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Name: _____ () Class: Sec _____



BUKIT VIEW SECONDARY SCHOOL
MID YEAR EXAMINATION 2015
SECONDARY 1 EXPRESS

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MATHEMATICS

7 May 2015
1 hour 30 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, register number and class in the spaces provided on top of this cover page.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question, it must be shown with the answer.

Omission of essential working will result in loss of marks.

Calculators should be used where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 60.

Marks	Deduction (max 4)	Final Marks
	—	60

Setter: Mr Low Chee Wah Parent's Signature: _____

This question paper consists of 10 printed pages. 31

Answer **all** questions.

- 1 (a) Express 108 as a product of prime factors in index notation.
- (b) Given that the prime factorization of 35721 is $3^6 \times 7^2$, find $\sqrt{35721}$, without using a calculator.

Answer : (a) _____ [2]

(b) _____ [2]

- 2 The number A and B , written as the product of their prime factors are given below.

$$A = 2^2 \times 3^4 \times 5^2 \times 7$$

$$B = 2^4 \times 3^2 \times 7^3$$

Use the results to find

- (a) the HCF and LCM of A and B ,
- (b) the square root of $A \times B$
- (c) the smallest integer, k , such that Bk is a perfect positive cube.

Answer : (a) HCF = _____ [1]

LCM = _____ [1]

(b) _____ [2]

(c) _____ [1]

- 3 Mary has three ribbons of lengths 140 cm, 224 cm and 560 cm respectively. She wishes to cut all the ribbons into maximum equal number of pieces without any leftover ribbons. Find
- the total number of pieces of ribbons that Mary has cut.
 - Mary's friend, Jane, asked for a piece of cut ribbon with 15 cm length. Is Mary able to give Jane what she asked for? Explain.

Answer (a) _____ [2]

(b) Yes / No

Explanation _____ [1]

- 4 Evaluate the following expressions.

(a) $-12 - [8 + (-29)]$

(b) $\left(-\frac{5}{6}\right) \div \left(-1\frac{2}{3}\right)$

Answer : (a) _____ [2]

(b) _____ [2]

5 Use a number line to illustrate each of the following.

(a) prime numbers between 41 and 50 inclusive, [2]

(b) factors of 12 [2]

(c) numbers $\frac{\pi}{2}, \frac{9}{11}, (-0.421)^2, -1.1^2$ [2]



6 (a) Round off the number 20725 to 3 significant figures.

(b) Round off the number 20.0132989 to 5 decimal places.

(c) Estimate $\sqrt{65} \div \sqrt[3]{65}$.

Answer : (a) _____ [1]

(b) _____ [1]

(c) _____ [2]

- 7 Write down an algebraic expression for each of the following statements.

Statement	Algebraic Expression
(a) Subtract 3 from the sum of $2x$ and $3y$.	
(b) Add $8v$ to the product of $3h$ and $7y$.	
(c) Divide the sum of $3z$ and $6p$ by $5a$.	
(d) Thrice the value of w divided by the sum of $3y$ and $5p$.	

[4]

- 8 Simplify the following expressions.

(a) $3(2p - 7q) - 5(4q - p)$

(b) $\frac{2n+4}{5} - \frac{n-1}{2}$

Answer : (a) _____ [2]

(b) _____ [3]

- 9 Given that $a = -2$, $b = 5$ and $c = -7$, evaluate $\frac{7b - a^2}{2c}$.

Answer : _____ [2]

-
- 10 Factorise the following expressions.

(a) $8 - 24x$

(b) $4h - h(54k + 18)$

Answer : (a) _____ [1]

(b) _____ [2]

- 11 (a) Mary is twice as old as Nancy and Jenny is 3 years younger than Mary. If the sum of their ages is 52, find Nancy's and Jenny's age.
- (b) Two consecutive odd numbers are such that the sum of the larger number and three times the smaller number is 54. Find the two numbers.

Answer : (a) Nancy's age _____ [1]

Jenny's age _____ [1]

(b) _____, _____ [2]

34

12 Solve each of the following equations.

(a) $3 - 2x - 9 = -3 - 4x$

(b) $\frac{3y + 2}{5} = \frac{2y - 1}{2}$

Solve each of the following inequalities.

(c) $6x < -18$

(d) $-10y \geq -28$

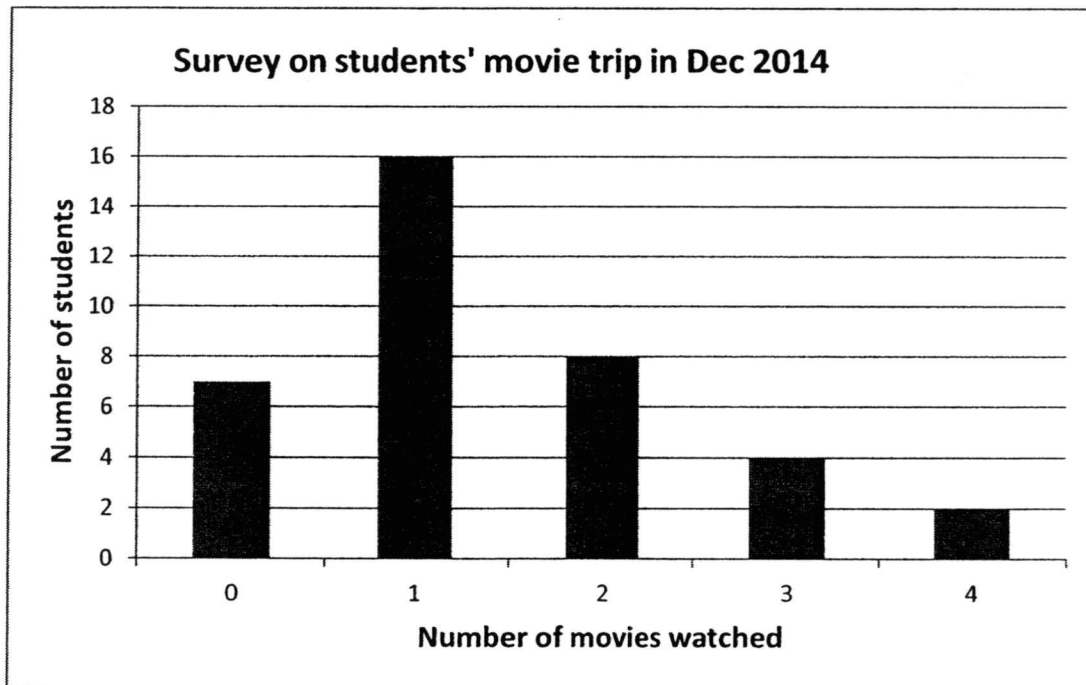
Answer : (a) _____ [2]

(b) _____ [2]

(c) _____ [1]

(d) _____ [1]

- 13 In a survey, some students were asked how many movie shows did they watched in December 2014.



The results of the survey are shown in the bar chart above. Find

- the total number of students in the survey,
- the total number of movies watched by the students,
- the percentage of the number of students who watched two or more movies in December 2014. Round your answer to the nearest 2 decimal places.
- the angle for the sector representing the category of two movies watched in December 2014 if the information is illustrated on a pie chart.

Answer : (a) _____ students [1]

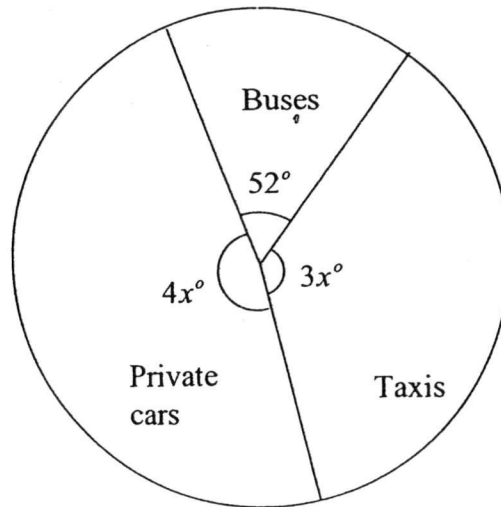
(b) _____ movies [2]

(c) _____ % [1]

(d) _____ ° [2]

- 14 The pie chart shows the results of a survey conducted on the vehicles entering an industrial building in a day.

**Survey of vehicles entering
an industrial building**



- (a) Find the value of x .
- (b) If the number private cars is 352, calculate the total number of vehicles entering the building during the survey.

Answer : (a) _____ [2]

(b) _____ vehicles [2]

END OF PAPER

Class: Sec



**BUKIT VIEW SECONDARY SCHOOL
MID YEAR EXAMINATION 2015
SECONDARY 1 EXPRESS**

[illegible]

MATHEMATICS

7 May 2015
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Marks	Deduction (max 4)	Final Marks
	—	60

Setter: Mr Low Chee Wah

Parent's Signature: _____

This question paper consists of **10** printed pages.

36

Answer all questions.

- 1 (a) Express 108 as a product of prime factors in index notation.

- (b) Given that the prime factorization of 35721 is
- $3^6 \times 7^2$
- , find
- $\sqrt{35721}$
- , without using a calculator.

(a)

2	108
2	54
3	27
3	9
3	3
	1

(M1)

(b) $\sqrt{3^6 \times 7^2} = \sqrt{3^3 \times 3^3 \times 7 \times 7}$ (M1)

$= 3^3 \times 7$

$= 189$ (A1)

zero marks if there is no workings

$108 = 2^2 \times 3^3$ (A1)

Answer: (a) $\underline{2^2 \times 3^3}$ [2]

(b) $\underline{189}$ [2]

- 2 The number A and B, written as the product of their prime factors are given below.

$A = 2^2 \times 3^4 \times 5^2 \times 7$

$B = 2^4 \times 3^2 \times 7^3$

Use the results to find

- (a) the HCF and LCM of A and B,
 (b) the square root of $A \times B$
 (c) the smallest integer, k, such that Bk is a perfect positive cube.

(a)

A	$2^2 \times 3^4 \times 5^2 \times 7$	
B	$2^4 \times 3^2 \times 7^3$	
HCF	$2^2 \times 3^2 \times 7$	$= 252$ (B1)
LCM	$2^4 \times 3^4 \times 5^2 \times 7^3$	$= 11\ 113\ 200$ (B1)

(b) $\sqrt{A \times B} = \sqrt{2^2 \times 2^4 \times 3^4 \times 3^2 \times 5^2 \times 7 \times 7^3}$ Also accept $A \times B = 2^6 \times 3^6 \times 5^2 \times 7^4$

$= \sqrt{2^6 \times 3^6 \times 5^2 \times 7^4}$ (M1) Answer: (a) HCF = $\underline{252}$ [1]

$= 2^3 \times 3^3 \times 5 \times 7^2$ LCM = $\underline{11\ 113\ 200}$ [1]

$= 52920$ (A1) (b) $\underline{52920}$ [2]

(c) $Bk = (2^4 \times 3^2 \times 7^3)k$ (c) $\underline{12}$ [1]

$= (2^4 \times 3^2 \times 7^3)(2^2 \times 3)$

$k = 2^2 \times 3$
 $= 12$ (B1)

For perfect cube, the index of a number must be a multiple of 3

9

- 3 Mary has three ribbons of lengths 140 cm, 224 cm and 560 cm respectively. She wishes to cut all the ribbons into maximum equal number of pieces without any leftover ribbons. Find

- (a) the total number of pieces of ribbons that Mary has cut.
 (b) Mary's friend, Jane, asked for a piece of cut ribbon with 15 cm length. Is Mary able to give Jane what she asked for? Explain.

(a)

2	140	224	560
2	70	112	280
7	35	56	140
	5	8	20

$$\text{HCF} = 2 \times 2 \times 7 = 28 \quad (\text{AI})$$

$$\text{Total number of ribbons cut} = 28 \times 3 = 84 \quad (\text{M1})$$

Answer (a) 84 [2]

(b) Yes (No)

Explanation The available ribbon lengths are 5cm, 8cm and 20cm. Only possibility is to give Jane a 20cm ribbon and ask her to cut to 15cm. [1] (B1)

Also acceptable: 140, 224 and 560 cannot be divided by 15.

- 4 Evaluate the following expressions.

(a) $-12 - [8 + (-29)]$

(b) $\left(-\frac{5}{6}\right) \div \left(-1\frac{2}{3}\right)$

(a) $-12 - (8 - 29) \quad (\text{M1})$
 $= -12 - (-21)$
 $= 9 \quad (\text{AI})$

(b) $\frac{-5}{6} \div \left(\frac{-5}{3}\right)$
 $= \frac{-5}{6} \times \left(\frac{-3}{5}\right) \quad (\text{M1})$
 $= \frac{1}{2} \quad (\text{AI})$

minus 1m if
 expressions are without
 parentheses involving
 2 operators (x-)

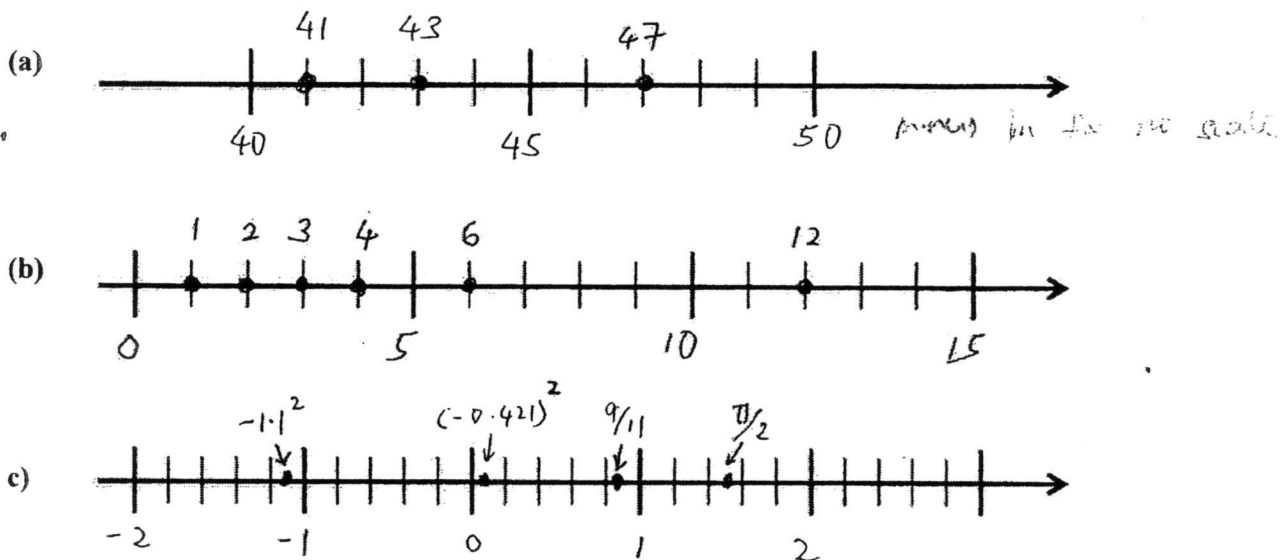
Answer: (a) 9 [2]

(b) 0.5 [2]

5 Use a number line to illustrate each of the following.

- (a) prime numbers between 41 and 50 inclusive, 41, 43, 47 [2]
 (b) factors of 12 1, 2, 3, 4, 6, 12 [2]
 (c) numbers $\frac{\pi}{2}, \frac{9}{11}, (-0.421)^2, -1.1^2$ [2]

minus 1m for every mistake



- 6 (a) Round off the number 20725 to 3 significant figures.
 (b) Round off the number 20.0132989 to 5 decimal places.
 (c) Estimate $\sqrt{65} \div \sqrt[3]{65}$.

(a) 20700 (B1)

(b) 20.01330 (B1)

(c) $\sqrt{65} \div \sqrt[3]{65} \approx \sqrt{64} \div \sqrt[3]{64}$

$\approx \sqrt{8 \times 8} \div \sqrt[3]{4 \times 4 \times 4}$ (M1)

$\approx \frac{8}{4}$

≈ 2 (A1)

Answer: (a) 20700 [1]

(b) 20.01330 [1]

(c) 2 [2]

- 7 Write down an algebraic expression for each of the following statements.

Statement	Algebraic Expression	
(a) Subtract 3 from the sum of $2x$ and $3y$.	$(2x + 3y) - 3$	(B1)
(b) Add $8v$ to the product of $3h$ and $7y$.	$(3h \times 7y) + 8v$	(B1)
(c) Divide the sum of $3z$ and $6p$ by $5a$.	$\frac{3z + 6p}{5a}$	(B1)
(d) Thrice the value of w divided by the sum of $3y$ and $5p$.	$(\frac{3w}{3y + 5p})$	(B1)

note: 7(b) Accept $21hy + 8v$ [4]
not acceptable if written $3h7y + 8v$

- 8 Simplify the following expressions.

(a) $3(2p - 7q) - 5(4q - p)$

(b) $\frac{2n+4}{5} - \frac{n-1}{2}$

(a) $6p - 21q - 20q + 5p$ (M1)
 $= 11p - 41q$ (A1)

(b) $\frac{2(2n+4)}{5 \times 2} - \frac{5(n-1)}{5 \times 2}$ (M1)
 $= \frac{4n+8 - 5n+5}{10}$ (M1)
 $= \frac{-n+13}{10}$ (A1)

Answer: (a) $\frac{11p - 41q}{10}$ [2]
 (b) $\frac{13-n}{10}$ [3]

- 9 Given that $a = -2$, $b = 5$ and $c = -7$, evaluate $\frac{7b - a^2}{2c}$.

$$= \frac{7(5) - (-2)^2}{2(-7)} \quad (M1)$$

$$= \frac{35 - 4}{-14}$$

$$= \frac{-31}{14}$$

$$= -2\frac{3}{14} \quad (A1)$$

Answer :

$$-2\frac{3}{14}$$

[2]

- 10 Factorise the following expressions.

(a) $8 - 24x$

(b) $4h - h(54k + 18)$

(a) $8(1 - 3x) \quad (A1)$

(b) $4h - 54hk - 18h \quad (M1)$

$$= -14h - 54hk$$

$$= -2(7h + 27hk)$$

$$= -2h(7 + 27k) \quad (A1)$$

Answer : (a) $\frac{8(1 - 3x)}{\quad} \quad [1]$

(b) $\frac{-2h(7 + 27k)}{\text{or } 2h(-7 - 27k)} \quad [2]$

- 11 (a) Mary is twice as old as Nancy and Jenny is 3 years younger than Mary. If the sum of their ages is 52, find Nancy's and Jenny's age.
- (b) Two consecutive odd numbers are such that the sum of the larger number and three times the smaller number is 54. Find the two numbers.

(a) Let $m = \text{Mary's age}$

$$\therefore \text{Nancy's age} = \frac{1}{2}m$$

$$\text{Jenny's age} = m - 3$$

$$m + \frac{1}{2}m + (m - 3) = 52$$

$$2.5m = 55$$

$$m = 22$$

$$\therefore \text{Nancy's age} = \frac{1}{2}(22) = 11$$

$$\text{Jenny's age} = 22 - 3 = 19$$

Accept model method

(A1) for both correct

(b) Let $x = \text{larger number}$

$$x + 3(x - 2) = 54$$

$$4x - 6 = 54$$

$$4x = 60$$

$$x = 15$$

$$\text{smaller number} = 15 - 2$$

$$= 13$$

$$\text{Numbers are } 13, 15$$

Guess and check method: -1m

Answer: (a) Nancy's age 11 [1]

Jenny's age 19 [1]

(b) 13, 15 [2]

12 Solve each of the following equations.

(a) $3 - 2x - 9 = -3 - 4x$

(b) $\frac{3y+2}{5} = \frac{2y-1}{2}$

Solve each of the following inequalities.

(c) $6x < -18$

(d) $-10y \geq -28$

(a) $-2x + 4x = -3 - 3 + 9$ (M1)
 $2x = 3$
 $x = 1.5$ (A1)

(b) $2(3y+2) = 5(2y-1)$ (M1)
 $6y + 4 = 10y - 5$
 $-4y = -9$
 $y = \frac{9}{4}$
 $= 2\frac{1}{4}$ (A1)

(c) $6x < -18$
 $x < -3$ (A1)

(d) $-10y \geq -28$
 $-y \geq -2.8$
 $y \leq 2.8$ (A1)

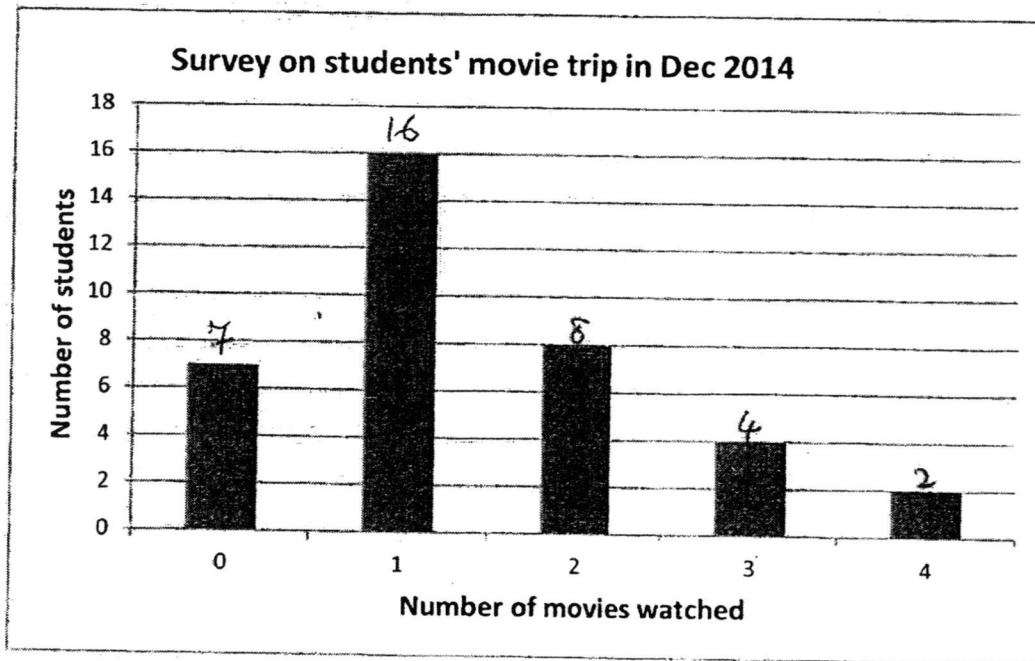
Answer : (a) $x = 1.5$ [2]

(b) $y = 2\frac{1}{4}$ [2]

(c) $x < -3$ [1]

(d) $y \leq 2.8$ [1]

- 13 In a survey, some students were asked how many movie shows did they watched in December 2014.



The results of the survey are shown in the bar chart above. Find

- the total number of students in the survey,
- the total number of movies watched by the students,
- the percentage of the number of students who watched two or more movies in December 2014. Round your answer to the nearest 2 decimal places.
- the angle for the sector representing the category of two movies watched in December 2014 if the information is illustrated on a pie chart.

(a) Total students = $7 + 16 + 8 + 4 + 2$
 $= 37$ students (B1)

Answer: (a) 37 students [1]

(b) 52 movies [2]

(b) Total movies = $(7 \times 0) + (16 \times 1) + (8 \times 2) + (4 \times 3) + (2 \times 4)$
 $= 0 + 16 + 16 + 12 + 8$
 $= 52$ movies (A1)

(c) 37.84 % [1]

(d) 77.8 ° [2]

$37 \frac{31}{37}$
 not accepted

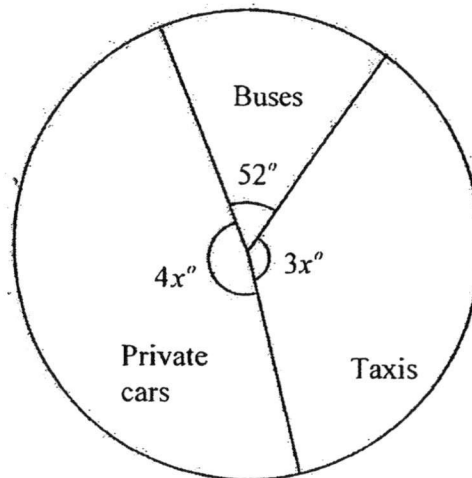
or $77 \frac{31}{37}$

(c) $\left(\frac{8+4+2}{37} \right) \times 100\% = 37.84\%$ (B1)

(d) $\left(\frac{8}{37} \right) \times 360 = 77.8^\circ$ (A1)

- 14 The pie chart shows the results of a survey conducted on the vehicles entering an industrial building in a day.

**Survey of vehicles entering
an industrial building**



- (a) Find the value of x .
- (b) If the number private cars is 352, calculate the total number of vehicles entering the building during the survey.

$$\begin{aligned}
 (a) \quad 4x + 3x + 52 &= 360 \quad (M1) \\
 7x &= 308 \\
 x &= 44 \quad (A1)
 \end{aligned}$$

$$\begin{aligned}
 (b) \quad 4x^\circ &= \text{Private car} \\
 \text{total number} &= \frac{360}{4 \times 44} \times 352 \quad (M1) \\
 &= 720 \quad (A1)
 \end{aligned}$$

Answer : (a) 44 [2]

(b) 720 vehicles [2]

END OF PAPER