Class	Register No.

Candidate Name_____

PEIRCE SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2021
SECONDARY 1 EXPRESS

MATHEMATICS
Paper 1

29 September 2021
1 hour 15 minutes

Additional Materials:
Plain Paper (for rough work)

INSTRUCTIONS TO CANDIDATES
Candidates answer on the Question Paper.

Write your name, class and register number on all the work you hand in.
Write in dark blue or black pen.
You may use a 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.
The use of an approved scientific calculator is expected, 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 either your calculator value or 3.142, unless the question requires the answer in terms of π.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 50.

PARENT'S SIGNATURE	**For Examiner's Use**	
	Total	

This paper consists of **10** printed pages and **0** blank page.
Setter: Mrs Cheryl Lin

1. Round off

   (a) 234.567 to 1 significant figure,

   Answer: .... [1]

   (b) 0.0035182 to 3 significant figures.

   Answer: .... [1]

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2. Consider this list of numbers: $\sqrt{2}\,,\,1\,,\,13\,,\,2\dfrac{3}{5}\,,-8\,,\,100$.
   List the

   (a) irrational number(s),

   Answer: .... [1]

   (b) prime number(s),

   Answer: .... [1]

   (c) integer(s).

   Answer: .... [1]

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3. Fill in the boxes with $<$, $>$ or $=$.

   (a) $-(-2)^2$ ☐ $-\left(-2^2\right)$ [1]

   (b) $\dfrac{6-45}{\sqrt{230}}$ ☐ -2.9 [1]

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4. Without using a calculator, estimate the value of $\dfrac{\sqrt{17} \times 6.09}{2.88}$.

Answer: .... [2]

5 Factorise

(a) $6pqr + 8p^2r$,

Answer: .... [1]

(b) $3a - 27ab$.

Answer: .... [1]

6 Subtract $(2x - 3)$ from $(5 - 8x)$.

Answer: .... [2]

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

   (a) Divide the square root of p by the product of p and n.

   Answer: .... [1]

   (b) Add cube of r to 3 times of s.

   Answer: .... [1]

8. It is given that the equation of a line is $y = 8 - 5x$.

   (a) State the y-intercept of the line.

   Answer: .... [1]

   (b) Does the line pass through the point $(-1.5, -20)$? Explain your answer.

   Answer: .... because ....
   .... [2]

9. (a) Express 278% as decimals.

   Answer: .... [1]

   (b) 3.125% of x is 9. Find x.

6

Answer: x = ... [2]

10.   (a)   Find the prime factorisation of 5760.

Answer: .... [1]

(b)   Find the smallest integer value of m such that $\dfrac{5760}{m}$ is a perfect cube.

Answer: .... [1]

11.   Three alarm clocks are set to ring at intervals of 9 minutes, 15 minutes, 36 minutes respectively. If all alarm clocks ring together at 6.30 a.m., at what time will they next ring together again?

Answer: .... [3]

12. (a) Construct triangle *PQR* such that *PQ* = 8 cm, *QR* = 6 cm and *PR* = 5 cm.

[2]

(b) Measure $\angle PQR$ and give your answer correct to the nearest degree.

Answer: ....° [1]

13. The size of each interior angle of a regular polygon is 8 times the size of each exterior angle.

Calculate

(a) the size of each exterior angle,

Answer: ....° [1]

(b) the number of sides of the polygon.

Answer: .... [1]

14. Solve $\dfrac{2+x}{3} + \dfrac{2+3x}{5} = 4$.

Answer: .... [3]

10

15. Mary has $(6x+12y)$ books. Peter has $\dfrac{2}{3}$ as many books as Mary and Jack has $\dfrac{1}{2}$ as many books as Peter.

(a) Find, in simplest form, the number of books Peter and Jack have in terms of x and y.
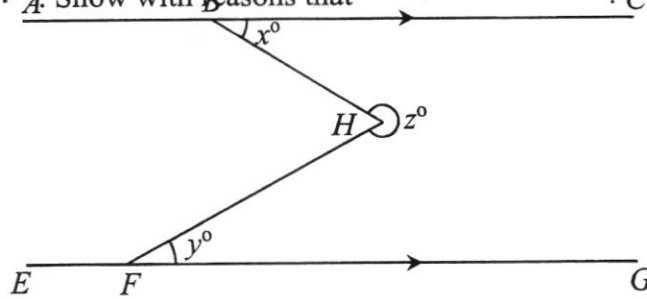
Answer: Peter: ……………… [1]

Jack: ……………… [1]

(b) Find the total number of books that the three children have in terms of x and y.

Answer: ……………………… [1]

(c) Find the total number of books that the three children have if $x=5\dfrac{1}{2}$ and $y=3$.

Answer: ……………………… [1]

16. In the diagram, AC is parallel to EG, $\angle CBH = x°$, reflex $\angle BHF = z°$ and $\angle HFG = y°$. Show with reasons that $x° + y° + z° = 360°$.

[3]

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17. The first four term of a number sequence is shown below.

$$T_1 = 4 \times (1+2) = 12$$
$$T_2 = 4 \times (2+2) = 16$$
$$T_3 = 4 \times (3+2) = 20$$
$$T_4 = 4 \times (4+2) = 24$$

(a) Find the 15th term of the sequence.

Answer: .... [1]

(b) Find the nth term of the sequence.

Answer: .... [1]

(c) Is 134 a term in the sequence? Explain your answer.

Answer: .... because ....

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.... [2]

18.
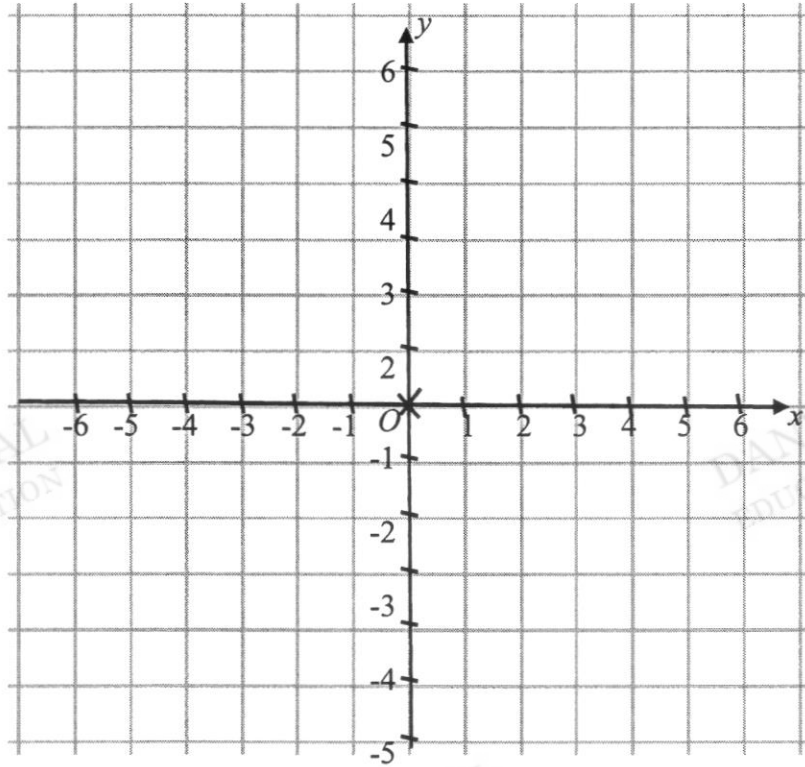
(a)   Plot and label the following points in the diagram above.
    (i) $A(0,-5)$
    (ii) $B(3,4)$

[2]

(b)   Find the gradient of
    (i) AB,

Answer: .... [1]

    (ii) OA.

Answer: .... [1]

(c)   State the coordinates of C if $AOBC$ is a parallelogram.

Answer: .... [1]

Class	Register No.

Candidate Name _____

PEIRCE SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2021
SECONDARY 1 EXPRESS

MATHEMATICS
Paper 2

5 Oct 2021
1 hour 15 minutes

Additional Materials:
Plain Paper (for rough work)

INSTRUCTIONS TO CANDIDATES
Candidates answer on the Question Paper.

Write your name, class and register number on all the work you hand in.
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You may use a pencil for any diagrams or graphs.
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Answer **all** questions.
If working is needed for any question it must be shown with the answer.
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The use of an approved scientific calculator is expected, 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 either your calculator value or 3.142, unless the question requires the answer in terms of π.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 50.

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	Total	

This paper consists of **11** printed pages and **1** blank page.
Setter: Mrs Cheryl Lin

1. (a) Rachel's weekly allowance was $10 and $50 in Primary 6 and Secondary 1 respectively. Find the percentage increase in her allowance.

Answer: ....% [2]

(b) Express 3 minutes : 80 seconds in the simplest form.

Answer: .... [2]

(c) Given that $9m - 3n = 5m - n$, find the ratio of $m : n$.

Answer: .... [2]

(d) Ray and Jane each receive a sum of money in the ratio 2 : 1. If Ray gives $16 to Jane, the ratio becomes 2 : 3. Find the total sum of money that Ray and Jane receive.

Answer: $........................ [2]

5

2.   (a)   Expand and simplify $-3(x+5)+8x+2$.

Answer: .... [2]

(b)   Express $\dfrac{2+x}{3} - \dfrac{3x-1}{4}$ as a single fraction in its simplest form.

Answer: .... [3]

(c)   Solve $3(2w-11) = 5(6-3w)$.

Answer: .... [2]

3. (a) There are a total of 104 chickens and goats in a farm.

Let the number of chickens be x.

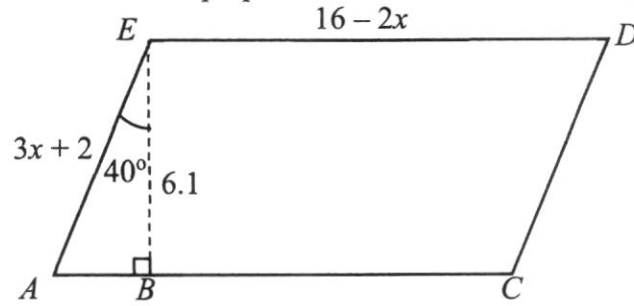(i) Find an expression, in terms of x, for the number of goats in the farm.

Answer: .... [1]

(ii) Given that the animals have 246 legs altogether, form an equation in terms of x.

Answer: .... [1]

(iii) Solve the equation in (a)(ii) to find the number of chickens in the farm.

Answer: .... [2]

(b)   In the diagram below, $ACDE$ is a parallelogram, $AE = 3x + 2$, $ED = 16 - 2x$ and $\angle AEB = 40°$. EB is perpendicular to AC and has a length of 6.1 cm.

(i)   Find $\angle ACD$.

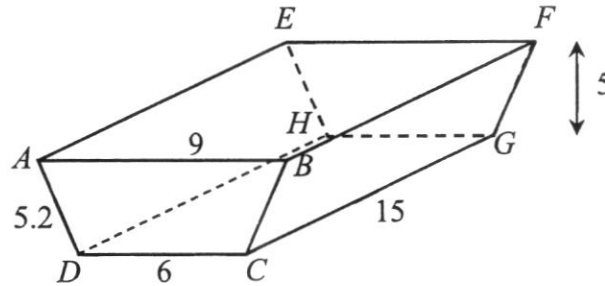*Answer:* ....° [1]

(ii)   Given that the perimeter of $ACDE$ is 40 cm, find x.

Answer: .... [2]

(iii) Find the area of parallelogram $ACDE$.

Answer: .... cm² [1]

4. The figure below shows a solid trapezoidal prism made of metal.

$AB = 9$ cm, $DC = 6$ cm, $CG = 15$ cm, $AD = BC = FG = EH = 5.2$ cm and the perpendicular distance between EF and HG is 5 cm.

(i) Find the area of *ABCD*.

Answer: .... cm² [1]

(ii) Find the volume of the prism.

Answer: .... cm³ [1]

(iii) Find the total surface area of the prism.

Answer: .... cm² [2]

(iv)   The prism is melted to form cylinders of radius 1 cm and height 2 cm. Find the number of complete cylinders that can be formed.

Answer: ....   [2]

5.   Sharon is strolling from her home to a park. After x minutes, her distance y metres from the park is modelled by $y = -50x + 300$ for $0 \le x \le 6$.

(a)   Complete the following table.

x	0	1	4	6
y	300		100	0

[1]

(b)   Using a scale of 2 cm representing 1 minute on the horizontal x-axis and 2 cm representing 50 metres on the vertical y-axis, draw the graph of $y = -50x + 300$ for $0 \le x \le 6$.

[3]

(c)   (i)   Find the gradient of the graph.

Answer: .... [1]

(ii)   Interpret what the gradient tells you about Sharon's stroll to the park.

Answer: ....

....

.... [1]

(d)   Write down the distance between Sharon's home and the park.

Answer: .... m   [1]

(e)   Use your graph to estimate Sharon's distance <u>from her home</u> after 3 minutes and 30 seconds.

Answer: .... m   [1]

6.   (a)   (i)   Convert 0.6 m/s to km/h.

Answer: .... km/h   [1]

(ii)   John walks at a constant speed of 0.6 m/s for 1 hour and run at a constant speed of 7.5 km/h for 30 minutes. Find John's average speed for the whole journey in km/h.

Answer: .... km/h   [2]

(b)   If Adam uses 5 hours to paint an apartment and Jay uses 4 hours to paint the same apartment, find the time required if both Adam and Jay work together to paint the apartment. Write your answer in hours, minutes and seconds.

Answer: .... h ......min ......s   [3]

7. Mark wants to renovate his living room. His living room is in the shape of a rectangle with dimensions 3.3 m by 11.4 m.

He plans to tile the floor of his living room with only one type of square tile.

(i) Show that the largest square tile that can fit Mark's living room is a square of length 30 cm if he does not intend to cut any of the tiles.

[2]

(ii) Some information on tiling is given below.

| Cost of each square tile (30 cm by 30 cm): $7 |
| Labour cost to lay tiles: $40 for every multiple of 50 tiles or part thereof. |

Mark claims that he needs to spend at least $4000 for tiling his living room completely. Justify whether Mark made a correct claim. Support your decision with clear working and reasoning.
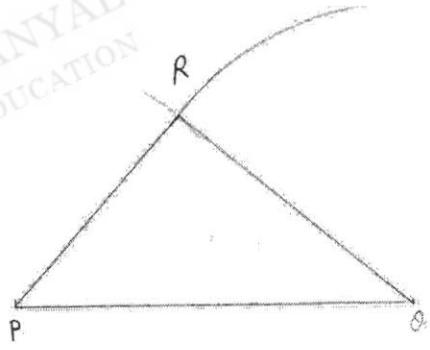
Answer Mark's claim is ...., as ....
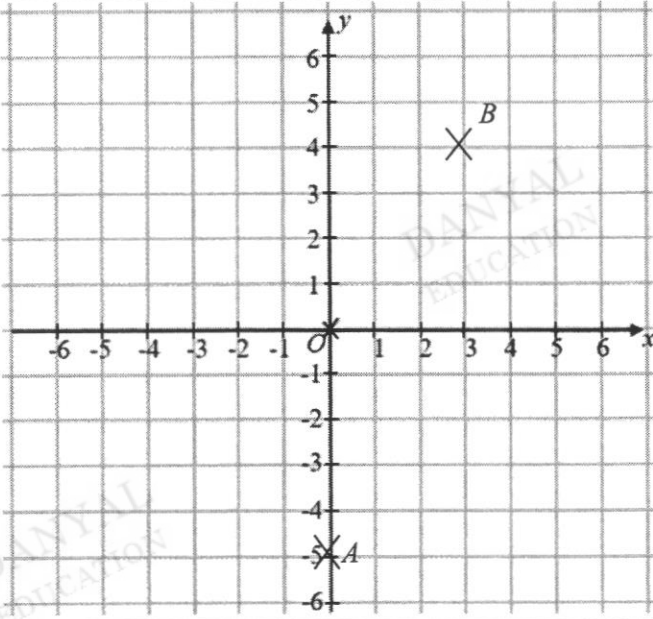
.... [5]

End of Paper 2

2021 1E SA2 Paper 1 Marking Scheme

1a	200	B1	
b	0.00352	B1	
2i	$\sqrt{2}$	B1	
ii	13	B1	
iii	1, 13, -8, 100	B1	
3a	<	B1	
b	>	B1	
4	$\dfrac{\sqrt{17}\times 6.09}{2.88}$ $\approx\dfrac{\sqrt{16}\times 6}{3}$	M1	
	$=\dfrac{4\times 6}{3}$ $=8$	A1	
5a	$2pr(3q+4p)$	B1	
b	$3a(1-9b)$	B1	
6	$(5-8x)-(2x-3)$ $=5-8x-2x+3$ $=8-10x$	M1 A1	
7a	$\dfrac{\sqrt{p}}{pn}$	B1	
b	r^3+3s	B1	
8a	8	B1	
b	$y=8-5(-1.5)=15.5$ No because when $x=-1.5$, the value of y is 15.5 instead of -20.	M1 A1	
9a	2.78	B1	
b	$x=\dfrac{9}{3.125}\times 100$ $x=288$	M1 A1	

10a	$5760 = 2^7 \times 3^2 \times 5$	B1	
b	$m = 2 \times 3^2 \times 5 = 90$	B1	
11	$9 = 3^2$ $15 = 3 \times 5$ $36 = 2^2 \times 3^2$ $LCM = 2^2 \times 3^2 \times 5$ $= 180 \, min$ $= 3h$ $9.30 a.m.$	M1 A1 A1	M1 for prime factorisation or ladder method
12a		B1 B1	B1 for accurate drawing B1 for label of vertices
b	$39°$	B1	Ecf.
13a	Int angle + ext angle = $180°$ 9 units $180°$ 1 unit $20°$	B1	
b	$360 \div 20 = 18$ sides	B1	
14	$\dfrac{2+x}{3} + \dfrac{2+3x}{5} = 4$ $\dfrac{5(2+x)}{15} + \dfrac{3(2+3x)}{15} = \dfrac{15(4)}{15}$ $10 + 5x + 6 + 9x = 60$ $14x + 16 = 60$ $14x = 44$ $x = 3\dfrac{1}{7}$	M1 M1 A1	M1 for common denominator M1 for changing to linear equation
15a	Peter $4x + 8y$ Jack $2x + 4y$	B1 B1	

b	$6x + 12y + 4x + 8y + 2x + 4y$ $= 12x + 24y$	B1	Ecf
c	$12\left(5\dfrac{1}{2}\right) + 24(3) = 138$	B1	Ecf
16	Construct a straight line IHJ such that IJ//AC $\angle BHI = x°$ (alt. angles, $AC//IJ$) $\angle IHF = y°$ (alt. angles, $IJ//EG$) $x° + y° + z° = 360°$ (angles at a point)	M1 M1 A1	
17a	$T_{15} = 4 \times (15 + 2) = 68$	B1	
b	$T_n = 4(n + 2)$	B1	
c	No Because 134 is not a multiple of 4.	B1 B1	Or solve for n and explain that n is not a whole number.
18a		B2	Minus 1 mark if student did not label the points.
bi	$gradient = \dfrac{rise}{run} = \dfrac{9}{3} = 3$	B1	
ii	undefined	B1	
c	$(3,-1)$	B1	No mark if students did not put bracket.

2021 1E SA2 Paper 2 Marking Scheme

1(a)	$\dfrac{40}{10} \times 100\%$ $= 400\%$	M1 A1	M1 for knowing that 100% rep. 10.
(b)	3 minutes = 180 seconds $180 : 80 = 9 : 4$	M1 A1	
(c)	$9m - 3n = 5m - n$ $4m = 2n$ $m = \dfrac{2n}{4}$ $\dfrac{m}{n} = \dfrac{2}{4} = \dfrac{1}{2}$ $m : n = 1 : 2$	M1 A1	
(d)	$R : J \qquad\qquad R : J$ $= 2 : 1 \qquad\quad = 2 : 3$ $= 10 : 5 \qquad\;\; = 6 : 9$ 4 units 16 15 units 60	 M1 A1	
2(a)	$-3(x + 5) + 8x + 2$ $= -3x - 15 + 8x + 2$ $= 5x - 13$	 M1 A1	
(b)	$\dfrac{2 + x}{3} - \dfrac{3x - 1}{4}$ $= \dfrac{4(2 + x)}{12} - \dfrac{3(3x}{12}$ $= \dfrac{8 + 4x - 9x + 3}{12}$ $= \dfrac{11 - 5x}{12}$	 M1 M1 A1	M1 for common denominator M1 for correct expansion and change of sign
(c)	$3(2w - 11) = 5(6 - .$ $6w - 33 = 30 - 15w$ $21w = 63$ $w = 3$	M1 A1	

3(a)(i)	$104 - x$	B1	
(ii)	$2x + 4(104 - x) = 246$	B1	
(iii)	$2x + 416 - 4x = 246$ $416 - 2x = 246$ $2x = 170$ $X = 85$	M1 A1	
(b)(i)	$130°$	B1	
(ii)	$16 - 2x + 3x + 2 = 20$ $x + 18 = 20$ $x = 2$	M1 A1	
(iii)	$(16 - 4) \times 6.1 = 73.2$ cm^2	B1	
4(i)	$\frac{1}{2} \times (6 + 9) \times 5 = 37.5$ cm^2	B1	
(ii)	$37.5 \times 15 = 562.5$ cm^3	B1	
(iii)	$[9 + 6 + 5.2 + 5.2] \times 15 = 381$ $37.5 \times 2 + 381 = 456$ cm^3	M1 A1	
(iv)	$\pi \times 1^2 \times 2 = 2\pi$ $\frac{562.5}{2\pi} = 89.524 \approx 89$ (round down)	M1 A1	
5(a)	250	B1	
(b)		B1 B1 B1	Scale Plot and straight line Label of axes and graph
(c)(i)	-50	A1	Ecf
(ii)	Sharon stroll from her home to the park at a **speed of 50 m/min**.	A1	Must say speed and must put in the units. Speed's value follow (ci) ecf.
(d)	300 m	B1	
(e)	Read 125 from graph, i.e. 125 m from park $300 - 125 = 175$ m from home	A1	ecf

6(a)(i)	1s 0.6 m 1 h 0.6 × 3600 = 2160 m = 2.16 km 2.16 km/h	B1	
(ii)	Total distance = 2.16 + 7.5 × 0.5 = 5.91 km Average speed = 5.91 ÷ 1.5 = 3.94 km/h	M1 A1	
(b)	Adam $\frac{1}{5}$ of apartment per hour Jay $\frac{1}{4}$ of apartment per hour Together of apartment per hour $1 \div \frac{9}{20} = \frac{20}{9}$ h = 2 h 13 min 20 s	M1 A1 A1	
7(i)	3.3 m = 330 cm 11.4 m = 1140 cm $330 = 2 \times 3 \times 5 \times 11$ $1140 = 2^2 \times 3 \times 5 \times 19$ $HCF = 2 \times 3 \times 5 = 30$ (shown)	M1 A1	M1 for prime factorisation or ladder method Marks not given if students divide the length and breadth by 30 cm.
(ii)	$\frac{330 \times 1140}{30 \times 30} = 418$ tiles cost of tiles = 418 × 7 = \$2926 $\frac{418}{50} = 8.36$ (round up to 9) cost of labour = 9 × 40 = \$360 Total cost = 2926 + 360 = \$3286 Mark's claim is **incorrect**, as he would have spent **less than \$4000**.	M1 M1 M1 A1 A1	M1 for number of tiles. M1 for cost of tiles, ecf. M1 for labour cost, ecf. No ecf. Ecf. Based on students' total cost.