Student: _____

Teacher: _____

BRIGIDINE COLLEGE RANDWICK

YEAR 10 MATHEMATICS

Stages 5.1- 5.2 Common

2007
HALF YEARLY

Time: 1.5 Hours

Directions to candidates
Time 1 hr 30 min

* *Put your **name** at the top of this page and the Answer Sections that will be collected.*

* *All questions are to be attempted and they will be divided into:*

  Section A   Multiple Choice

  Section B   Short and Longer Response

  Section C   Short and Longer Response

* *All necessary working should be shown in Section B and C.*

* *Full marks may not be awarded for careless or badly arranged work.*

Section A *Answer on the Answer Sheet provided*

1. $\dfrac{39.256 - 25.32}{2.32 + 5.6}$ correct to 3 significant figures would be

    a.   1.76   b.   1.759   c.   1.760   d.   11.6

2. Which one of the following is equivalent to 3.507×10^3

    a. 3507×1000 b. 35.07×100

    c. $0.3507 \div 100$ d. $3.507 \div 1000$

3. A calculator displayed

    $9.82^{\ 04}$

    Expressed as an ordinary number this would be

    a.   0.000982   b.   - 0.000982   c.   98200   d.   9820

4. There are 620 pupils in a school and 45% of them are girls. How many boys are there in this school?

    a.   55   b.   341   c.   283   d.   353

5. In a pile of 80 000 bricks, 2 000 are faulty. The percentage of faulty bricks is

    a.   0.025 %   b.   0.4 %   c.   2.5 %   d.   40 %

6. For the statement "ten more than a number n is five times the number" may be represented by:

    a. $10n = n + 5$ b. $10 + n = n + 5$

    c. $10 + n = 5n$ d. $10n = 5n$

7. A bookseller buys a book for $35.50. The book is then sold after a 10% profit is added. How much did the bookseller charge for this book?
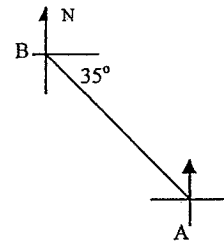
   a. $39.05   b. $31.95   c. $3.55   d. $36.60

8. This diagram to the right represents a trapezium of height 10cm. The parallel sides are 10cm and 7cm in length. The area of the trapezium is
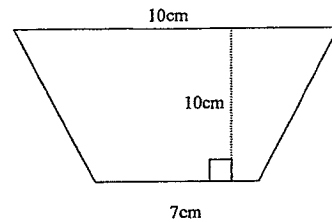
   a. 100 cm²   b. 70 cm²

   c. 65 cm²   d. 85 cm²

10cm

10cm

7cm

9. The Bearing of Point A from Point B in this diagram to the right would be

   a. 35°   b. 135°

   c. S35°E   d. 125°

N

B⌐ 35°

A

10. $Sin35°$ is closest to

   a. 0.57   b. 0.82

   c. 0.70   d. -0.43

11. The factors of $x^2 + 3x$ are

   a. 3x and x   b. x and (x + 3)

   c. (x - 3) and x   d. 2 and 3

12. $\dfrac{5x}{3} \times \dfrac{21}{6}$ =

   a. $\dfrac{26x}{6}$ b. $\dfrac{35x}{6}$ c. $\dfrac{105x}{18}$ d. $\dfrac{30x}{18}$

13. Given that 11 : 6 = k : 2, then k =

   a. $\dfrac{11}{3}$ b. $\dfrac{22}{3}$ c. $1\dfrac{11}{3}$ d. none of these

14. What is the solution to $-4 - 2x < 22$

   a. x < -13   b. x < 13   c. x > -13   d. x > 13

15. Answer to 3 decimal places

   $\dfrac{23.76 \times 32.4}{8.74 - 1.897}$

   a. 86.184   b. 112.498

   c. 453.56   d. 167.879

16. At a sale all goods are marked at 15% off. A TV's sale price is $739.50. What was the original price of the TV?

   a. $870   b. $850.425   c. $628.575   d. $800

17. The base length l of a square pyramid of volume V and perpendicular height h is given by

$$l = \sqrt{\frac{3V}{h}}$$

Find l correct to one decimal place if $V = 400$ and $h = 8.4$

a.   11.9   b.   12.0   c.   20408.2   d.   362.8

18. 123 900 000 000 in scientific notation is :

a. 1.239×10^{11} b. 1.239×10^{-11} c. 1239×10^{11} d. 1.24×10^{7}

19. Simplify $17 - 5(x + 1)$

a. $17 - 5x$ b. $16 - 5x$ c. $18 - 5x$ d. $12 - 5x$

20. The ratio of 6 seconds to 4 hours expressed in simplest form would be

a. $1 : 24$ b. $4 : 480$ c. $1 : 2400$ d. $1 : 240$

21. Which of the following has the largest value?

a.   0.71   b. $\dfrac{3}{5}$ c. $\dfrac{3}{4}\%$ d. $\sin 30°$

22. Given that $V = u + at$, and $V = 14.7$ when $u = 4.5$ and $a = 2.6$, the value of t, to three significant figures, is:

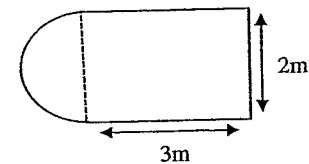a.   7.38   b.   3.923   c.   3.92   d.   7.384

23. What fraction of the square is shaded?

a. $\dfrac{2}{5}$ c. $\dfrac{1}{4}$

b. $\dfrac{4}{14}$ d. $\dfrac{4}{18}$
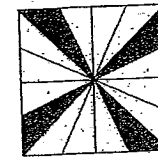
24. The diagram below represents a garden bed. It is the shape of a rectangle with semicircle at one end. Find it's perimeter.

a.   11.14m   b.   13.14m   c.   14.28m   d. 16.28m

25. In a game of chance 3 red discs and 7 blue discs are placed in a container. If one disc is drawn at random, what is the probability that the drawn disc will be red?

a. $\dfrac{3}{10}$ b. $\dfrac{3}{7}$ c. $\dfrac{7}{3}$ d. $\dfrac{7}{10}$

26. $\dfrac{4x^{6}}{8x^{2}} =$

a. $\dfrac{x^{3}}{2}$ b. $\dfrac{x^{4}}{2}$ c. $2x^{3}$ d. $2x^{4}$

27. The production costs for a particular product are $1,000 set up costs plus $20 per unit produced. This could be represented by which of the following formulas?

a. $C = 1000N + 20$
b. $C = 20N + 1000$
c. $C = N(1000 + 20)$
d. $C = N + 1020$

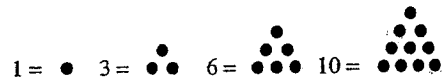28. The best price of a litre of discounted petrol from the local garage is:

    a. $1.36 for 1L   b. $1.50 for $\frac{3}{4}$ L   c. $2 for 1.75L   d. $1 for 750 ml

29. What is the value of x in the following number line?

    1   x 2
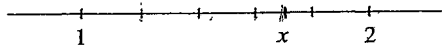
    a.   1.30
    b.   1.35
    c.   1.70
    d.   1.75

30. The triangular numbers can be represented as follows:

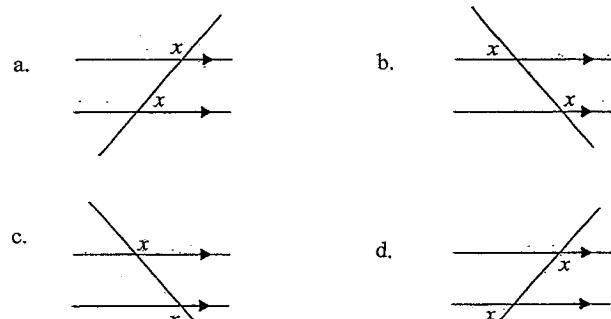 $1 = \bullet$ $3 =$ $6 =$ $10 =$

    What value would the seventh triangle have?

    a. 27   b. 28   c. 29   d. 30

31. The mean of 5 numbers is 15. What value would one extra number have to raise the mean to 16?

    a. 1   b. 5   c. 16   d. 21

32. In which of the following would x be equal?

33. The following table shows how a year 10 class travels to school.

Method of Travel	Number of Students
Bus	7
Train	6
Car	4
Walk	3
Other	5
	Total = 25

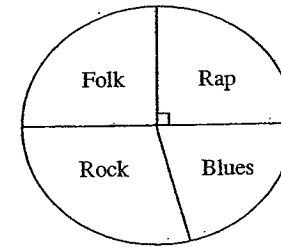   What is the proportion of students travelling by car?

    a. 1/5   b. 4   c. 4/25   d. 16

34. The value of 4^3 is the same as which of the following?

    a. 8^2 b. 3^4 c. 6^2 d. 12^1

35. In the following sector graph the number of 100 year 10 students liking various forms of music is recorded.

    How many students like rap?

    a. 25   b. 20   c. 90   d. 100

36. A solid shape has exactly five faces. One is a square and the other four are triangles. What could the solid be?

    a.   square pyramid
    b.   square prism
    c.   triangular prism
    d.   triangular pyramid

37. Evaluate $1\frac{1}{2} \div \frac{1}{2}$

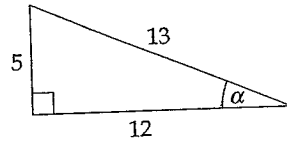   a. 1   b. 3   c. $\frac{3}{4}$ d. $\frac{1}{4}$

38. A driver completed a 600km trip in 8 hours and 20 minutes. What was the car's average speed?

   a.   71km/h   b.   72km/h   c.   73km/h   d.   74km/h

39. What is the value of $\cos \alpha$?

   a. $\dfrac{5}{13}$ b. $\dfrac{12}{13}$ c. $\dfrac{5}{12}$ d. $\dfrac{13}{12}$

40. What is the gradient of the interval PQ?

   a. $-\dfrac{2}{3}$ b. $-\dfrac{3}{2}$ c. $\dfrac{2}{3}$ d. $\dfrac{3}{2}$

Section B   Teacher: _____

Show all necessary working
Neatness may be taken into consideration in the awarding of marks
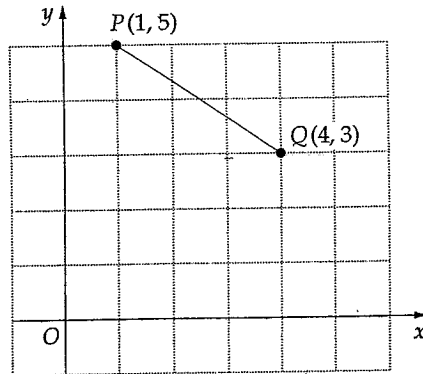
1. Solve the equation: $2(x + 7) = 20$ (2 marks)

2. Given the equation $y = 2x - 1$

   a) Complete a table of values: (2 marks)

x	-1	0		2
y			1	

   b) Draw the graph on the grid provided   (2 marks)
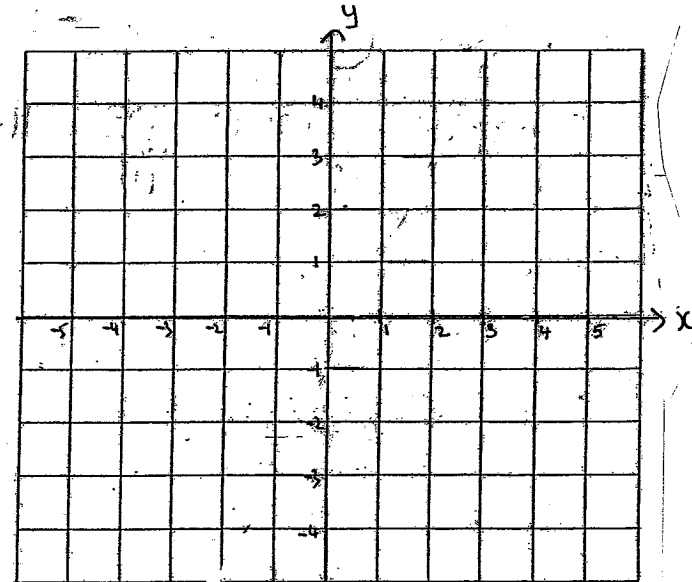
3. Find α to the nearest minute   (3 marks)

10cm

8cm

α
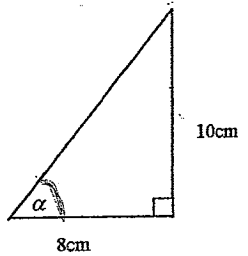
4. Find the value of x and y   (2 marks)
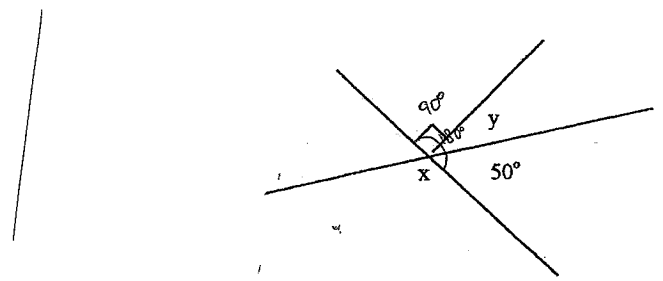
90°
y
x   50°

(not to scale)

5. Into a barrel are placed 100 blue tickets numbered 1 to 100, 50 red tickets numbered 1 to 50 and 50 green tickets numbered 1 to 50. If one ticket is drawn at random from the barrel, what is the probability that the ticket is:

a) Green _____

b) a 36 _____

c) not 50 _____   (3 marks)

Show all necessary working
Neatness may be taken into consideration in the awarding of marks

1. Find the value of X   (3 marks)

14   8

6

X

5

Find the value of X

2. In the diagram, prove $\triangle AOB \equiv \triangle COD$, where O is the centre of the circle   (3 marks)
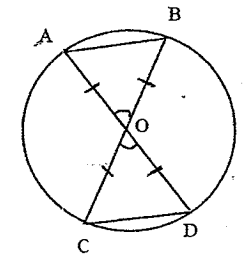
A   B

O

C   D

3. Sarah conducted a survey on Year 10 asking them how many *Pink* songs they liked. She decided to put her results in groups as shown in the table below.

(6 marks)

Class	Class Centre	Frequency (f)	f x C.C	Cumulative Frequency
1 - 5		2		
6 - 10		4		
11 - 15		6		
16 - 20		1		
21 - 25		1		
Total:				

a) Complete the table for the three missing columns

b) Calculate the mean correct to 1 decimal place

c) Determine the modal class

d) Determine the median class

4. Find the surface area of the triangular prism below, in square centimetres
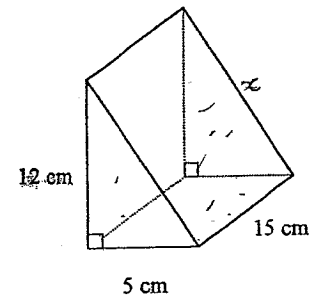
(3 marks)

12 cm

x

15 cm

5 cm

5. The diagram below represents the shape of a garden bed. (4 marks)

L

15m

10m   8m
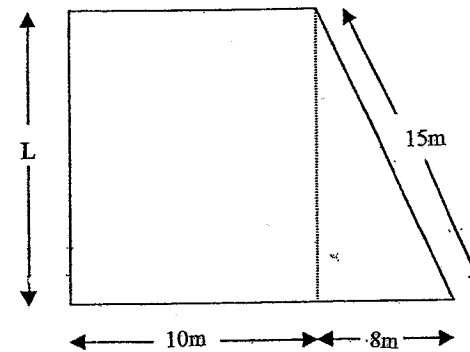
a) Find the length L (correct to 1 decimal place)

b) Find the area of the garden bed, to the nearest square metre

Year 10 Half Yearly 2007
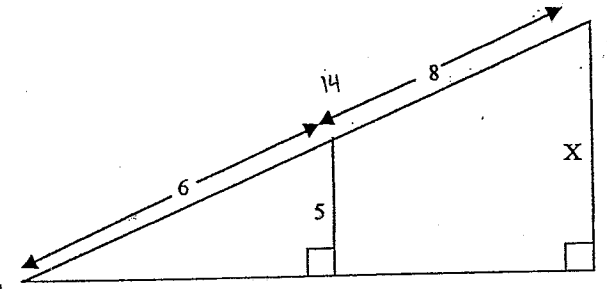**Stage 5.1 – 5.3 Common**
(30 minutes)
Section D

Student: _____

Teacher: _____

Show all necessary working
*Neatness may be taken into consideration in the awarding of marks*

1. Expand and simplify $(2x-3)^2$ (1 mark)

2. Fully simplify $3\sqrt{54} + 2\sqrt{24}$ (2 marks)

3. Fully simplify $\dfrac{3}{x^2+4x-5} + \dfrac{1}{x-1}$ (2 marks)

4. Show that $\dfrac{6+\sqrt{2}}{2\sqrt{3}}$ can be written like $a\sqrt{3} + b\sqrt{6}$, find "a" and "b"

(3 marks)

5. Simplify $\sqrt{16x^{16}}$ (1 mark)

6. Solve these simultaneous equations $3x + 4y = 10$ ① (3 marks)
   $x - 5y = -32$ ②

7. Solve these quadratic equations *(giving your answers as simple surds)*
   a) $2x^2 + 5 = 11x$ (2 marks) b) $5x^2 + 2x - 1 = 0$ (3 marks)

8. Solve the following quadratic equation by completing the square: (3 marks)
   $x^2 + 7x - 4 = 0$ (correct to 2 decimal places)

9.   A spinner can give the numbers 1,2,3,4,5. The spinner is spun twice and the numbers are added together. What is the probability that the **total** is   (5 marks)

i.   divisible by 3

ii.   greater that 7

iii.   less than 4

iv   less that 4 given that it is less than 7.

10.   A solid is made of a cylinder of radius x metres and height x metres, surmounted by a cone , also of height x metres as shown in the diagram below.   (5 marks)

The volume of this solid is found to be exactly equal to a sphere of diameter 24 m.

i.   Find the volume of the sphere to 1 dec.pl.
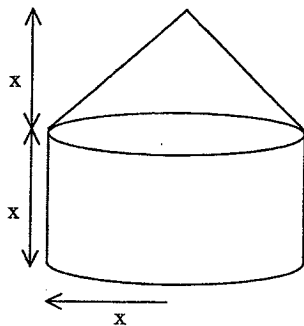
ii.   Find algebraic expressions for the volume of the above cylinder and cone in terms of x (in simplest form)

iii.   Find the value of x.

Student: MASTER COPY SOLUTIONS

Teacher:

MULTIPLE CHOICE ANSWER SHEET

Mark your answer by placing and X through the appropriate box

	a	b	c	d
1	X	b	c	d
2	a	X	c	d
3	a	b	X	d
4	a	b	X	d
5	a	b	X	d
6	a	b	X	d
7	X	b	c	d
8	a	b	c	X
9	a	b	X	(d)
10	X	b	c	d
11	a	X	c	d
12	a	X	c	d
13	a	X	c	d
14	a	b	X	d
15	a	b	c	d
16	X	b	c	d
17	a	X	c	d
18	X	b	c	d
19	a	b	c	X
20	a	b	X	d
21	X	b	c	(d)
22	a	(b)	X	d
23	a	X	c	d
24	X	b	c	d
25	X	b	c	d

	a	b	c	d
26	a	X	c	d
27	a	X	c	d
28	a	b	X	d
29	a	X	c	d
30	a	X	c	d
31	a	b	c	X
32	a	b	X	d
33	a	b	X	d
34	X	b	c	d
35	X	b	c	d
36	X	b	c	d
37	a	X	c	d
38	a	X	c	d
39	a	X	c	d
40	X	b	c	d

$\frac{37}{40}$ ✗

V. Good!!!

Marking Scheme.

Q5.3 Marking Scheme.

$4 \cdot x^2 - 12x + 9$ (1mark)

$\rightarrow 9\sqrt{6}$ (2marks) $\rightarrow 9\sqrt{6}$ or $\frac{4\sqrt{6}}{\text{shown}}$ (1mark)

(2marks) $\frac{x+8}{(x-1)(x+5)}$

Factorising $x^2 + 4x - 5$ correctly. ie $(x-1)(x+5)$ (1mark)

(3marks) $a = 1, b = \frac{1}{6}$

✱ correctly rationalise denominator
ie $\frac{6\sqrt{3} + \sqrt{6}}{6}$

mb * finding "a" and "b" from incorrect working.
ie "a" a correct "a" and "b" from incorrect working.

(1mark) ✱ multiply top and bottom by either $\sqrt{3}$ or $2\sqrt{3}$.

Q5. (1mark) $4x^8$

Q6. (3marks) $y = 5\frac{11}{19}$ and $x = -4\frac{2}{19}$
or /mistake in working.

(2marks) either $y = 5\frac{11}{19}$ or $x = -4\frac{2}{19}$

(1mark) correctly substituting an incorrect 1st value to find the 2nd

Q7a) (2marks) $x = \frac{1}{2}, x = 5$
or $x = \frac{1}{2}$ or $x = 5$
or correct soln from incorrect factorising.

(1mark) $(2x-1)(x-5)$

Q8. (3marks) $x = 7.53, +0.53$
$x = \frac{-7 \pm \sqrt{65}}{2}, -$ equivalent
(2marks) $-\frac{7}{2} \pm \frac{\sqrt{65}}{2}$ or /mistake in working.

(1mark) $(x + \frac{7}{2})^2$

Q9. i) (1mark) $\frac{9}{25}$

ii) (1mark) $\frac{6}{25}$

iii) (1mark) $\frac{3}{25}$

iv) (2marks) $\frac{3}{15}$ (or $\frac{1}{5}$)

(1mark) $\frac{3}{\text{a number other than 25}}$ ← used in (iii)

note: students who recognised the number was 25 in i, ii, iii got a mark.

substitution must show this

Q10. i) (1mark) $V = 7238.2$

ii) (2marks) for πx^3 and $\frac{1}{3}\pi x^3$
(1mark) for πx^3 or $\frac{1}{3}\pi x^3$
or $\pi x^2 \times x + \frac{1}{3}\pi x^2 \times x$

iii) (2marks) $x = 12$
or correct working from incorrect part i

(1mark) $\frac{4}{3}\pi x^3 =$ answer in (i)

✱ Note:
✱ ii (sum) = i

➙ a bold $x = 12$ will get 2 marks even though it is very poor.

➙ $x = 12$ with some justification with radius or diameter get to zero.
ie diam = 24 so rad = 12
∴ $x = 12$ is not correct working.

➙ you must find x, not substitute an $x = 12$.

Student: _____

Teacher: _____ UD _____

Show all necessary working
Neatness may be taken into consideration in the awarding of marks

1. Solve the equation: $2(x + 7) = 20$ (2 marks)

$$2x + 14 = 20$$
$$\quad -14 \quad -14$$
$$2x = 6$$
$$\underline{\underline{x = 3}}$$

✓ Some attempt

✓

2. Given the equation $y = 2x - 1$

$\dfrac{correct}{4} \rightarrow 2$ marks

$2, 3 \rightarrow 1$

$0, 1 \rightarrow 0$

   a) Complete a table of values: (2 marks)

x	-1	0	* 1	2
y	−3	* * −1	1	* 3

b). Draw the graph on the grid provided·   (2 marks)

$y = 2x - 1$
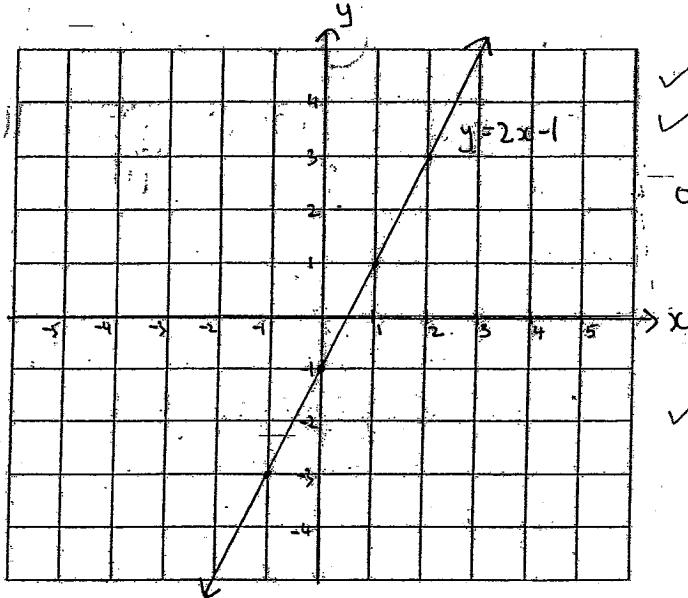
✓ correct line

✓ 0 wrong line

✓
• plotting 2 pts correctly
  [OR]
• plotting their incorrect pts from above
  [OR]
• freehand correct line

/6

3. Find α to the nearest minute [✓ for wrong ratio (ie sin/cos)]   (3 marks)

10cm
8cm
α

$\tan \alpha = \dfrac{10}{8}$
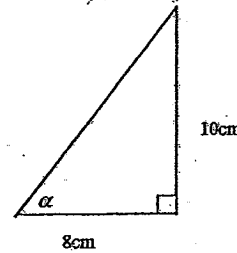
$\alpha = 51.34019174°$

$= 51° 20' 24.69''$

$= 51° 20'$

✓ some attempt

✓ correct but not rounded

✓ nearest min

4. Find the value of x and y   (no reason needed)   (2 marks)

$x = 180 - 50 \ (\text{adj supp})$

$= 130°$ ✓

$y = 130 - 90 \ (\text{vert opp})$

$= 40°$ ✓
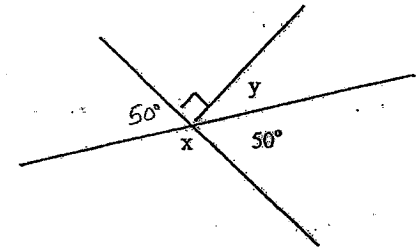
50°   y
50°   x

(not to scale)

5. Into a barrel are placed 100 blue tickets numbered 1 to 100, 50 red tickets numbered 1 to 50 and 50 green tickets numbered 1 to 50. If one ticket is drawn at random from the barrel, what is the probability that the ticket is:

100 B
50 R
50 G

a) Green $\dfrac{50}{200} = \dfrac{1}{4} = 0.25$ ✓

b) a 36 $\dfrac{3}{200} = 0.015$ ✓

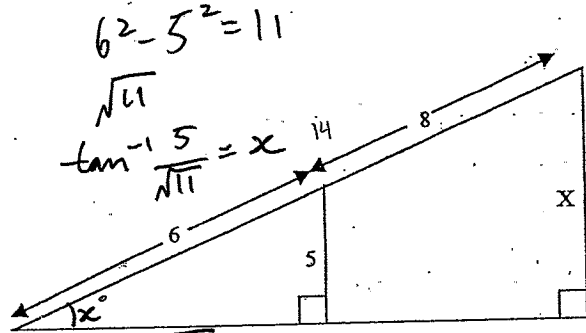c) not 50 $\dfrac{197}{200} = 0.985$ ✓   (3 marks)

• one off for ratio notation

/8

Student: _____

Teacher: _____

Show all necessary working
Neatness may be taken into consideration in the awarding of marks

1. Find the value of X   (3 marks)

$6^2 - 5^2 = 11$

$\sqrt{11}$

$\tan^{-1} \dfrac{5}{\sqrt{11}} = x$

Find the value of X

$\sin x° = \dfrac{5}{6}$

$\sin x° = \dfrac{X}{14}$

$3x = 2\frac{1}{3}$

$X = \sin x × 14$

$X = 11\frac{2}{3}$

$\dfrac{5}{6} = \dfrac{X}{14}$

$X = \dfrac{5 × 14^7}{6_3}$

$= \dfrac{35}{3}$

2. In the diagram, prove $\triangle AOB \equiv \triangle COD$, where O is the centre of the circle
                                                                    (3 marks)

$AO = OD$ (Given)
$BO = OC$ (Given)
$C\hat{O}D = A\hat{O}B$ (vertically opp. ∠'s)
$\therefore \triangle AOB \equiv \triangle COD$ (SAS)
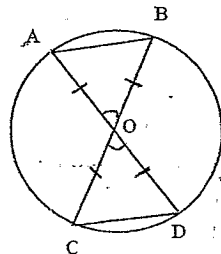
3. Sarah conducted a survey on Year 10 asking them how many *Pink* songs they liked. She decided to put her results in groups as shown in the table below.
                                                                    (6 marks)

Class	Class Centre	Frequency (f)	f x C.C	Cumulative Frequency
1 – 5	3	2	6 ✓	2
6 – 10	8	4	32 ✓	6
11 – 15	13	6	78 ✓	12
16 – 20	18	1	18 ✓	13
21 – 25	23 ✓	1	23 ✓	14
Total:		14		

a) Complete the table for the three missing columns

b) Calculate the mean correct to 1 decimal place

11.2 ✓
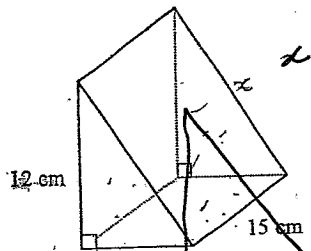
c) Determine the modal class

$11 - 15$ ✓

d) Determine the median class

$11 - 15$ ✓

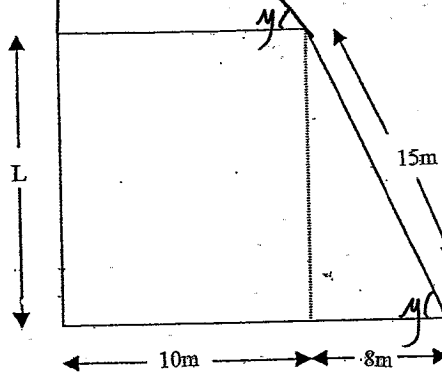4. Find the surface area of the triangular prism below, in square centimetres

(3 marks)

$x = 13$

510 cm^2

12 cm

15 cm

18.75

15.86072143 cm

5. The diagram below represents the shape of a garden bed. (4 marks)

15m

L

10m — 8m

$x + L =$

$\cos^{-1} \frac{8}{15}$

$y = 57.76904736$

$\tan y \times 18 = x + L$

$x + L - x = L$

$L =$

a) Find the length L (correct to 1 decimal place)

$L = 12.7$

b) Find the area of the garden bed, to the nearest square metre

$= 127 \text{ m}^2$ 178 m^2

Show all necessary working
Neatness may be taken into consideration in the awarding of marks

1. Expand and simplify $(2x-3)^2$ (1 mark)

$(2x-3)(2x-3)$

$4x^2 - 6x - 6x + 9$

$= 4x^2 - 12x + 9$

2. Fully simplify $3\sqrt{54} + 2\sqrt{24}$ (2 marks)

$3\sqrt{9 \times 6} + 2\sqrt{4 \times 6}$

$3 \times 3\sqrt{6} + 2 \times 2\sqrt{6}$

$= 9\sqrt{6} + 4\sqrt{6}$

$= 13\sqrt{6}$

3. Fully simplify $\dfrac{3}{x^2+4x-5} + \dfrac{1}{x-1}$ (2 marks)

$\dfrac{x+8}{(x+5)(x-1)}$ ✳

$\dfrac{3}{(x+5)(x-1)} + \dfrac{1}{(x-1)}$

$= \dfrac{3}{(x+5)(x-1)} + \dfrac{(x+5)}{(x+5)(x-1)}$

$= \dfrac{3x+15}{(x+5)(x-1)} = \dfrac{3(x+5)}{(x+5)(x-1)} = \dfrac{3}{(x-1)}$

4. Show that $\dfrac{6+\sqrt{2}}{2\sqrt{3}}$ can be written like $a\sqrt{3} + b\sqrt{6}$, find "a" and "b"

(3 marks)

$\dfrac{\sqrt{3}}{\sqrt{3}} \times \dfrac{6+\sqrt{2}}{2\sqrt{3}} = a\sqrt{3} + b\sqrt{6}$

$= \dfrac{6\sqrt{3} + \sqrt{6}}{6}$

$= \sqrt{3} + \tfrac{1}{6}\sqrt{6}$

$a = 1, \ b = \tfrac{1}{6}$

5. Simplify $\sqrt{16x^{16}}$ (1 mark)

$$\sqrt{16x^{16}} = (4x^8)^2 \quad \text{(only 2nd one in the form to get this correct well done).}$$

$$= 4x^8 \checkmark$$

6. Solve these simultaneous equations $3x + 4y = 10$ ① (3 marks)
   $x - 5y = -32$ ②

$$② \times 3 = 3x - 15y = -96 \; ③$$

$$③ - ① = -19y = -106$$

$$19y = 106$$
$$y = \frac{106}{19} = 5.58 \checkmark$$

sub y into ②
$$x - (5 \times 5.58) = -32$$
$$x = -4.1 \quad \text{Never! ever! round off your answer if solutions to these quadratic equations can be as a fraction.}$$

7. Solve these quadratic equations Give exact and fully simplified
   a) $2x^2 + 5 = 11x$ (2 marks) b) $5x^2 + 2x - 1 = 0$ (3 marks)

$$2x^2 - 11x + 5 = 0$$
$$(2x - 1)(x - 5) = 0$$

$$2x - 1 = 0 \qquad x - 5 = 0$$
$$2x = 1 \qquad 2x = 5$$
$$x = \frac{1}{2}$$

$$\therefore x = 5, \frac{1}{2}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-2 \pm \sqrt{2^2 - 4 \times 5 \times -1}}{2 \times 5}$$

$$x = \frac{-2 \pm \sqrt{24}}{10} \checkmark\checkmark$$

$$x = \frac{-2 \pm 4\sqrt{24}}{10} \; \alpha$$

8. Solve the following quadratic equation by completing the square: (3 marks)
   $x^2 + 7x - 4 = 0$ (correct to 2 decimal places)

$$x^2 + 7x = 4$$
$$x^2 + 7x + \left(\frac{7}{2}\right)^2 = 4 + \left(\frac{7}{2}\right)^2$$
$$(x + 3.5)^2 = 16.25$$
$$x + 3.5 = \pm\sqrt{16.25}$$
$$x = \pm\sqrt{16.25} - 3.5 \; \checkmark\checkmark\checkmark$$
$$x = 0.53, -7.53$$

⑪

* Question 7 should read " Solve these quadratic equations *completely*"

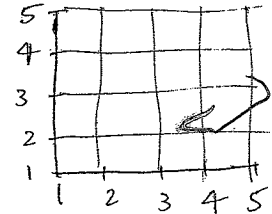* Cross out questions 9 and 10 and replace them with the following :

9. A spinner can give the numbers 1,2,3,4,5. The spinner is spun twice and the numbers are added together. What is the probability that the **total** is (5 marks)

   i. divisible by 3 $\frac{9}{25}$
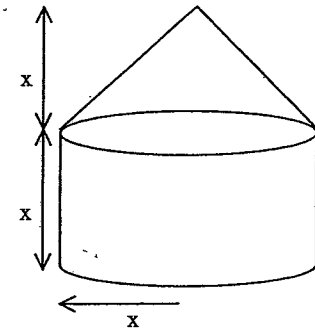
   ii. greater that 7 $\frac{6}{25}$

   iii. less than 4 $\frac{3}{25}$

   iv. less that 4 given that it is less than 7. $\frac{3}{15}$ or $\frac{1}{5}$

10. A solid is made of a cylinder of radius x metres and height x metres, surmounted by a cone , also of height x metres as shown in the diagram below. (5 marks)

The volume of this solid is found to be exactly equal to a sphere of diameter 24 m.

   i. Find the volume of the sphere to 1 dec.pl.

$$V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times \pi \times 12^3$$
$$V = 7238.2 \text{ m}^3$$

   ii. Find algebraic expressions for the volume of the above cylinder and cone in terms of x (in simplest form)

   cylinder
$$V = \pi \times x^2 \times x$$
$$V = \pi x^3$$

   cone
$$V = \frac{1}{3}\pi \times x^2 \times x$$
$$V = \frac{1}{3}\pi x^3$$

   iii. Find the value of x.

$$\pi x^3 + \frac{1}{3}\pi x^3 = 7238.2$$
$$\frac{4}{3}\pi x^3 = 7238.2$$
$$x^3 = 1728 \quad (1727.9929\cdots)$$
$$x = 12$$