BRIGIDINE RANDWICK COLLEGE

YEAR 9 YEARLY EXAM 2014

Name: _____ Teacher: /_____

Algebra and Number	30min (approx.)	/35
Measurement and Geometry	30min (approx.)	/30
Statistics And Probability	15min (approx.)	/15
Challenge	15min (approx.)	/20
Total	90 min	/100

SECTION A: NUMBER AND ALGEBRA   (35 MARKS)

Circle the correct multiple choice answer

1. The expression $3a+4b-2a-b$ simplifies to

   A. $3a-b$ B. $a+5b$ C. $a+3b$ D. $5a+3b$

2. Given a:b $= 2:3$ and b:c $= 4:5$. What is a:c ?

   A.   1:2   B.   2:5   C.   3:5   D.   8:15

3. Minnette is m years old. Joanne is 5 years older than Minnette. Which of these is an expression for Joanne's age in 3 years time?

   A. $m - 2$ B. $3(m - 5)$ C. $m + 8$ D. $3m + 5$

4. Convert $80km/h$ to m/s. (to the nearest metre per second)

   A.   13   B.   22   C.   27   D.   30

5. Katrina sells cars. She earns $270 per week plus 5% commission on her total weekly sales over $40 000.
   What is the value of her sales in a week when she earns $860?

   A. $11 800   B. $17 200   C. $51 800   D. $57 200

Show all working for the following questions.

6. a. Simplify $4a^2 + 7a - a^2 + a$ 1

   b. Simplify $\dfrac{x}{10} + \dfrac{2x}{5}$ 2

7. a. Solve $4x + 12 = 20$ 1

   b. Solve $9x - 3 = 4x + 17$ 2

8. If $S = \dfrac{n}{2}[2a + (n-1)d]$ find d if $S = 498$, $n = 12$, $a = 3$.   2

9. The table below is used to calculate tax payable on personal yearly income.

Taxable income	Tax on this income
0 - $18,200	Nil
$18,201 - $37,000	19c for each $1 over $18,200
$37,001 - $80,000	$3,572 plus 32.5c for each $1 over $37,000
$80,001 - $180,000	$17,547 plus 37c for each $1 over $80,000
$180,001 and over	$54,547 plus 45c for each $1 over $180,000

   a. Determine how much tax Emily would pay if she earned a gross salary of $77 000 per year.   2

   b. How much would Emily receive each fortnight after tax was deducted?   1

10. Angelica's annual salary $72 400

   a. Calculate her weekly income.   1

   b. Holiday loading is calculated at $17\frac{1}{2}$% of four weeks pay. Calculate Angelica's loading.   1
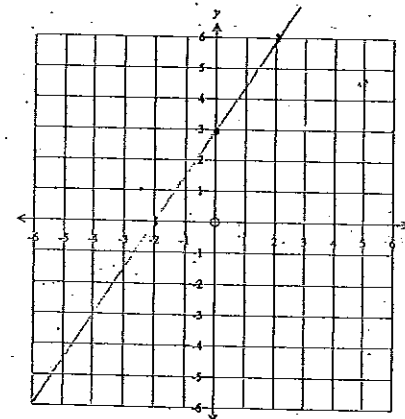
   c. Angelica takes four weeks' holiday. Calculate Angelica's holiday pay.   1

   d. Angelica's employee is thinking of abolishing holiday loading. To compensate, he offers Angelica a 1.6% increase in salary. Use calculations to explain why Angelica is better off with a 1.6% increase in salary.   2

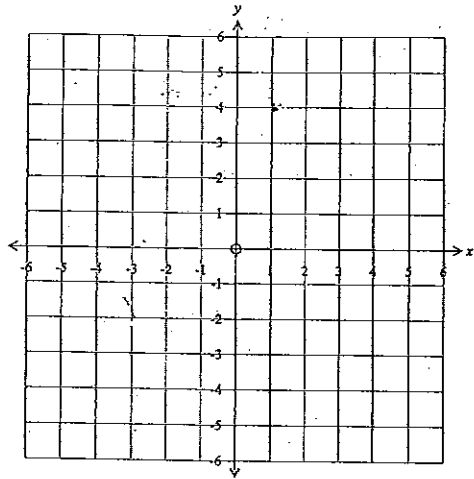11. a. Complete the table of values for $y = \dfrac{3}{2}x + 3$ 1

x	-2	0	2
y			

   b. Graph the line $y = \dfrac{3}{2}x + 3$ on the number plane.   2

12. A(–3, –2) and B(1, 4) are points on the number plane.
   a. Plot these points on the number plane provided. Clearly label each point with the appropriate letter. **1**

   b. Determine the distance between A and B. Express your answer correct to 1 decimal place. **2**

   c. Calculate the gradient of the line passing through A and B. **1**

   d. Determine the equation of line AB. **2**

13. Kathleen's aunty was 42 years old when Kathleen was born. Her aunty was three times Kathleen's age when she retired.
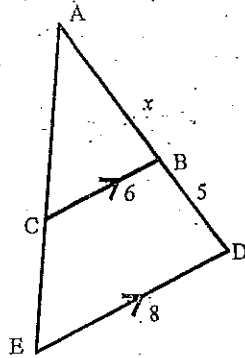
   How old was Kathleen when her aunty retired? Write equations and solve. **2**

14. Tony usually works a 32 hour week. Calculate his hourly rate of pay in a week where he worked 37 hours at an overtime rate of time and a half, if he earned $888.75 for that week. **3**
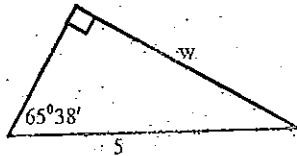
Student : _____
Teacher : _____

1.
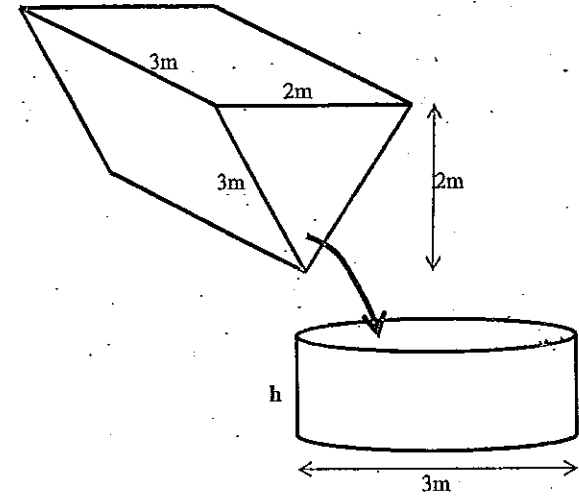

a. State which condition could be used to show that triangle ABC similar to triangle ADE? (You do not need to prove they are similar).   1
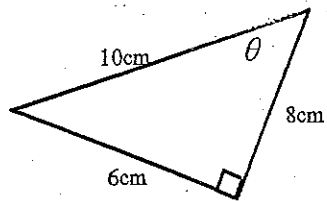
b. Find x.   2

2. a. Find w :

(1)

3. The trough in the shape of a triangular prism is full of water. It is emptied into another trough in the shape of a cylinder. What height will the cylindrical trough be filled up to (to 2 decimal places)?   3
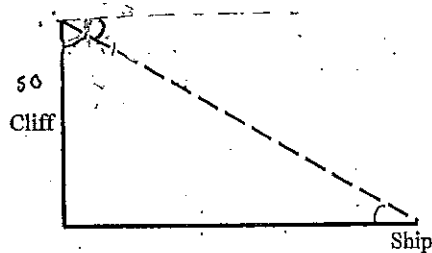
b.   Find θ to the nearest minute

10cm

θ

8cm

6cm

c.   The angle of depression of a ship out to sea as seen from a vertical cliff, 50m above the water is 60°.

    i.   Fill in the information provided. 1   ii.   Find the exact distance
         (clearly identifying the angle   from the ship to the base
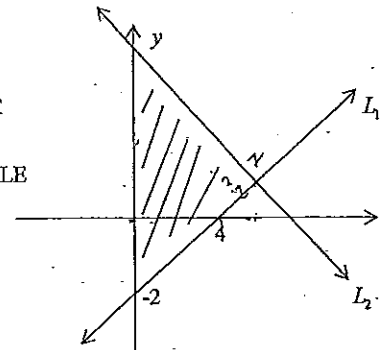   of depression)   of the cliff.   2

50
Cliff

Ship

d.   In a right angle triangle, if $\sin\theta = \dfrac{\sqrt{10}}{4}$, find the exact value of $\cos\theta$.   2

4.

NOT
TO
SCALE

L_1

L_2

-2

4

a.   Determine the equation of L_1
                                              1

b.   If L_2 is perpendicular to L_1, find the equation of L_2 if L_1 and L_2 intersect at $\left(7, \dfrac{3}{2}\right)$.

Leave your answer in general form. 2

c.   Calculate the area of the shaded region. 2

5.   Expand and simplify the following: $(3a-1)(2a-5)-(3a-2)^2$ 2

BRIGIDINE RANDWICK COLLEGE

YEAR 9 YEARLY EXAM 2014

Name: _____ Teacher: _____

SECTION C: STATISTICS AND PROBABILITY   (15 MARKS)

Circle the correct multiple choice answer

Question		Marks

1   A letter is chosen at random from the word REFERENCES. What is the probability it is the letter E?   1

   (A) $\frac{1}{10}$ (B) $\frac{1}{5}$ (C) $\frac{3}{10}$ (D) $\frac{2}{5}$

2   The Weather Bureau predicts a 30% chance of rain tomorrow. Which fraction represents the probability that it won't rain?   1

   (A) $\frac{3}{10}$ (B) $\frac{1}{2}$ (C) $\frac{2}{3}$ (D) $\frac{7}{10}$

3   Find the median for the set of scores 5, 2, 3, 7, 9, 8, 8.   1

   (A)   7   (B)   6   (C)   5.5   (D)   5

4   A group of six students completed a test. The mean for the group on this test was 15. However one of the scores had been incorrectly recorded as a 10 instead of 20. What is the correct mean?   1
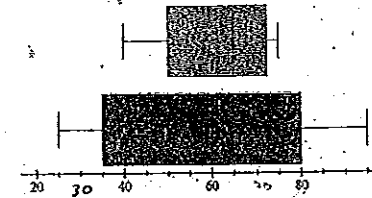
   (A)   16.5   (B)   16.7   (C)   17.3   (D)   18.3

5   The results of two yearly examinations are displayed in the box-and-whisker plot. Determine the interquartile range for exam B.

Exam A

Exam B

   (A) 22.5   (B)   35   (C)   45   (D)   65

Show all working for the following questions

6   The time taken (in seconds) to download twelve different videos is shown below:

130, 145, 129, 153, 143, 127, 129, 142, 137, 148, 139, 141.

Calculate correct to 2 decimal places.

   (i)   Mean   1

   (ii)   Median   1

7   Refer to the table below which records Andy's results in his last 50 tennis matches comparing how often his first serve was in.

One of his matches is chosen at random.

	Serve $\geq$ 60%	Serve < 60%	Totals
Won the match	25	6	31
Lost the match	7	12	19
Totals	32	18	50

(a) What is the probability that he won the match?   1

_____

_____

(b) What is the probability that he served < 60% in the match?   1

_____

_____

(c) What is the probability that he won the match and served < 60%?   1

_____

_____

8   The cumulative frequency histogram summarises the results of a test.
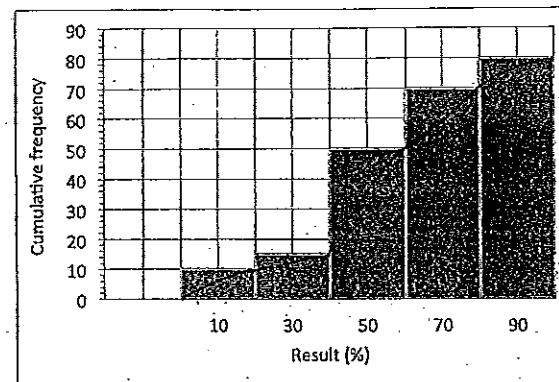
(i)   How many people completed the test?   1

_____

_____

(ii)   Construct a cumulative frequency polygon (or ogive) on this graph.   1

9   The digits 8, 7, 6, 5, 4 and 3 are written on six separate cards. Three cards are drawn at random from the deck, one at a time, and placed face up on a table to form a three-digit number.

(i)   How many different three-digit numbers can be formed?   1

_____

(ii)   What is the probability of selecting 345?   1

_____

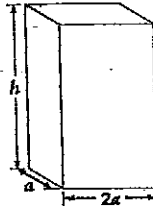(iii) What is the probability of selecting a number greater than 600?   1

_____

SECTION B: GEOMETRY and MEASUREMENT   30 (MARKS)

Circle the correct multiple choice answer

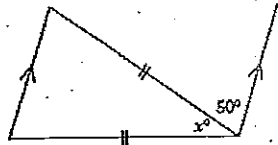1. What is the total surface area, in square units, of this rectangular prism?

    A. $2a^2h$ B. $4a^2+4ah$ C. $4a^2+6ah$ D. $4a^2+8$

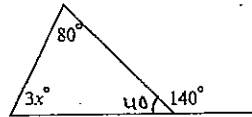2. The diameter of a circle is 6cm. The perimeter is closest to:

    A. 3cm   B. 9cm   C.   18cm   D.   19cm

3. What is the value of x

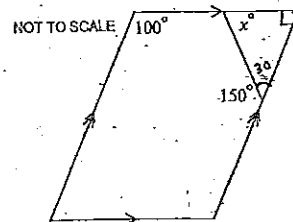   A. 40^0 B. 50^0 C. 65^0 D. 80^0

4. The value for x in the diagram is

    A. 80^0 B. 60^0 C. 40^0 D. 20^0

5. The figure shown is a parallelogram.

    What is the value of x?

    A. 50   B. 70   C. 90   D. 100

    NOT TO SCALE 100^0 x^0
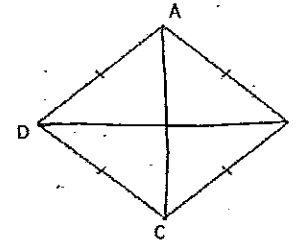
    30^0

    150^0

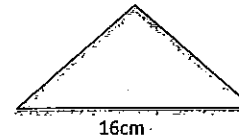Show all working for the following questions.

6. Calculate the area of the trapezium to the nearest square metre.   1

    15cm   10cm
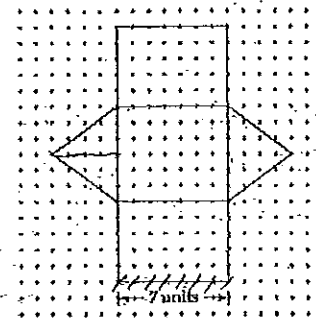
    30cm

7. ABCD is a rhombus. Its area is 48cm², and AC = 8cm . What is the length of BD ?   1

    A

    D   B

    C

8. The triangle shown has an area of 48 cm² with a base of 16 cm.
    Determine the height of the triangle.   2

    16cm
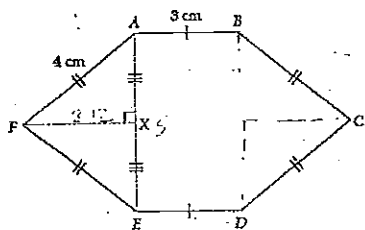
9. a. What is the name of the solid formed by this net ?   1

    b. What is the surface area of this solid?   2

    7 units
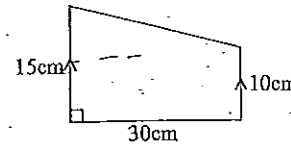
10.   For the hexagon ABCDEF

a. Calculate the perimeter of ABCDEF.   1

b. AE = 5cm. Show by calculation that FX= 3.12 (correct to 2 decimal places)   1

c. Calculate the area of ABCDEF.   2

d. A new fruit-juice container in the form of a hexagonal prism is constructed

   using hexagon ABCDEF as the base. The fruit juice container is to hold 250 mL.
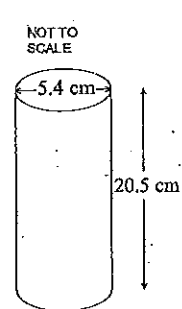   NOTE 1 mL = 1 cm^3

   Calculate the height of the container to the nearest centimetre.   2

11.   Calculate the surface area of the following cylinder to the nearest square centimetre   2

NOT TO SCALE

5.4 cm

20.5 cm
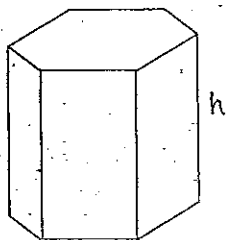
12.   The volume of a cube is 64cm^3. Determine its surface area.   2

13.   Name the regular polygon that has each of its external angles equal to 72 degrees.   2
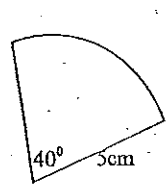
14.   The angles inside a quadrilateral are represented by $x^0, (x+30)^0, (x+10)^0$ and $(x+20)^0$.
       Find the size of the largest angle.   2
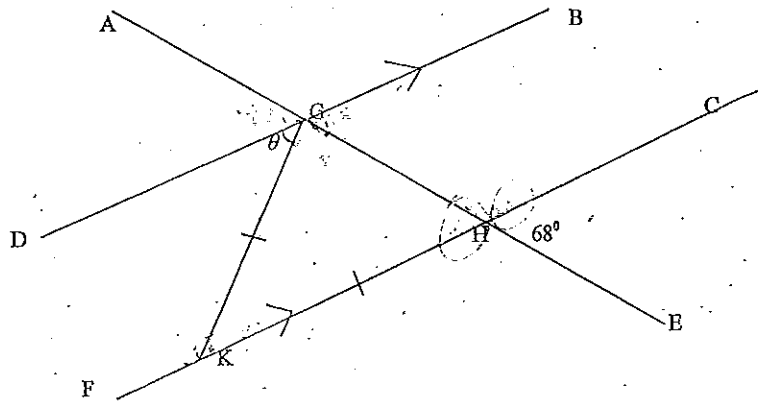
15. Find the area of the following sector.

4

40° 5cm

16. Find θ giving reasons.   NOT TO SCALE

3

A   B

G

θ

D   C

H   68°

E

F   K

Student Name: _____

Teacher's Name: _____ , _____

SECTION A: NUMBER AND ALGEBRA (35 MARKS)

Circle the correct multiple choice answer

1. The expression $3a+4b-2a-b$ simplifies to

   $a+3b$

   A. $3a-b$ B. $a+5b$ C. $a+3b$ D. $5a+3b$ ✓

2. Given a:b = 2:3 and b:c = 4:5 . What is a:c ?   15:1

   A. 1:2   B. 2:5   C. 3:5   D. 8:15   ✗

3. Minnette is m years old. Joanne is 5 years older than Minnette.
   Which of these is an expression for Joanne's age in 3 years time?

   $3(m+5)$

   A. $m-2$ B. $3(m-5)$ C. $m+8$ D. $3m+5$ ✗

4. Convert $80 km/h$ to m/s. (to the nearest metre per second)

   A. 13   B. 22   C. 27   D. 30   ✓

5. Katrina sells cars. She earns $270 per week plus 5% commission on her total weekly sales over $40 000.
   What is the value of her sales in a week when she earns $860?

   A. $11 800   B. $17 200   C. $51 800   D. $57 200   ✗

1

Show all working for the following questions.

6. a. Simplify $4a^2+7a-a^2+a$ 1

   $4a^2-a^2+7a+a$

   $3a^2+8a$ ✓

   b. Simplify $\dfrac{x}{10}+\dfrac{2x\times2}{5\times2} = \dfrac{5x}{10} = \dfrac{x}{2}$ 2

   $\dfrac{5x+20x}{15} = \dfrac{25x}{15} = \dfrac{5x}{3}$ ✗ ✓

   $\dfrac{x}{10}+\dfrac{2x}{10} = \dfrac{5x}{10}$

7. a. Solve $4x+12=20$ 1

   $4x+12=20$
   $4x = 20-12$
   $4x = 8$
   $x = 2$ ✓

   b. Solve $9x-3=4x+17$ 2 $\dfrac{x}{2}$

   $9x-4x = 17+3$
   $5x = 20$
   $x = 4$ ✓✓

8. If $S=\dfrac{n}{2}[2a+(n-1)d]$ find d if $S = 498$, $n = 12$, $a = 3$.   2

   $498 = \dfrac{12}{2}[2(3)+(12-1)d]$
   $498 = 6[6+(11)d]$
   $498 = 6(6+11d)$
   $498 = 36+66d$
   $462 = 66d$

   $\dfrac{462}{66} = d$
   $d = 7$ ✓✓

9. The table below is used to calculate tax payable on personal yearly income.

Taxable income	Tax on this income
0 - $18,200	Nil
$18,201 - $37,000	19c for each $1 over $18,200
$37,001 - $80,000	$3,572 plus 32.5c for each $1 over $37,000
$80,001 - $180,000	$17,547 plus 37c for each $1 over $80,000
$180,001 and over	$54,547 plus 45c for each $1 over $180,000

a. Determine how much tax Emily would pay if she earned a gross salary of $77 000 per year.   2

   $77000 - 37000 = 40000 \times 0.325$
   $= 13000+3572$
   $= 16572$ ✓✓

b. How much would Emily receive each fortnight after tax was deducted?   1

   $77000 - 16572$
   $= 60428/52$
   $= 1162.07 \times 2 = \$2324.15$ ✓

10. Angelica's annual salary $72 400

   a. Calculate her weekly income.   1

$$72400/52$$
$$= \$1392.30$$

   b. Holiday loading is calculated at $17\frac{1}{2}\%$ of four weeks pay. Calculate Angelica's loading.   1

$$\$1392.31 \times 4$$
$$= 5,569.24 \times 0.175$$
$$= \$974.62$$

1 week loading $= \$243.654$
$= \$243.65$

   c. Angelica takes four weeks' holiday. Calculate Angelica's holiday pay.   1

4 weeks $= \$974.62$ not finished

243 65
× 4

$974.62 + 59.24$
$= \$6543$

   d. Angelica's employee is thinking of abolishing holiday loading.
   To compensate, he offers Angelica a 1.6% increase in salary.
   Use calculations to explain why Angelica is better off with a 1.6% increase in salary.   2
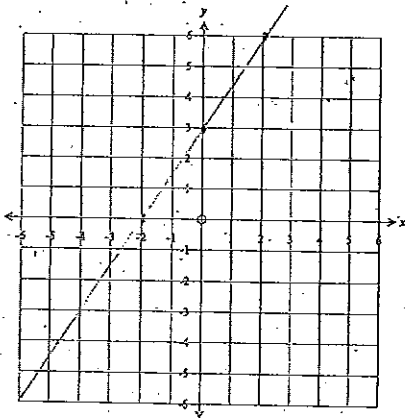
$$72400 \times 0.016$$
$$= 1158.4$$
$$= 73558.4$$

Because the 1.6 increase is more than the Holiday loading.

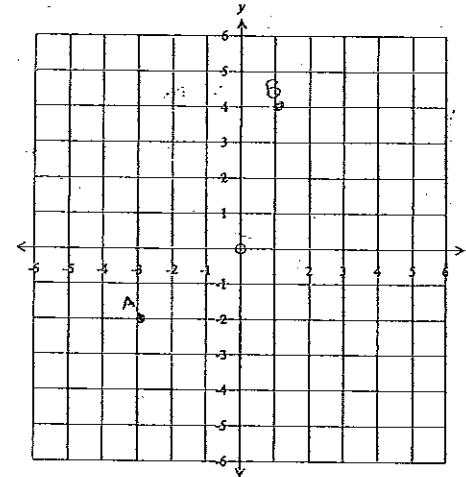11. a. Complete the table of values for $y = \frac{3}{2}x + 3$ 1

x	-2	0	2
y	0	3	6

   b. Graph the line $y = \frac{3}{2}x + 3$ on the number plane.   2

12. A(−3, −2) and B(1, 4) are points on the number plane.

   a. Plot these points on the number plane provided. Clearly label each point with the appropriate letter.   1

   b. Determine the distance between A and B. Express your answer correct to 1 decimal place.   2

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
$$\sqrt{(1+3)^2 + (4+2)^2}$$
$$(4)^2 + (6)^2$$
$$16 + 36 \Rightarrow \sqrt{52} = 7.2$$

   c. Calculate the gradient of the line passing through A and B.   1

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{4+2}{1+3} = \frac{6}{4} = \frac{3}{2}$$

   d. Determine the equation of line AB.   2

$$y + 2 = \frac{3}{2}(x + 3)$$
$$y + 2 = \frac{3}{2}x + 4.5$$
$$y = 1.5x + 2.5 \text{ or } y = 1\tfrac{1}{2}x + 2\tfrac{1}{2}$$

13. Kathleen's aunty was 42 years old when Kathleen was born. Her aunty was three times Kathleen's age when she retired.

How old was Kathleen when her aunty retired? Write equations and solve.   2

$$3x - x = 42$$
$$2x = 42$$
$$x = 21$$

14. Tony usually works a 32 hour week. Calculate his hourly rate of pay in a week where he worked 37 hours at an overtime rate of time and a half, if he earned $888.75 for that week.

3

$32 \times$ $(888.75 \div 32)$

$(5 \times 1.5) = 7.5$ 32
               $+7.5$
              $\overline{39.5}$
$888.75 \div 39.5$

$= \$22.50$ an hour.

$(32 \times 22.50) + (22.50 \times 5 \times 1\frac{1}{2})$
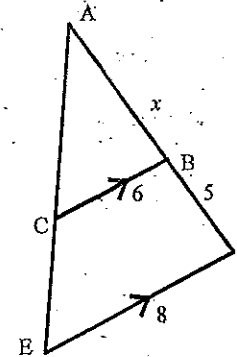
$(720) + (168.75)$

$= \$888.75$

✓✓✓

1.

$\frac{8}{6} = \frac{x+5}{x}$

$\frac{6}{8} = \frac{5+x}{5}$

$3\frac{3}{4} = 5+x$

$\ldots = 1.25$

a. State which condition could be used to show that triangle ABC similar to triangle ADE? (You do not need to prove they are similar).   1

Matching ~~sides: were~~ the ~~angles~~ sides correspond ~~with each other~~ Equiangular (All angles are equal) ✗

b. Find x.   2

$\frac{8}{6} = 1.3$

$15 \times 1.3 = x$

$\frac{6}{8} = 0.75$

$\frac{5+x}{5} \div \frac{8}{6} \times 5 \rightarrow$

$5x = 6.666$
$x = 1.666$ ✗

$5x = 3.75$
$x = 0.75$

Can't read !! ✗

2. a. Find w :
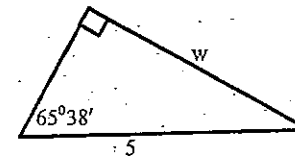
$\sin 65°38' = \frac{w}{5}$

$(\sin 65°38') \times 5 = w$

$4.55 = w$

$w = 4.6$ ✓

b. Find θ to the nearest minute

10cm, 8cm, 6cm
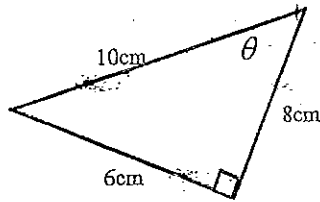
$$\tan\theta = \frac{6}{8}$$
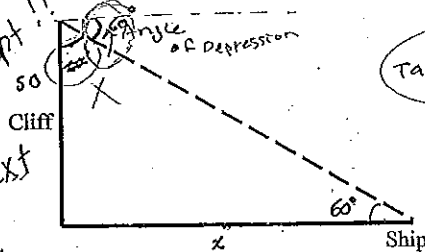
$$\theta = \tan^{-1}\frac{6}{8}$$

$$\theta = 36°52' \checkmark$$

c. The angle of depression of a ship out to sea as seen from a vertical cliff, 50m above the water is $60°$.

(i.) Fill in the information provided. (clearly identifying the angle of depression)   1
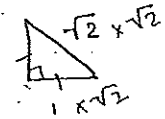
ii. Find the exact distance from the ship to the base of the cliff.   2

Can't accept !!
Must be clearer next time !!

Angle of Depression
50, Cliff, 60°, x, Ship

$$\tan 60° = \frac{x}{50} \quad \frac{50}{x} \quad \checkmark \text{ Incorrect from diagram}$$

$$x = 28.86 \checkmark$$

$$\therefore x = \frac{50}{\tan 60°}$$

$$= 28.87 \text{ (to 2 d.p)}$$

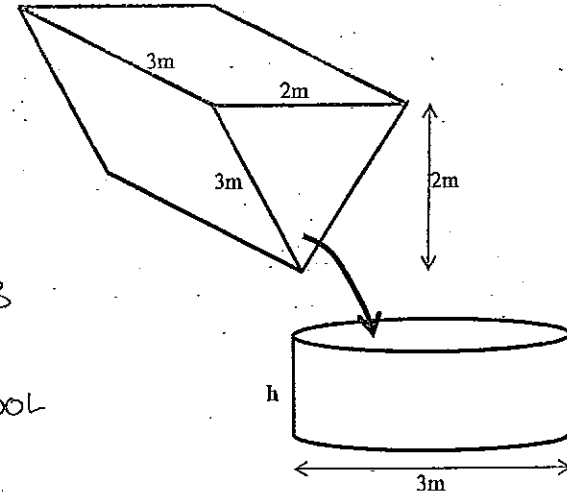**d.** In a right angle triangle, if $\sin\theta = \frac{\sqrt{10}}{4}$, find the exact value of $\cos\theta$.   2

$\sqrt{2} \times \sqrt{2}$
$1 \times \sqrt{2}$
$\sqrt{3} \times \sqrt{2}$
2

$$\cos\theta = \frac{\sqrt{6}}{4} \checkmark\checkmark$$

$\frac{\sqrt{10}}{4}$
$4 \quad \sqrt{6}$
$4\sqrt{2}$

$$\sqrt{10}^2 + c^2 = 4^2$$
$$10 + c^2 = 16$$
$$16-10 = c^2$$
$$c^2 = \sqrt{6}$$

3. The trough in the shape of a triangular prism is full of water. It is emptied into another trough in the shape of a cylinder. What height will the cylindrical trough be filled up to (to 2 decimal places)?   3

3m, 2m, 3m, 2m, h, 3m

$$\frac{1}{2}(2\times 2)\times 3$$

$$2+3 \checkmark$$

$$= 6m^3 \quad 600L$$

$$1cm^3 = 1ml$$

$$2\pi rh + 2\pi r^2$$
$$2\times\pi\times1.5\times h + 2\times\pi\times2.25$$
$$3\pi h + 4.5\pi$$
$$8\pi \times h$$
$$= 25.132h$$

$$\pi r^2 h$$
$$\pi\times2.25\times h$$
$$\boxed{7.068h = 6m}$$ $\checkmark$
$$600$$

$$= 0.84\text{ m}$$

$$= 840\text{ cm}$$

$$84\text{ cm}$$

$$h = 84\text{cm}$$

$$\pi\times2.25\times0.84$$
$$=5.937\cdots$$
$$=6m \quad \times$$

(1)

(2)

(4)

(2)

4.

NOT
TO
SCALE

a. Determine the equation of L_1. (1)

$y =$

$y + 2 = m = 6x = \frac{0 + 2}{4 - 0} (x - 0)$
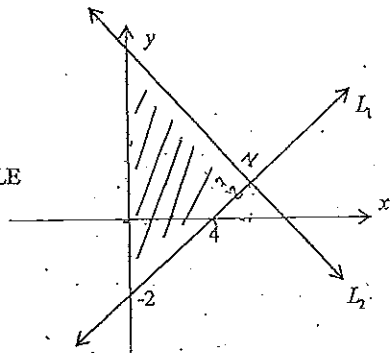
$y + 2 = \frac{2}{4}(x - 0)$

$y + 2 = \frac{1}{2}x$

$y = \frac{1}{2}x - 2$ ✓

b. If L_2 is perpendicular to L_1, find the equation of L_2 if L_1 and L_2 intersect at $\left(7, \frac{3}{2}\right)$.

Leave your answer in general form. 2

$y - \frac{3}{2} = m\left(x - \frac{3}{2}\right)$

$y - \frac{3}{2} = mx - \frac{3}{2}m$

$L_1 = y = \frac{1}{2}x - 2$

$y = 2x$

$y - \frac{3}{2} = -2(x - 7)$

$y - \frac{3}{2} = -2x + 14$

$\boxed{y = -2x + (15\frac{1}{2})}$ ✓

c. Calculate the area of the shaded region. 2

$y = -2x + 31$

$y = -2(0) + 15\frac{1}{2} = y = 15\frac{1}{2}x$

then

$A = \frac{b \times h}{2} = \frac{17\frac{1}{2} \times 7}{2}$

$= 61.25 \text{ units}$

5. Expand and simplify the following: $(3a-1)(2a-5) - (3a-2)^2$ 2

$= 6a^2 - 15a - 2a + 5 - (9a^2 + 4 - 12a)$

$= 6a^2 - 17a + 5 - 9a^2 - 4 + 12a$

$= -3a^2 - 5a + 1$

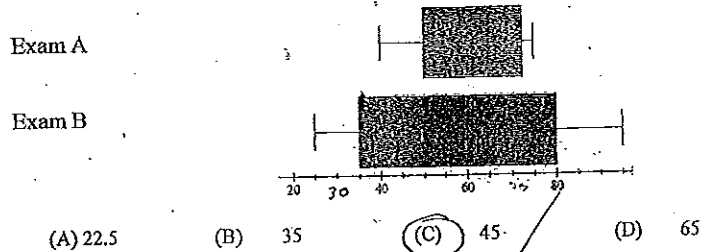

BRIGIDINE RANDWICK COLLEGE

YEAR 9 YEARLY EXAM 2014

$\frac{14}{15}$

Name: _____ Teacher: _____

SECTION C: STATISTICS AND PROBABILITY   (15 MARKS)

Circle the correct multiple choice answer

Question		Marks

1. A letter is chosen at random from the word REFERENCES. What is the probability it is the letter E?   **1**

   $\frac{4}{10}$ $\frac{2}{5}$

   (A) $\frac{1}{10}$ (B) $\frac{1}{5}$ (C) $\frac{3}{10}$ (D) $\frac{2}{5}$ ✓

2. The Weather Bureau predicts a 30% chance of rain tomorrow. Which fraction represents the probability that it won't rain?   **1**

   (A) $\frac{3}{10}$ (B) $\frac{1}{2}$ (C) $\frac{2}{3}$ (D) $\frac{7}{10}$ ✓

3. Find the median for the set of scores 5, 2, 7, 7, 9, 8, 8.   **1**

   (A) 7   (B) 6   (C) 5.5   (D) 5 ✓

4. A group of six students completed a test. The mean for the group on this test was 15. However one of the scores had been incorrectly recorded as a 10 instead of 20. What is the correct mean?   **1**

   (A) 16.5   (B) 16.7 ✓   (C) 17.3   (D) 18.3

4

5   The results of two yearly examinations are displayed in the box-and-whisker plot. Determine the interquartile range for exam B.

Exam A

Exam B

20   30   40   60   80

(A) 22.5   (B)   35   (C)   45   (D)   65

$80 - 35 = 45$

Show all working for the following questions

6   The time taken (in seconds) to download twelve different videos is shown below:

130, 145, 120, 153, 143, 127, 129, 142, 137, 148, 139, 141.

Calculate correct to 2 decimal places.

(i)   Mean $= 137.83$ 1

(ii) Median 140 1

120, 127, 129, 130, 137, (139, 141) 142, 143, 145, 148 153

$\dfrac{139 + 141}{2}$

$= 140$

---

7   Refer to the table below which records Andy's results in his last 50 tennis matches comparing how often his first serve was in.

One of his matches is chosen at random.

	Serve $\geq 60\%$	Serve $< 60\%$	Totals
Won the match	25	6	31
Lost the match	7	12	19
Totals	32	18	50

(a) What is the probability that he won the match?   1

$\dfrac{31}{50}$ The probability that Andy won the match was 62% Most likely

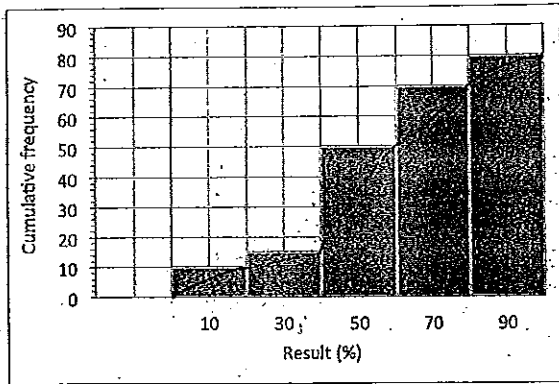(b) What is the probability that he served $< 60\%$ in the match?   1

$\dfrac{18}{50}$ the probability of Andy's serves being $< 60\%$ is 36%. is unlikely near even

(c) What is the probability that he won the match and served $< 60\%$?   1

$\dfrac{13}{50}$ the probability that Andy won the match and served $< 60\%$ was 26% unlikely

$\dfrac{6}{50} = \dfrac{3}{25}$

8. The cumulative frequency histogram summarises the results of a test.

(i) How many people completed the test?   **1**

80 people ✓

(ii) Construct a cumulative frequency polygon (or ogive) on this graph.   **1**

9. The digits 8, 7, 6, 5, 4 and 3 are written on six separate cards. Three cards are drawn at random from the deck, one at a time, and placed face up on a table to form a three-digit number.

(i) How many different three-digit numbers can be formed?   **1**

120 ✓

(ii) What is the probability of selecting 345?   **1**

1/120 ✓

(iii) What is the probability of selecting a number greater than 600?   **1**

60/120 = 1/2 ✓

SECTION B: GEOMETRY and MEASUREMENT   30 (MARKS)

Circle the correct multiple choice answer

1. What is the total surface area, in square units, of this rectangular prism?

   A. $2a^2h$ B. $4a^2 + 4ah$ **C. $4a^2 + 6ah$**   D. $4a^2 + 8$

   $2a \times a (2) = 4a^2$
   $2a \times h(2) = 4ah$
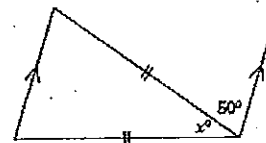 $a \times h (2) = 2ah$

   $4a^2 + 6ah$
   $4a^2 + 6ah$

2. The diameter of a circle is 6cm. The perimeter is closest to:
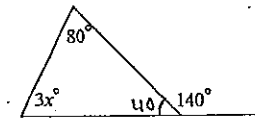
   A. 3cm   B. 9cm   C. 18cm   **D. 19cm**

   $2\pi r$

3. What is the value of x

   A. 40^0   B. 50^0 C. 65^0 D. 80^0

4. The value for x in the diagram is

   A. 80^0 B. 60^0 C. 40^0 **D. 20^0**

   $180 - 120 = 60$
   $60/3$
   $x = 20$

5. The figure shown is a parallelogram.
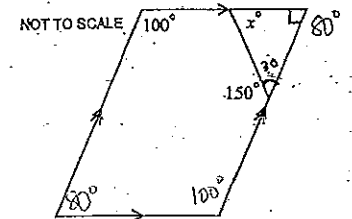
   What is the value of x?

   NOT TO SCALE

   A. 50   **B. 70**   C. 90   **D. 100**

Show all working for the following questions.

6. Calculate the area of the trapezium to the nearest square metre.   1

15cm, 10cm, 30cm

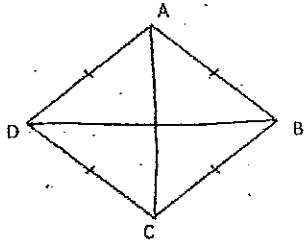$$\frac{1}{2}(a+b)\times h$$

$$\frac{1}{2}(15+10)\times 30$$
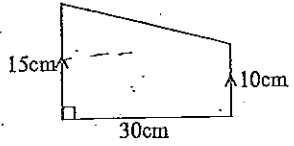
$$=375 \checkmark$$
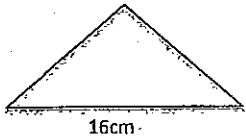
7. ABCD is a rhombus. Its area is 48cm², and AC = 8cm. What is the length of BD ?   1
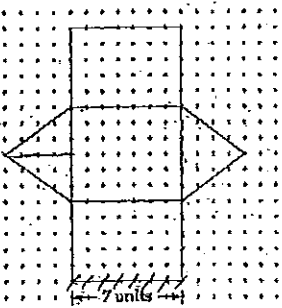
$$BD = 12 \leftarrow \frac{48\times 2=96}{8}$$

8. The triangle shown has an area of 48 cm² with a base of 16 cm. Determine the height of the triangle.   2

16cm

$$6 \checkmark \leftarrow \frac{48\times 2=96}{16}$$

9. a. What is the name of the solid formed by this net ?   1

7 units

Triangular prism ✓

b. What is the surface area of this solid?   2
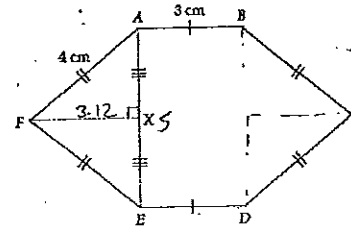
$$7\times 6 = 42\times 2 = 84$$

$$5\times 7 = 35 (\ \times 2)$$

$$7\times 7 = 49$$

$$168 \quad \times$$

$$(2\ 7\times 5) + (6\times 7) + 2\frac{1}{2}\times 6\times 4 =$$

10. For the hexagon ABCDEF

3cm, 4cm, 3.12, ×5

a. Calculate the perimeter of ABCDEF.   1

22cm ✓

b. AE = 5cm. Show by calculation that FX= 3.12 (correct to 2 decimal places)   1

$$4^2 - 2.5^2 = FX^2$$

$$16 - 6.25 = FX^2$$

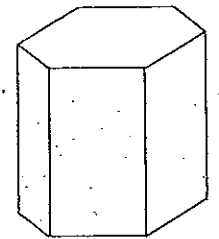$$\sqrt{9.75} = FX \rightarrow 3.12 \checkmark$$

c. Calculate the area of ABCDEF.   2

$$(3.12\times 5)\times 2 = 15.6$$

$$3\times 5 = 15$$

$$= 30.6$$

d. A new fruit-juice container in the form of a hexagonal prism is constructed using hexagon ABCDEF as the base. The fruit juice container is to hold 250 mL. NOTE 1 mL = 1 cm³

Calculate the height of the container to the nearest centimetre.   2

h

$$250\,cm = 30.6\times h$$

$$h = 8.169934$$

$$h = 8.2$$

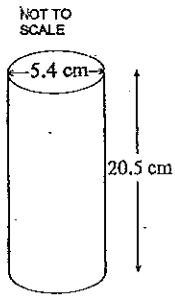$$h = 8 \checkmark$$

11. Calculate the surface area of the following cylinder to the nearest square centimetre **2**

NOT TO SCALE

←5.4 cm→

20.5 cm

$2\pi rh + 2\pi r^2$

$2 \times 2.7 \times \pi \times 20.5 + 2 \times \pi \times 7.29$

$110.7\pi + 14.58\pi$

125.28π

$= 393.578$

$= 394 \text{ cm}^2$ ✓

12. The volume of a cube is $64cm^3$. Determine its surface area. **2**

$s^2 \times s = s^3$

$\sqrt[3]{64} = 4$

$4 \times 4 = 16 \times 6$

$= 96 \text{ cm}^3$ ✓

13. Name the regular polygon that has each of its external angles equal to 72 degrees. **2**

$180 - 72 = 108$ $(n-2)180 = $ interior sum

108 $3 \times 180 = 540°$ internal $72n$

Pentagon $\dfrac{540}{4} \times 108$ ✗ $\dfrac{360-72}{180} + 2 = 3.6$?

14. The angles inside a quadrilateral are represented by $x°, (x+30)°, (x+10)°$ and $(x+20)°$.
Find the size of the largest angle. **2**
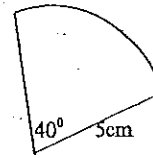
$x + (x+30) + (x+10) + (x+20) = 360$

$77.5 + 30$ $4x + 50 = 360$

$3 + (x+30)$ $4x = 310$

$= 107.5$ $x = 77.5$ ✗

$x^2 + 2x + 50 = 360$
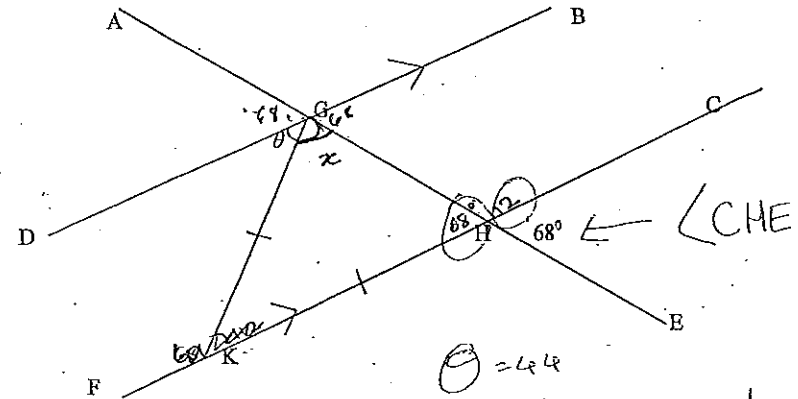
15. Find the area of the following sector. 4

40° 5cm

$\dfrac{\theta}{360} \times \pi r^2$

$\dfrac{40}{360} \times \pi 5^2$

$\dfrac{1}{9} \times \pi 25 \rightarrow 8.726$ ✓

8.7 cm

16. Find θ giving reasons.   NOT TO SCALE **3**

A   B

C

D

E

F

G   H   K

∠CHE

$\theta = 44$

angles have 3 letters

$180 - 68 = 112$ = Supplementary angles

$\angle BGH = 68$ = corresponding angles

$\angle PGH = 112$ = Supplementary angle

$\angle E = 112$ = Supplementary angle alternating exterior angles.

$\angle K = 68 = $

$18°$

$68(92 - \theta) = 180$ sum of triangle

$= 112$

$112 - 90 = 22$

$68 + 2(\theta + x) = 180$ $x = 22$ triangle sum

$112 - 22 = 90$

$\cancel{42.2}$ 52

$\theta = 44$