ ✓✓

⑫

PART C

Show all working

1.

(handwritten top right)
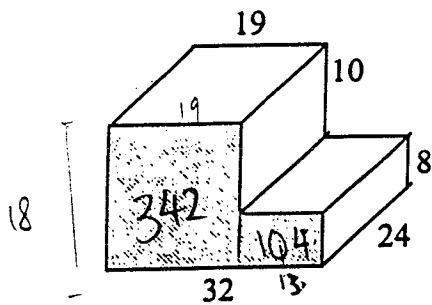
b) Back + Front ~ 446 × 2
= 892 cm² ✓
= 32 × 24
= 768 cm² × 2 ✓
= 1536 cm²
18 × 24 × 2 = 864 cm²
= 3292 cm² ✓

(on figure) 19, 10, 8, 342, 18, 32, 24

446 cm^2 ✓

a. Find the shaded area (all measurements are in centimetres)

b. Calculate the surface area of the solid. $= 3292 \text{ cm}^2$

2.

(on figure) B, 120°, A, 5·1 m, C, 8·3 m
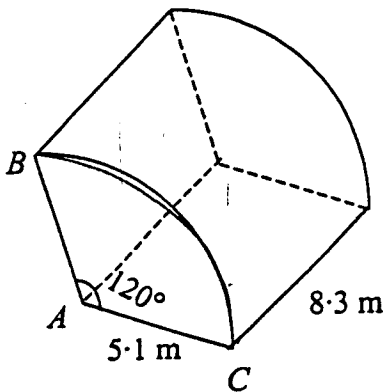
a. Find the area of sector ABC (in terms of π) $\pi \times 5.1^2 \times \frac{1}{3} = 8.67\pi \text{ m}$ ✓
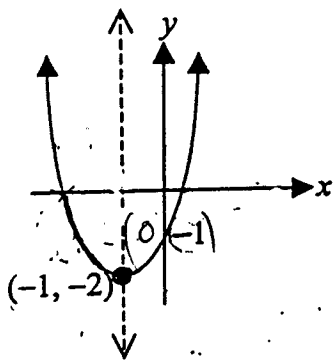
b. Find the **exact** length of the arc BC $2\pi r \times \frac{1}{3} = 2 \times \pi \times 5.1 \times \frac{1}{3}$ ✓ $= 10.68 \text{ m}$ ✓
$= 3.4\pi$ ✓

c. Find the surface area of the solid correct to 4 significant figures. ✓

$(2 \times 42.33) + (2 \times 8.67\pi) +$ ✓
$(8.3 \times 3.4\pi)$ ✓

$= 227.8$ ✓

3. Find the equation of the given parabola.

(on graph) y, x, $(0,-1)$, $(-1,-2)$

$y = ax^2 + bx + c$
$c = -1$

$-2 = a \times (-1)^2 + b(-1) + c$

$0 = \frac{-b}{2a}$

$-1 = \frac{-b}{2a}$

$b = 2a$ ✓

$-2 = -a + 2a - 1$

$-1 = -a$ ✓

$a = 1$ ✓

$y = x^2 + 2x$

END OF TEST