

Student's Name:

Teacher's Initials:



Barker
College

Thursday 6th September 2018

Period 4 or 6

Time Allowed: 55 minutes

GPF AYG
TE DZP
RMH* ARP

YEAR 9 MATHEMATICS

5.3

ASSESSMENT 3

160 copies

**Earning Money
Surface Area and Volume
Equations and Inequations
Coordinate Geometry**

INSTRUCTIONS TO STUDENTS

- * **Write ALL answers in the spaces provided.**
- * **ALL NECESSARY working for each question must be shown to gain full marks.**
- * **Marks may not be awarded for careless or badly arranged working.**
- * **DIAGRAMS ARE NOT TO SCALE.**
- * **Write in blue or black pen.**
- * **NESA-approved, non-programmable calculators may be used.**

TOTAL: [68 marks]

* * * *

Earning Money (12 marks)

Marks

Question 1

2

Matt's normal hourly rate of pay is \$21.45.

In one week, Matt worked 12 hours at the normal hourly rate, 6 hours at time-and-a-half and 3 hours double-time. How much was Matt paid that week?

Question 2

2

Tom invests \$3500 for 4 years at a rate of 5.1% p.a.

Calculate the simple interest earned on Tom's investment.

Question 3

2

A set of screwdrivers cost \$126.50 including 10% GST.

Calculate the cost of the screwdrivers before the GST was added.

Earning Money (continued)

Marks

Question 4

Harry received a salary of \$92450 and \$732 from his investments.

His total tax deductions were \$2970.

During the year he had already paid tax instalments amounting to \$19008.35.

The Medicare levy is 1.5% of taxable income.

Calculate:

(i) total income 1

(ii) taxable income 1

(iii) tax payable on his taxable income, using the tax table below 2

Taxable Income	Tax on this income
\$0 - \$18200	nil
\$18201 - \$37000	19c for each \$1 over \$18200
\$37001 - \$87000	\$3572 plus 32.5c for each \$1 over \$37000
\$87001 - \$180000	\$19822 plus 37c for each \$1 over \$87000
\$180001 and over	\$54232 plus 45c for each \$1 over \$18000

(iv) the amount Harry must pay as his Medicare levy 1

(v) the refund or balance payable when the Medicare levy is included. 1

Surface Area and Volume (14 marks)

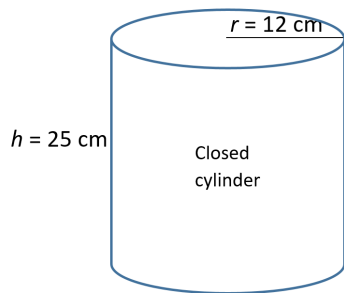
Marks

Question 5

Calculate the **surface area** of the following **solids**. Answers to 1 d.p. where necessary.

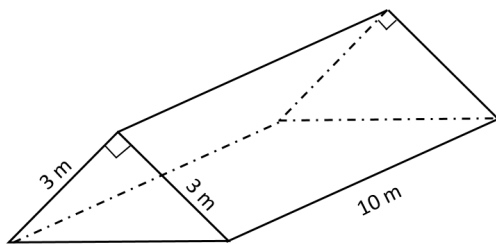
(a)

3



(b)

3



(c)

2



Surface Area and Volume (continued)

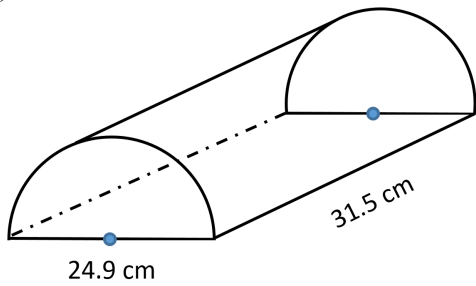
Marks

Question 6

Calculate the **volume** of the following solids. Answers to 1 d.p. where necessary.

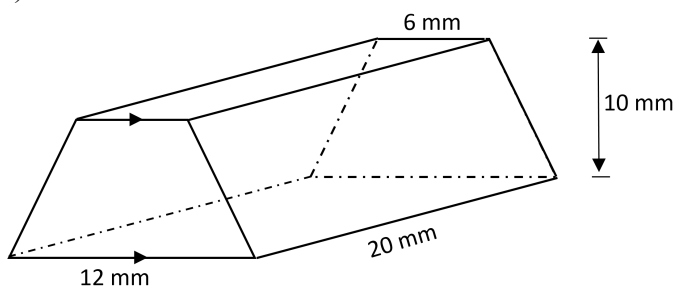
(a)

2



(b)

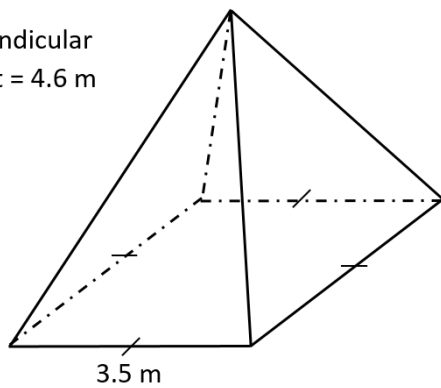
2



(c)

2

Perpendicular
height = 4.6 m



Equations (20 marks)**Marks****Question 7**

Solve the following equations.

(a) $3x + 5 = 12$ **2** (b) $6y - 5 = 2 + 10y$ **2**

(c) $\frac{2b-4}{4} = 9 + \frac{b}{6}$ **3**

Question 8

Solve the following inequalities and mark your solution on the number line.

(a) $4(x-7) \leq -16$ **3** (b) $\frac{1-2x}{3} < 4$ **3**



Equations (continued)

Marks

Question 9

Archeologists use the formula $H = 2.52t + 75.8$ to calculate the height H cm of a man when the shin bone length t cm is measurable.

- (i) An intact male shin bone measuring 42 cm long was found. 1
Using the formula, calculate the height of the male to two decimal places.

- (ii) Make t the subject of the above formula. 2

- (iii) Calculate, to the nearest centimetre, the length of the shin bone of a male of height 174 cm. 1

Question 10

3

Make X the subject of the formula $m = \frac{X}{X-3}$.

Coordinate Geometry (17 marks)

Marks

Question 11

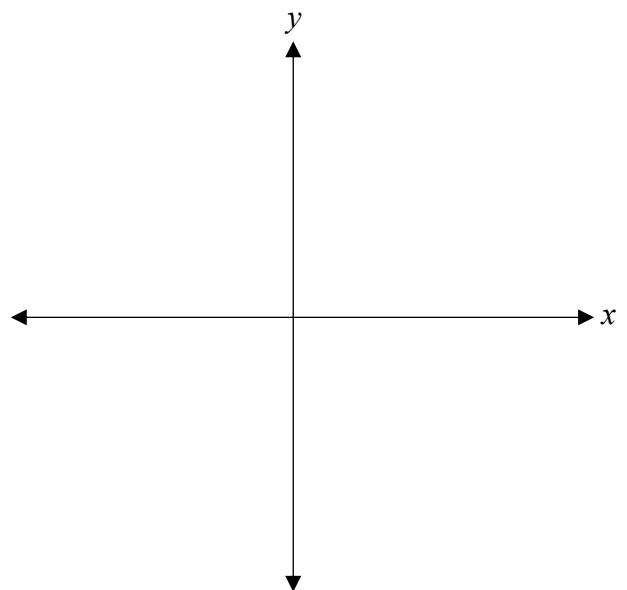
The points $A(-1, 1)$ and $B(3, 4)$ are points on a plane.

- | | | | |
|---|---|--|---|
| (i) Calculate the length of the interval AB . | 2 | (ii) Find the midpoint of the interval AB . | 2 |
| | | | |
| (iii) Find the gradient of AB . | 2 | (iv) Show working to determine whether B lies on the line $y = 3x - 2$. | 1 |

Question 12

The equation $y = 3x - 2$ is a straight line.

- | | |
|--|---|
| (i) Write down the gradient of this line. | 1 |
| | |
| (ii) Write down the y -intercept of this line. | 1 |
| | |
| (iii) Draw this line on the axes provided. | 2 |



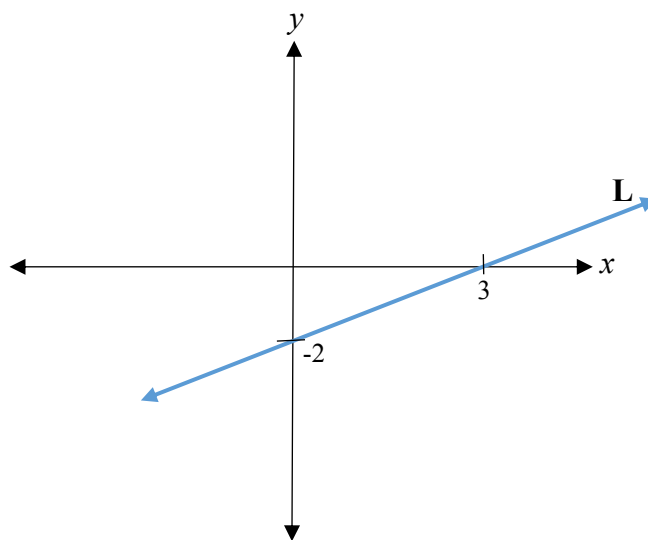
Coordinate Geometry (continued)

Marks

Question 13

2

Write down the equation of the line **L**.



Question 14

2

A line passes through the point (5, -2) with a gradient of -3.
Determine the equation of the line.

Question 15

2

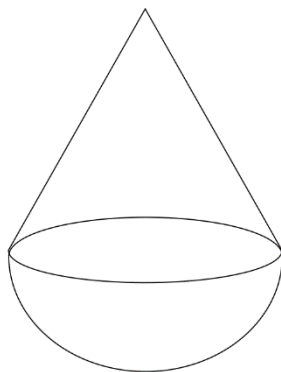
Determine the equation of the line that passes through the points (-2, -4) and (1, 2).

Harder Question (5 marks)

Marks

Question 16

A cone of height h cm sits on top of a hemisphere with radius r cm as shown in the diagram.



- (i) The volume of the cone is to be the same as the volume of the hemisphere.
What should the height of the cone be, in terms of r ?

2

- (ii) If the radius of the hemisphere is 1.2 m, how many litres of water would the whole shape hold? Answer to 3 significant figures.

3

END OF PAPER

YR 9 5.3 Assess 3 6/9/18

$$1. \quad 12 \times 21.45 = 257.40$$

$$6 \times 1.5 \times 21.45 = 193.05$$

$$3 \times 2 \times 21.45 = \underline{128.70}$$

$$\$579.15$$

OR

$$12 + (6 \times 1.5) + (3 \times 2) = 27$$

$$27 \times 21.45 = \$579.15$$

$$2. \quad I = 3500 \times \frac{5.1}{100} \times 4$$

$$= \$714$$

$$3. \quad 110\% = 126.50$$

$$\div 110$$

$$1\% = 1.15$$

$$\times 100$$

$$100\% = \$115$$

OR

$$126.50 \div 1.1 = \$115$$

$$7. (i) \quad 92450 + 732 = \$93182$$

$$(ii) \quad 93182 - 2970 = \$90212$$

$$(iii) \quad 19822 + 0.37 \times (90212 - 87000)$$

$$= \$21010.44$$

$$(iv) \quad 90212 \times \frac{1.5}{100} = \$1353.18$$

$$(v) \quad 21010.44 + 1353.18 = 22363.62$$

$$22363.62 - 19008.35 = \$3355.27$$

\therefore balance payable of \$3355.27

$$5. (a) \quad SA = 2 \times \pi \times 12^2 + 2 \times \pi \times 12 \times 25$$

$$= 2789.7 \text{ cm}^2$$

$$(b) \quad \begin{array}{c} 3 \quad 3 \\ \diagdown \quad \diagup \\ x \end{array} \quad x^2 = 3^2 + 3^2$$

$$x = \sqrt{18}$$

$$x = 4.243$$

$$\text{triangles} = 2 \left(\frac{1}{2} \times 3 \times 3 \right) = 9$$

$$\text{base} = 4.243 \times 10 = 42.43$$

$$\text{slope sides} = 2(3 \times 10) = 60$$

$$\text{Total} \quad \underline{111.4 \text{ m}^2}$$

$$(c) \quad SA = 4 \times \pi \times 14^2$$

$$= 2463 \text{ cm}^2$$

$$6. (a) \quad V = \frac{1}{2} \times \pi \times \left(\frac{24.9}{2} \right)^2 \times 31.5$$

$$= 7669.5 \text{ cm}^3$$

$$(b) \quad V = \frac{10}{2} (6 + 12) \times 20$$

$$= 1800 \text{ mm}^3$$

$$(c) \quad V = \frac{1}{3} \times 3.5 \times 3.5 \times 4.6$$

$$= 18.8 \text{ m}^3$$

$$7. (a) \quad 3x + 5 = 12$$

$$3x = 7$$

$$x = \frac{7}{3}$$

$$(b) \quad 6y - 5 = 2 + 10y$$

$$-5 = 2 + 4y$$

$$-7 = 4y$$

$$y = -\frac{7}{4}$$

$$(c) \quad \frac{2b-4}{4} = \frac{9+b}{6}$$

$$\frac{2b-4}{4} = \frac{54+b}{6}$$

$$6(2b-4) = 4(54+b)$$

$$12b - 24 = 216 + 4b$$

$$8b - 24 = 216$$

$$8b = 240$$

$$b = 30$$

OR

$$7(c) \frac{2b-4}{4} = 9 + \frac{b}{6}$$

$$\frac{3(2b-4)}{12} = \frac{108}{12} + \frac{2b}{12}$$

$$6b-12 = 108+2b$$

$$4b-12 = 108$$

$$4b = 120$$

$$b = 30$$

$$8.(a) 4(x-7) \leq -16 \quad \text{or} \quad 4(x-7) \leq -16$$

$$4x-28 \leq -16 \quad x-7 \leq -4$$

$$4x \leq 12 \quad x \leq 3$$

$$x \leq 3$$



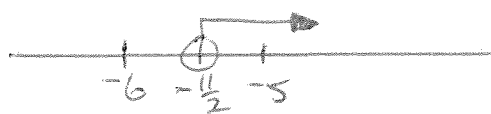
$$(b) \frac{1-2x}{3} < 4 \quad \text{or} \quad \frac{1-2x}{3} < 4$$

$$1-2x < 12 \quad 1-2x < 12$$

$$-2x < 11 \quad 1 < 12+2x$$

$$x > -\frac{11}{2} \quad -11 < 2x$$

$$-\frac{11}{2} < x$$



$$9.(i) H = 2.52 \times 42 + 75.8$$

$$= 181.64 \text{ cm}$$

$$(ii) H = 2.52t + 75.8$$

$$H - 75.8 = 2.52t$$

$$t = \frac{H - 75.8}{2.52}$$

$$(iii) t = \frac{174 - 75.8}{2.52}$$

$$= 38.97$$

$$\approx 39 \text{ cm}$$

$$10. m = \frac{X}{X-3}$$

$$m(X-3) = X$$

$$mX - 3m = X$$

$$mX - X = 3m$$

$$X(m-1) = 3m$$

$$X = \frac{3m}{m-1}$$

$$11(i) d = \sqrt{(-1-3)^2 + (1-4)^2}$$

$$= \sqrt{25}$$

$$= 5$$

$$(ii) \left(\frac{-1+3}{2}, \frac{1+4}{2} \right) = \left(1, \frac{5}{2} \right)$$

$$(iii) m = \frac{4-1}{3+1} \quad \text{or} \quad m = \frac{1-4}{-1-3}$$

$$= \frac{3}{4} \quad = \frac{-3}{-4} = \frac{3}{4}$$

$$(iv) \text{RHS} = 3 \times 3 - 2$$

$$= 7$$

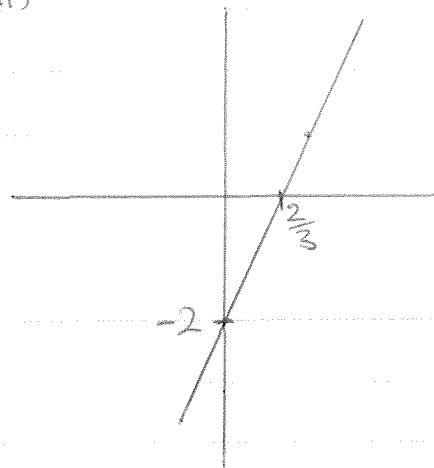
$$\neq \text{LHS}$$

\therefore point does not lie on line.

$$12.(i) m = 3$$

$$(ii) y \text{ int is } -2$$

$$(iii)$$



13. y int is -2

$$m = \frac{\text{rise}}{\text{run}} = \frac{2}{3}$$

$$\therefore y = \frac{2}{3}x - 2$$

14. $y + 2 = -3(x - 5)$

$$y = -3x + 15 - 2$$

$$y = -3x + 13$$

$$\text{OR}$$

$$y = -3x + b$$

$$x = 5 \quad y = -2$$

$$-2 = -3 \times 5 + b$$

$$-2 = -15 + b$$

$$b = 13$$

$$\therefore y = -3x + 13$$

15. $m = \frac{2+4}{1+2} = \frac{6}{3} = 2$

$$\therefore y + 4 = 2(x + 2)$$

$$y = 2x + 4 - 4$$

$$y = 2x$$

$$\text{OR}$$

$$y = 2x + b$$

$$x = 1 \quad y = 2$$

$$2 = 2 \times 1 + b$$

$$b = 0$$

$$\therefore y = 2x$$

16. (i) cone $V = \frac{1}{3} \pi r^2 h$

hemisphere $V = \frac{1}{2} \left(\frac{4}{3} \pi r^3 \right)$
 $= \frac{2}{3} \pi r^3$

If the volumes are the same
 then make them equal each other

$$\frac{1}{3} \pi r^2 h = \frac{2}{3} \pi r^3$$

$$h = \frac{\frac{2}{3} \pi r^3}{\frac{1}{3} \pi r^2}$$

$$h = 2r$$

(ii) Cone $V = \frac{1}{3} \pi r^2 \times 2r$

$$= \frac{2}{3} \pi r^3$$

$$= \frac{2}{3} \times \pi \times 1.2^3$$

$$= 3.619$$

If they are equal then

$$\text{Hemisphere} = 3.619$$

$$\text{Total Vol} = 2 \times 3.619$$

$$= 7.238 \text{ m}^3$$

$$\text{Convert to L} \quad 1000 \text{ m}^3 = 1 \text{ L}$$

$$7.238 \times 1000 = 7238 \text{ L}$$

$$= 7240 \text{ L}$$

(3 sig fig)