J.M.J.CH

MARCELLIN COLLEGE RANDWICK

YEAR 10 Stage 5.3

TERM 4 ASSESSMENT

2013

Weighting: 35% of Assessment Mark.

STUDENT NAME: _____

TEACHER NAME: _____

MARK: / 120

PERCENTAGE: %

TIME ALLOWED: 2 hours.

DIRECTIONS:
- Answer all questions.
- Show all necessary working where more than one mark is allocated to a question.
- Full marks will not be awarded for answers only.
- Marks may not be awarded for badly arranged work.
- Calculators are allowed

Section 1. Multiple Choice. (20 marks)

Answer on sheet provided.

1. What is the probability of rolling a 5 on a single die?

   a) $\frac{1}{3}$ b) $\frac{1}{6}$ c) $\frac{1}{10}$ d) $\frac{1}{2}$

2. Greg earns $13.60 / hour, what is his gross pay for a 8 hour shift?

   a) $217.60   b) $111.80   c) $108.80   d) $110.40

3. Find the simple interest earned on $7500 at 3.2% p.a. for 5 years?

   a) $1200   b) $12000   c) $120   d) $120000

4. Calculate the range from the stem and leaf:

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

   a) 35   b) 28   c) 65   d) 70

5. Two coins are flipped together. What is the chance of them landing on a head and a tail?

a) $\frac{1}{2}$ b) $\frac{1}{4}$ c) $\frac{1}{8}$ d) $\frac{2}{3}$

6. State the gradient of the following line, $y = 7 - 5x$

a) 7   b) -5 c) $5x$ d) $-5x$

7. Find the amount of compound interest earned on an investment of $31000 at 8% p.a. for 3 years, compounded monthly? (To nearest dollar)

a) $39377   b) $31624   c) $624   d) $8377

8. Calculate the inter-quartile-range for the following scores?

$$10, 12, 13, 14, 16, 18, 22, 25, 26, 27, 29, 33$$

a) 13.5   b) 13   c) 12.5   d) 6.5

9. Calculate the surface area of a cube with sides of 8.5cm?

a) $578cm^2$ b) $204cm^2$ c) $289cm^2$ d) $433.5cm^2$

10. A parabola is concave down and has a y-intercept of -4, its equation could be:

a) $y = x^2 - 6x + 4$ b) $y = x^2 - 4$ c) $y = 5x^2 + 4x$ d) $y = -4 - x^2$

11. The cross sectional area of a particular prism is $62cm^2$. If the prism's height is $13cm$. What is the volume of the prism.

a) $75cm^3$ b) $806cm^3$ c) $49972cm^3$ d) $8.06cm^3$

12. Two similar shapes have a scale factor ratio of 1 : 5. The base of the larger shape is 45cm in length, calculate the corresponding base of the smaller shape.

a) 5 cm   b) 9 cm   c) 9 m   d) 225 cm

13. The mean for a set of 7 scores is 126. The score 50 is added to the set of scores, the new mean for the set of 8 scores is?

a) 6.25   b) 43.75   c) 25   d) 22

14. Find the time taken for an investment of $1500 to grow to $1900, if the investment earns 7% p.a. simple interest. (To the nearest year)

a) 4 years   b) 18 years   c) 3 years   d) 9 years

15. Which of the following lines is parallel to $y = 6 - 2x$?

a) $2y = -4x + 10$ b) $y = 2 - 6x$ c) $y = 2x - 7$ d) $y = 6 + 2x$

16. A drawing is using the scale 1:1000. A road has a length of 12.8 cm on the drawing, what would be the real length of the road?

a) 12.8cm   b) 12.8 m   c) 128 m   d) 1280 m

17. If you roll a single die 216 times how many times would you expect to roll a 2?

a) 36 times   b) 72 times   c) 108 times   d) 54 times

18. What is the equation of a line parallel to the y axis with an x intercept of -3?

    $a)\ y = -3$ $b)\ x = -3$ $c)\ x = 3$ $d)\ y = -3x$

19. Find the median for the following set of data:

Score (x)	Freq (f)
10	13
11	7
12	1
13	6
14	4

    $a)\ 12$ $b)\ 12.5$ $c)\ 11$ $d)11.5$

20. A sphere has a surface area of $764cm^2$, calculate its radius to the nearest cm.

    $a)7cm$ $b)\ 8\ cm$ $c)\ 15\ cm$ $d)\ 60cm$
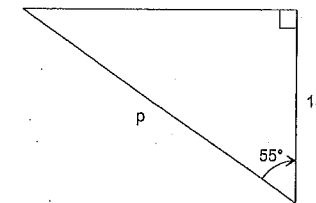
Section 2. Short Answers. (100 marks)
Answer on lined paper provided.
Begin each question on a new page.

Question 1: Trigonometry (25 marks)

a) In a right angled triangle $tan\ \theta = \frac{9}{12}$. What are the simplest fractions for $sin\ \theta$?   2

b) Find the value of the pronumeral, correct to 2 decimal places.   2

c) From a point on the horizontal ground 35m from a tree a bird is observed to be 18m up the tree. Calculate the angle of elevation to the bird from the observation point. To the nearest minute.   2

d) Andy walks south for 350m then turns directly west and walks for another 440m.

    (i)   Draw a diagram showing this information.   1
    (ii)   What is the bearing of Andy from his starting point?   3

e) Find the value of x, correct the nearest minute.   3
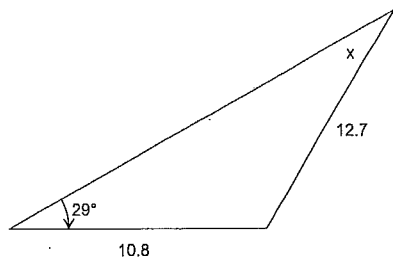
f) Two straight roads meet at an angle of 65°. A car on each road is travelling away from the intersection, each at constant speeds for 45 minutes The first car travels at 66km/hr the other at 72km/hr.

(i)   Find the distance each car has travelled after 45 minutes?   2
(ii)   Draw a diagram showing this information.   1
(iii)   How far apart are the cars at this time?   2

g) A plane leaves Melbourne and flies for 515km on a bearing of 033°. It then turns and flies on a bearing of θ for 625km until it is due east of Melbourne. Evaluate θ to the nearest minute.   3

h) For the triangle below:

(i)   Find the size of the marked angle, correct to nearest degree.   2
(ii)   Find the area of the triangle, correct to 3 siginifant figres.   2
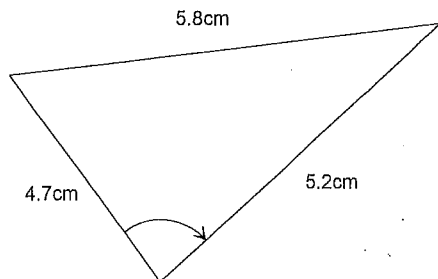
Question 2: Basic Arithmetic (25 marks)

Please start your answers on a new page of lined paper.

a) Evaluate to 2 decimal places: 2

$$\frac{\sqrt{12.55-4.3}}{(11.32+4.7)^2}$$

b) Evaluate the following:

(i) $|-5+2|$ 1

(ii) $64^{\frac{2}{3}}$ 1

(iii) $2(m^3)^0$ 1

c) Write 0.000345 in scientific notation, correct to 2 significant figures.   2

d) Write $\frac{2}{\sqrt[3]{2m+3}}$ in index form   1

e) Evaluate $\frac{a^4 g^7}{ag^3}$ as a fraction in index form when $a=\frac{2}{3}$ and $b=\frac{4}{5}$.   3

f) A survey found 28 out of 60 people watched television while eating. What percentage of people surveyed don't watch television while eating?   2

g) A car was sold for $56000, the car dealer made a 45% profit. Find the cost price of the car.   2

h) Greg and Alison share profits of their company in the ratio 4 : 7. If Alison receives $8100 more, how much does each person receive?   2

i) The price of an antique vase increased from $3500 to $4200. Find the percentage increase.   2

j) Mark earns a net pay of $4300 / fortnight. He spends $\frac{1}{5}$ of his pay on rent and household bills, $\frac{2}{3}$ on food and general expenses and he saves the rest. What percentage of his pay does he save?   2

k) If petrol costs 148.7 cents per litre, how many litres could I buy for $70?   2

l) A shop is offering a 15% discount on all items. If Maxine paid $280 for a cooking wok, what was the original price of the item?   2

Question 3: Algebra and Surds (25 marks)

Please start your answers on a new page of lined paper.

a) Simplify the following:

(i) $4d + 5y - 7d + 3y$ 1

(ii) $6pk^2 \times -3pk$ 1

(iii) $-24h^3 \div -8h^2$ 1

(iv) $\frac{4w}{3} - \frac{2w}{5}$ 1

b) Simplify leaving answers in surd form:

(i) $\sqrt{243}$ 1

(ii) $4\sqrt{3} + 2\sqrt{12} - 7\sqrt{45}$ 2

(iii) $\frac{6\sqrt{80}}{5\sqrt{320}}$ 2

c) Factorise the following completely:

(i) $12d + 15df$ 1

(ii) $9w^2 - 36$ 2

(iii) $2 + 2m + a + am$ 2

(iv) $3h^2 + 2h - 8$ 3

d) Using the formula $P = \frac{5r^2}{4}$ find the value of 'r' if P = 80.   2

e) Factorise and simplify the following algebraic fractions:

(i) $\frac{3x^2-48}{x^2-7x+10} \div \frac{6x^3+48}{4x-20}$ 3

(ii) $\frac{2x}{x^2-9} - \frac{5}{x+3}$ 3

Question 4: Equations (25 marks)

a) Solve the following:

(i) $3g - 7 = 29$ 2

(ii) $8x - 9 = 16 + 2x$.   2

(iii) $5(f + 5) - (f - 3) = 52$ 2

(iv) $\frac{w}{3} + 6 = 30 - \frac{3w}{5}$ 3

(v) $4^{3x-5} = \frac{1}{64}$ 2

b) Solve the following and graph on a number line: 3

$$7 - 2y \leq 15$$

c) Solve the following equations simultaneously: 3

$$2x + y = 4$$
$$5x + 2y = 9$$

d) Solve the following absolute value equation: 3
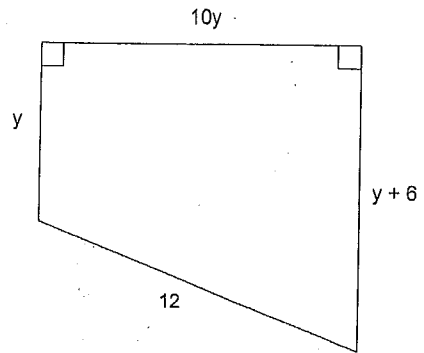
$$|4c - 18| = 6 - c$$

e) For the shape below:

(i)   Show that the area is given by $A = 10y^2 + 30y$ 2

(ii) If the area is $180m^2$, find the perimeter of the trapezium.   3

YEAR 10 5.3 TASK 4.
MULTIPLE CHOICE ANSWER SHEET

#	A	B	C	D
1.		●		
2.			●	
3.	●			
4.				●
5.	●			
6.		●		
7.				●
8.		●		
9.				●
10.				●
11.		●		
12.		●		
13.				
14.	●			
15.	●			
16.			●	
17.	●			
18.		●		
19.			●	
20.		●		

1.
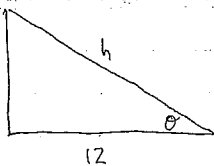
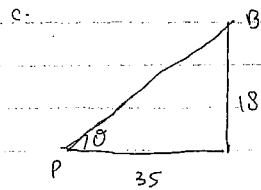$h^2 = 9^2 + 12^2$
$= 15$

a. $\sin \theta = \dfrac{o}{h}$

$= \dfrac{9}{15}$

$= \boxed{\dfrac{3}{5}}$ 2

b. $\dfrac{P}{\sin 90} = \dfrac{15}{\sin 35}$
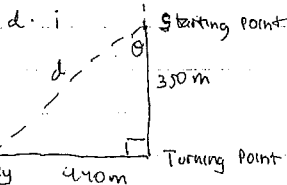
$P \sin 35 = 15$
$P = \dfrac{15}{\sin 35}$

$= \boxed{26 \cdot 15}$ 2

c.

$\tan \theta = \dfrac{18}{35}$

$\theta = \tan^{-1}\left(\dfrac{18}{35}\right)$

$\boxed{\theta = 27° 13'}$

d. i.

$\boxed{1}$

---

ii. $d^2 = 350^2 + 440^2$

$= \sqrt{316,100}$

$\dfrac{\sin \theta}{440} = \dfrac{\sin 90}{\sqrt{316,100}}$

$\sin \theta = \dfrac{440 \sin 90}{\sqrt{316,100}}$

$\sin \theta = 0.7826$

$\theta = 51° 29' 57.6$

Bearing $= 180° + 51° 29' 57.65''$

$= \boxed{231° 29' 57.65''}$ 3

c. $\dfrac{\sin x}{10.8} = \dfrac{\sin 29}{12.7}$

$\sin x = \dfrac{10.8 \sin 29}{12.7}$

$x = 24° 21'$ 3

f. i. car A $= \dfrac{45}{60} \times 66 = 49.5$ km   2

car B $= \dfrac{45}{60} \times 72 = 54$ km

ii.

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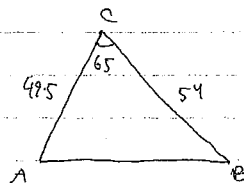
iii $c^2 = a^2 + b^2 - (2 \times a \times b \times \cos C)$

$49.5^2 + 54^2 - (2 \times 49.5 \times 54 \times \cos 65)$

$= 55.74$ km   2

---

2. a. $\dfrac{\sqrt{8.25}}{(16.02)^2} = \boxed{0.01}$ 2

b. i. $\boxed{3}$

ii. $\left(4^3\right)^{\frac{2}{3}}$

$= 4^2$

$= \boxed{16}$ 1

iii $2 (1)$

$= \boxed{2}$ 1

c. $\boxed{3.5 \times 10^{-4}}$ 2

d. $\boxed{\dfrac{2}{(2m+3)^{\frac{1}{3}}}}$ 1

e. $\dfrac{a^4 g^7}{a g^3}$

$a^3 g^4$

$\left(\dfrac{2}{3}\right)^5 \left(\dfrac{4}{5}\right)^4$

$\dfrac{8}{27} \cdot \dfrac{256}{625}$

$\boxed{\dfrac{2048}{16875}}$ 3

f. $\dfrac{32}{60} \times 100$

$= \boxed{53.\dot{3}\,\%}$ 2

g. $\dfrac{100}{145} \times 56\,000$

$= \boxed{\$38\,620.69}$ 2

---

h. $3 = \$8100$

Alison $= \dfrac{7}{3} \times 8100$

$= \boxed{\$18\,900}$

Greg $= \dfrac{4}{3} \times 8100$

$= \boxed{\$10\,800}$ 3

i. $\dfrac{(4200 - 3500)}{3500} \times 100$

$= \dfrac{700}{35}$

$= \boxed{20\%}$ 2

j. $\left(1 - \left(\dfrac{13}{15}\right)\right) \times 100\%$

$= \boxed{13.\dot{3}\,\%}$ 2

k. $\dfrac{7000}{148.7}$

$= \boxed{47\,\ell}$ 2

l. $\dfrac{100}{85} \times 280$

$= \boxed{\$329.41}$ 2

a. i $\boxed{-3d + 8y}$ ✓

ii $\boxed{-18p^2k^3}$ ✓

iii $\boxed{3h}$ ✓

iv $\dfrac{20w - 6w}{15}$

$= \boxed{\dfrac{14w}{15}}$ ✓

b. i $\sqrt{3 \cdot 81}$

$= \boxed{9\sqrt{3}}$ ✓

ii $2\sqrt{3} + 4\sqrt{3} - 21\sqrt{5}$

$= \boxed{6\sqrt{3} - 21\sqrt{5}}$ ✓ 2

iii $\dfrac{24\sqrt{5}}{40\sqrt{5}}$

$= \boxed{\dfrac{3}{5}}$ ✓ 2

c. i $\boxed{3d(4 + 5f)}$ ✓

ii $\dfrac{9(w^2 - 4)}{\boxed{9(w+2)(w-2)}}$ ✓ 2

iii $\dfrac{2(1+m) + a(1+m)}{\boxed{(2+a)(1+m)}}$ ✓ 2

iv. $\dfrac{(3h + 6)(3h - 4)}{3}$

$\dfrac{3(h+2)(3h-4)}{3}$

$= \boxed{(h+2)(3h-4)}$ ✓ 3
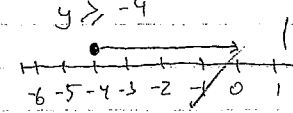
d. $4p = 5r^2$

$\dfrac{4p}{5} = r^2$

$\sqrt{\dfrac{4p}{5}} = r$

$\sqrt{64} = r$

$\boxed{r = 8}$ ✓ 2

---

e. i $\dfrac{3(x^2 - 16)}{(x+5)(x-2)} \times \dfrac{4(x+5)}{4(x^3 + 8)}$

$\boxed{\dfrac{(x+4)(x-4) \cdot 2}{(x-2)(x+2)(x^2-2x+4)}}$ ✓ 3

ii $\dfrac{2x}{(x+3)(x-3)} - \dfrac{5(x-3)}{(x+3)(x-3)}$

$\dfrac{2x - 5x + 15}{(x+3)(x-3)}$

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

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

---

4. a. i $3y = 36$

$\boxed{y = 12}$ ✓ 2

ii $6x = 25$

$x = \boxed{\dfrac{25}{6}}$ ✓ 2

iii $5f + 25 - f + 3 = 52$

$4f = 24$

$\boxed{f = 6}$ ✓ 2

iv. $\dfrac{w}{3} + \dfrac{3w}{5} = 30 - 6$

$= 24$

$5w + 9w = 360$

$\boxed{w = 25.71}$ ✓ 3

v. $4^{3x-5} = 4^{-3}$

$3x - 5 = -3$

$3x = 2$

$\boxed{x = \dfrac{2}{3}}$ ✓ 2

b. $7 - 15 \le 2y$

$-8 \le 2y$ ✓ 2

$y \ge -4$

$-6\ -5\ -4\ -3\ -2\ -1\ 0\ 1$ 3

c. $4x + 2y = 8$

$5x + 2y = 9$

$-x = -1$

$\boxed{x = 1}$

$\boxed{y = 2}$ ✓

d. $4c - 18 = 6 - c$ $4c - 18 = -6 + c$

$5c = 24$

$\boxed{c = \dfrac{24}{5}}$ ✓ $3c = 12$ ✓

$\boxed{c = 4}$ 3

---

e. i $A = \dfrac{y + y + 6}{2} \times 10y$

$\dfrac{(y+3)(10y)}{1}$ 2

$= \boxed{10y^2 + 30y}$

ii $180 = 10y^2 + 30y$

$18 = y^2 + 3y$

$y^2 + 3y - 18 = 0$

$(y+6)(y-3) = 0$ ✓ 2

$y = -6$ or 3

$\boxed{y = 3}$ (can't be negative)

perimeter $= 3 + 30 + 9 + 12$

$\boxed{= 54\ m}$ ✓ 1