

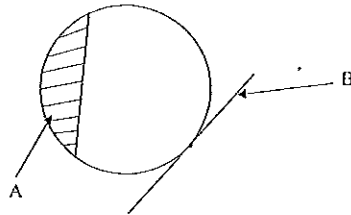
QUESTION 1 (20 marks) ANSWERS ONLY MARKS

(a) Determine the value of x in each of the following:

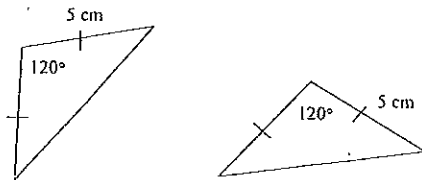
(i) $x + 5 = -2$ 1

(ii) $7:12 = x:60$ 1

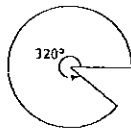
(b) Name the two features of a circle indicated in the diagram below 2



(c) For the following pair of congruent triangles state which congruence test is satisfied. 1



(d) What fraction of a circle is represented by the following sector? 1



(e) For the formula $C = \frac{5}{9}(F - 32)$ find C if $F = 68$. 1

(f) (i) Convert 3.7 L/min to mL/min 1

(ii) A train is travelling at 120 km/h. How far will it travel in 45 minutes? 1

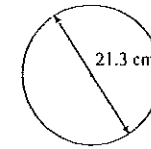
(g) Alice is paid \$620 per week. Find her:

(i) fortnightly pay 1

(ii) annual salary 1

QUESTION 1(cont) ANSWERS ONLY MARKS

(h) Calculate the circumference of the circle below, correct to 1 decimal place. 1

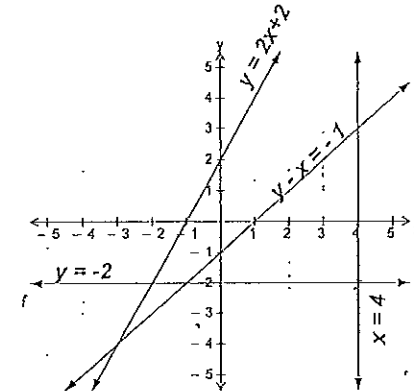


(i) (i) Divide 15 in the ratio 3:2. 1

(ii) Express \$71.25 for $9\frac{1}{2}$ hours as a rate in simplest form. 1

(j) Determine the coordinates of the point of intersection for each pair of lines. 3

(i) $x = 4$ (ii) $x = 4$ (iii) $y = 2x + 2$
 $y = -2$ $y - x = -1$ $y - x = -1$

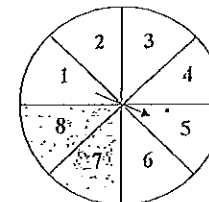


(k) Use the diagram below to determine the probability that the pointer lands on:

(i) the number 4 1

(ii) the number 6 or 7 1

(iii) a number ≥ 4 1



QUESTION 2 (20 marks)

MARKS

(a) The letters of the word EQUILATERAL are placed in a bag and one letter is drawn out at random. Find the probability of drawing:

- (i) the letter A 1
- (ii) a consonant 1
- (iii) one of the letters A, Q or L 1

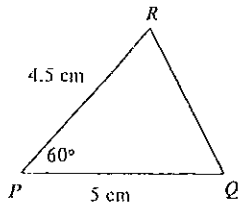
(b) Solve the following equations

- (i) $4x + 5 = 21$ 2
- (ii) $9(10 - j) = 45$ 2

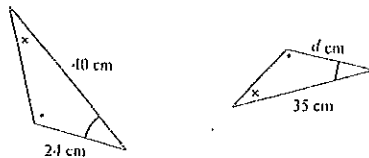
(c) The mean of six scores 6, 5, 4, 3, 4 and x , is 5. Find the value of x . 2

(d) The area of a trapezium is given by the formula $A = \frac{h}{2}(a + b)$. Find the value of b if $A = 36$, $h = 8$ and $a = 6$. 2

(e) Construct the triangle below using compasses and ruler only. Show all construction lines. 3



(f) Find the value of the pronumeral in the pair of similar triangles below. 2



(g) (i) A plane carries 25 first-class passengers and 210 economy-class passengers. What is the ratio of the number of economy class to the number of first-class passengers? 2

(ii) A fertiliser mix contains 2 parts of potash, 2 parts of nitrogen and 3 parts of phosphate. How many kilograms of phosphate are there in a 10.5 kg bag of fertiliser? 2

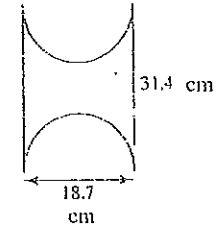
QUESTION 3 (20 marks)

MARKS

(a) (i) For the following set of data find the median. 1

3 5 3 7 6 4 5 8 6 4 2 3

(ii) Find the perimeter of the figure below, correct to 1 decimal place. 2



(b) A 20-sided die has faces labelled 2, 4, 6, 8, ..., 38, 40. If the die is rolled, what is the probability of obtaining:

- (i) an even number? 1
- (ii) a number divisible by 12? 1
- (iii) a number less than 20? 1

(c) (i) If the scale on a map is 1: 100 000, how far would it be in real life if the distance between two points on the map is 10.3 cm? 2

(ii) In a sale all items are reduced by 25%. At Crazy Colin's Store, shop assistants are entitled to an additional 10% discount off the sale price. If a shop assistant paid \$675 for a mobile phone what was the regular price of the item? 2

(d) Melanie receives 17.5% holiday loading on 4 weeks normal wages. If she normally works a 42-hour week at a rate of \$16.00 per hour, calculate her:

- (i) 4 weeks pay 1
- (ii) holiday loading 1
- (iii) her total holiday pay 1

(e) (i) Complete the table of values for the equation $y = 3x + 4$ 3

x	-1	0	1
y			

- (ii) Sketch the graph of this line on the number plane. 2
- (iii) Does the point (-3, -2) lie on this line? Justify your answer. 2

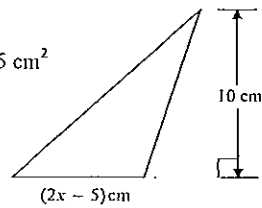
QUESTION 4 (20 marks)

MARKS

(a) Construct an equation and then solve it to find the value of the pronumeral.

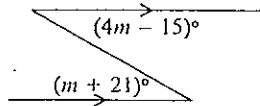
(i)

Area = 55 cm^2



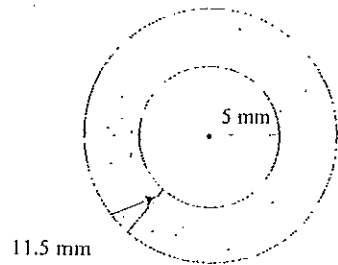
3

(ii)



2

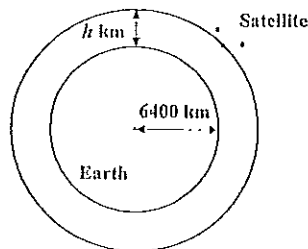
(b) (i) In the diagram below the radius of the inner circle is 5 mm and the radius of the outer circle is 11.5 mm. Determine the area of the shaded region between each pair of concentric circles, correct to 1 decimal place.



2

(ii) A satellite is orbiting the Earth at a height of $h \text{ km}$ above the Earth's surface. In one complete orbit the satellite travels a distance of 41 469 km. Find the height of the satellite above the Earth, to the nearest km.

3

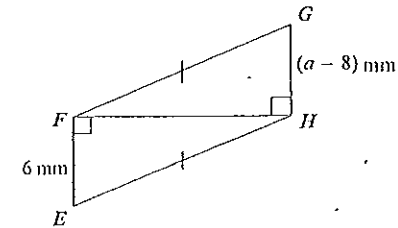


QUESTION 4 (cont)

MARKS

(c) (i) Prove that $\triangle FGH$ is congruent to $\triangle HEF$

4

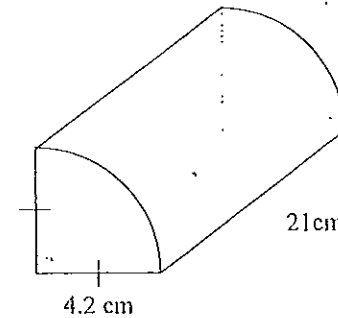


(ii) Hence, find the value of the pronumeral, giving a reason.

2

(d) Calculate the volume of the solid, correct to 1 decimal place

2



(e) Using the following information to form an equation and hence solve it, stating any pronumerals used.

2

The sum of two consecutive integers is 53. What are the integers?

QUESTION 5 (20 marks)

MARKS

- (a) Justin can dig a garden in 30 minutes, while his father James takes 20 minutes. How long should they take to dig a garden if they work together? 2
- (b) An assembly line worker is paid using either of the following methods:
- a flat rate of 28 cents per article assembled
 - a special rate of 23 cents per article assembled up to 1000 then 30 cents for each article assembled thereafter

Calculate the income earned using:

- (i) the flat rate if 3500 articles are assembled 2
- (ii) the special rate if 4200 articles are assembled 2
- (iii) Anthony is paid the special rate. If he earned \$465.80, how many articles did he assemble? 2

(c) **Tax rates 2004-05 financial year**

Taxable income	Tax payable on Taxable income
\$0 – \$6,000	Nil
\$6,001 – \$21,600	17c for each \$1 over \$6,000
\$21,601 – \$58,000	\$2,652 plus 30c for each \$1 over \$21,600
\$58,001 – \$70,000	\$13,572 plus 42c for each \$1 over \$58,000
Over \$70,000	\$18,612 plus 47c for each \$1 over \$70,000

Jessica earns a salary of \$59 600. She has a total income from other sources (investments and bank interest) of \$4834. Her total tax deductions for the year are \$1320.

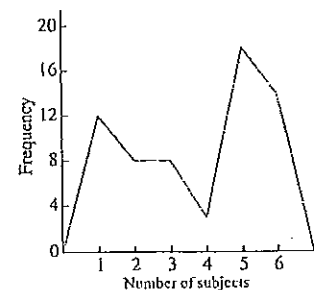
Find:

- (i) Jessica's total income 1
- (ii) her taxable income 1
- (iii) the tax payable on her taxable income 2

QUESTION 5 (cont)

MARKS

- (d) Sixty-three university students were surveyed and the number of subjects studied by each student recorded. The frequency polygon below illustrates the results of the survey.



- (i) From the Frequency polygon above complete a frequency distribution table on to your answer sheet with the following headings: 2

Number of subjects <i>x</i>	Frequency <i>f</i>	<i>fx</i>
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Hence, find:

- (ii) Mean 1
- (iii) Mode 1
- (iv) Range 1

- (e) Danielle is four times as old as Veronica. In 12 years' time Danielle will only be twice as old as Veronica. Form an equation and hence solve it in order to determine Danielle and Veronica's present ages. 3

END OF EXAM

YEAR 8 YEARLY EXAM 2005 (iii) (-3, -4) (1)

SOLUTIONS

QUESTION 1 (20 marks)

(a) (i) $x + 5 = -2$
 $x = -7$ (1)

(ii) $7:12 = x:60$
 $x = 35$ (1)

(b) A: Minor segment (2)
 B: Tangent

(c) Side Angle Side (SAS) (1)

(d) $\frac{320}{360} = \frac{8}{9}$ (1)

(e) $C = 20$ (1)

(f) (i) 3700 mL/min (1)
 (ii) 90 km (1)

(g) (i) fortnightly pay = \$1240 (1)
 (ii) annual salary = \$32,240 (1)

(h) (i) 9:6 (1)
 (ii) \$7.50/hr (1)

(i) $C = 66.9$ cm (1)

(j) (i) (4, -2) (1)
 (ii) (4, 3) (1)

(k) (i) $P(4) = \frac{1}{8}$ (1)

(ii) $P(6 \text{ or } 7) = \frac{2}{8}$
 $= \frac{1}{4}$ (1)

(iii) $P(\text{no. } > 4) = \frac{5}{8}$ (1)

QUESTION 2 (20 marks)

(a) (i) $P(\text{letter A}) = \frac{2}{11}$ (1)

(ii) $P(\text{consonant}) = \frac{5}{11}$ (1)

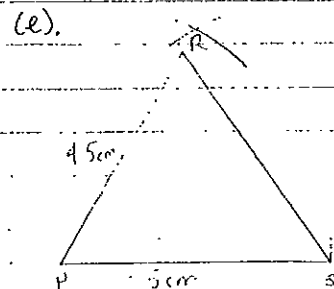
(iii) $P(A, Q \text{ or } L) = \frac{3}{11}$ (1)

(b) (i) $4x + 5 = 21$
 $4x = 16$ (2)
 $x = 4$

(ii) $9(10 - y) = 45$
 $90 - 9y = 45$
 $45 = 9y$
 $5 = y$ (2)

(c) $6 + 5 + 4 + 3 + 4 + x = 5$
 $6 \times \frac{22 + x}{6} = 5 \times 6$
 $22 + x = 30$
 $x = 8$ (2)

(d) $A = \frac{n}{2}(a + b)$
 $36 = \frac{8}{2}(6 + b)$
 $72 = 48 + 8b$ (2)
 $24 = 8b, b = 3$



(f) $\frac{d}{24} = \frac{35}{40}$
 $24 \times d = \frac{35}{40} \times 24$
 $d = 21$ (2)

(g) First Class : Economy class = 210 : 25
 $= 42 : 5$

(ii) Total number of parts = 7
 $\therefore 1 \text{ part} = \frac{10.5}{7}$
 $= 1.5 \text{ kg}$

3 parts of phosphate are required
 \therefore amount of phosphate required = 3×1.5
 $= 4.5 \text{ kg}$

QUESTION 3 (20 marks)

(a)(i)

2, 3, 3, 3, 4, 4, 5, 5, 6, 6, 7, 8

$$\text{Median} = \frac{4+5}{2} = 4.5 \quad (1)$$

(ii) Perimeter = $2(31.4) + \pi(18.7)$
 $= 121.5 \text{ cm} \quad (2)$

(b)(i) $P(\text{even no.}) = \frac{1}{2} \quad (1)$

(ii) $P(\text{no. divisible by 12}) = \frac{3}{20} \quad (1)$

(iii) $P(\text{no.} < 20) = \frac{9}{20} \quad (1)$

(c)(i) Actual dist. = map dist. \times scale factor
 $= 10.3 \times 100\,000$
 $= 1\,030\,000 \text{ cm}$
 $= 10.3 \text{ km} \quad (2)$

(ii) Let the regular price be \$x

$$\therefore 0.75x - 0.1(0.75x) = 675$$

$$0.675x = 675$$

$$x = 1000$$

\therefore regular price is \$1000 (2)

(d)(i) 4 weeks pay = $4 \times 42 \times \$16$
 $= \$2688.00 \quad (1)$

(ii) Holiday loading = $17.5\% \times \$2688$
 $= \$470.40 \quad (1)$

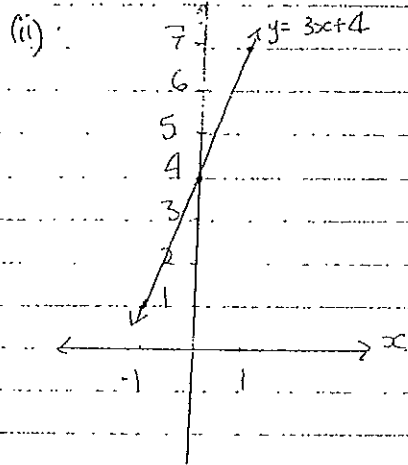
(d)(iii) Total holiday

$$\text{pay} = \$2688 + \$470.40$$

$$= \$3158.40 \quad (2)$$

(e)(i)

x	-1	0	1	(3)
y	1	4	7	



(iii) $x = -3$ $y = -2$ $y = 3x + 4$
 LHS = -2 RHS = $3(-3) + 4$
 $= -9 + 4$
 $= -5$

LHS \neq RHS (2)

$\therefore (-3, -2)$ does not lie on the line $y = 3x + 4$

QUESTION 4 (20 marks)

(a)(i) $A = \frac{bh}{2}$
 $55 = \frac{10(2x-5)}{2}$

$$110 = 20x - 50$$

$$160 = 20x$$

$$8 = x \quad (3)$$

(ii) $4m - 15 = m + 21$
 $3m = 36$
 $m = 12 \quad (3)$

(b) Area = $\pi(11.5)^2 - \pi(5)^2$
 $= 336.9 \text{ mm}^2 \quad (2)$

(ii) $C = 2\pi r$ $C = 41469$
 $r = 6400 + h$

$$\therefore 41469 = 2\pi(6400 + h)$$

$$41469 = 12800\pi + 2\pi h$$

$$41469 - 12800\pi = 2\pi h$$

$$41469 - 12800\pi = h$$

$$2\pi$$

$$\therefore h = 200$$

Height is approx 200 m

(c)(i) In Δ s FGH & HEF

FG = HE (given)

$\angle GFH = \angle FEH = 90^\circ$ (given)

FH is common

$\therefore \Delta FGH \cong \Delta HEF$ (RHS) (4)

(ii) $a - 8 = 6$ (corresp. sides of congruent Δ s are equal)
 $a = 14 \quad (2)$

(d) $V = \frac{4}{3} \times \pi \times (4.2)^2 \times 2.1$
 $= 290.9 \text{ cm}^3 \quad (2)$

(e) Let x be one of the integers.
 \therefore the next consecutive integer is $x + 1$.

$$x + x + 1 = 53$$

$$2x + 1 = 53 \quad (2)$$

$$2x = 52$$

$$x = 26$$

\therefore The integers are 26 & 27

QUESTION 5 (20 marks)

(a) Justin can dig a garden in 30 mins.
 \therefore Justin can dig 2 gardens in 1 hour.

James can dig 3 gardens in 1 hour.

If they work together Justin & James can dig 5 gardens in 1 hour.
 1 garden in $\frac{1}{5}$ hr = 12 mins.

(b)(i) income earned at flat rate = 3500×0.28
 = \$980

(ii) income earned at special rate = $1000 \times 0.23 + (3200 \times 0.3)$
 = \$1190

(iii) let x be the no. of articles produced.
 $465.80 = 0.3x + 0.23 \times 1000$
 $465.80 = 0.3x + 230$
 $235.80 = 0.3x$
 $786 = x$
 \therefore 786 particles were produced.

(c)(i) Total income = $\$59600 + \4834
 = \$64434

(ii) Taxable income = $\$64434 - \1320
 = \$63114

(iii) Tax payable = $\$1857.2 + (0.42 \times \$5114)$
 = \$15719.88

(d)

(i) x	f	fx
1	12	12
2	8	16
3	8	24
4	3	12
5	18	90
6	14	84

$\Sigma f = 63$, $\Sigma fx = 238$

(ii) mean = $\frac{\Sigma fx}{\Sigma f}$
 = $\frac{238}{63}$
 = 3.78

(iii) Mode = 5

(iv) Range = $6 - 1$
 = 5

(e) let Veronica's current age be x . Danelle's current age is $4x$.

	Present ages	Ages in 12 yrs
Veronica	x	$x+12$
Danelle	$4x$	$4x+12$

$4x+12 = 2(x+12)$

$4x+12 = 2x+24$

$2x = 12$

$x = 6$

\therefore Veronica's present age is 6 and Danelle's age is 24.