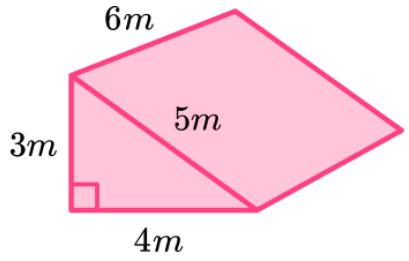
Surface Area of Triangular Prisms - Worksheet

Skill

Group A - Right angle triangles

Work out the surface area of the following:

1)



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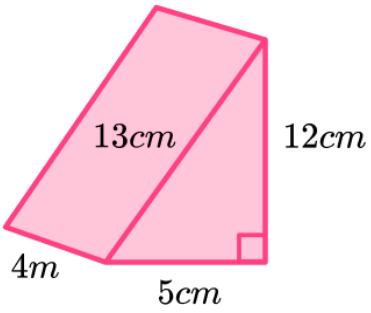
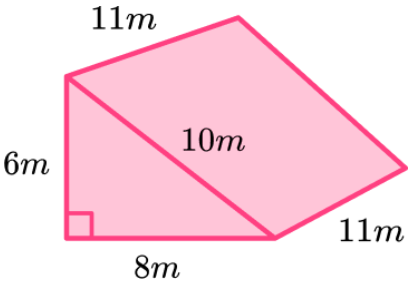


3)



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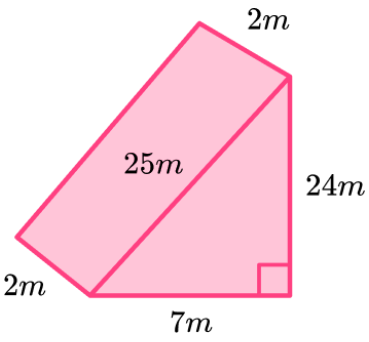

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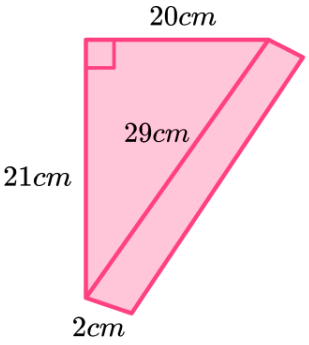

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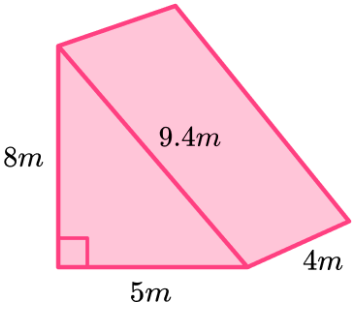

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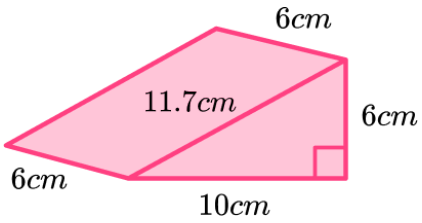

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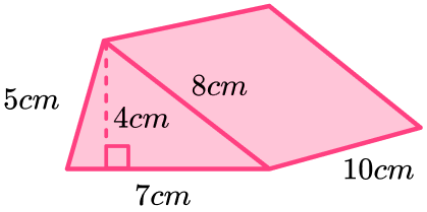

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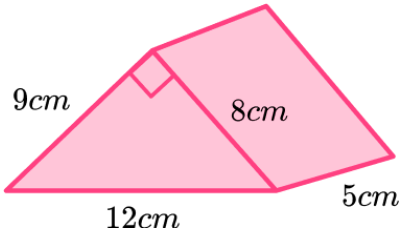
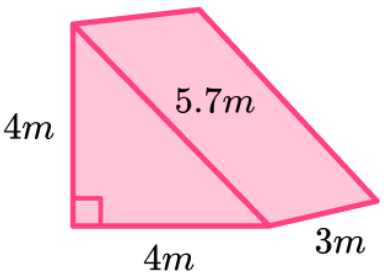


10)



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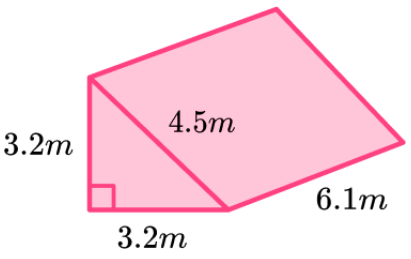

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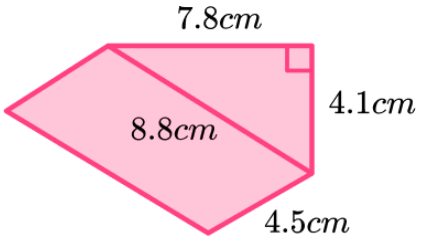
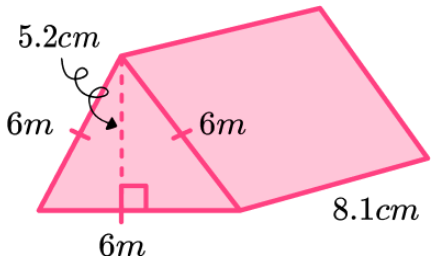


Surface Area of Triangular Prisms - Worksheet

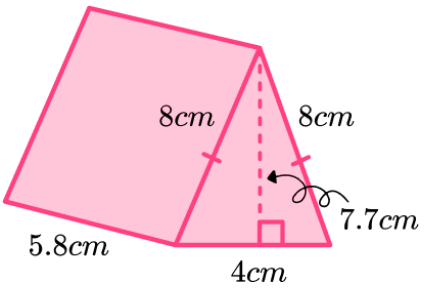
Group B - Equilateral and isosceles triangles

Work out the surface area of the following:

1)



2)



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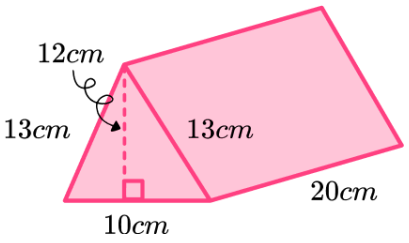

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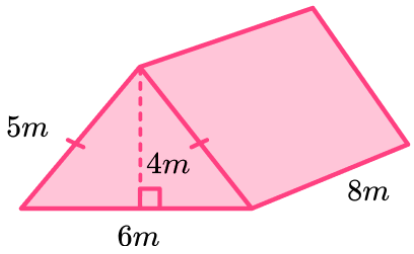

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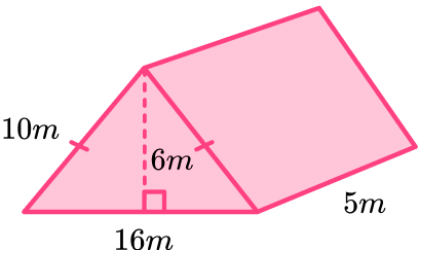

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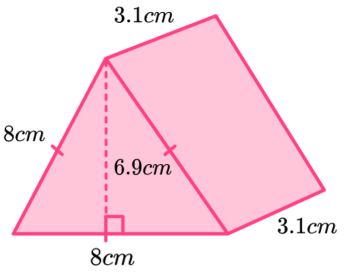

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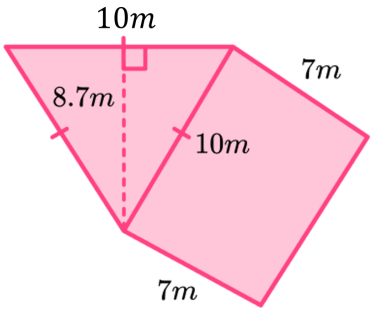
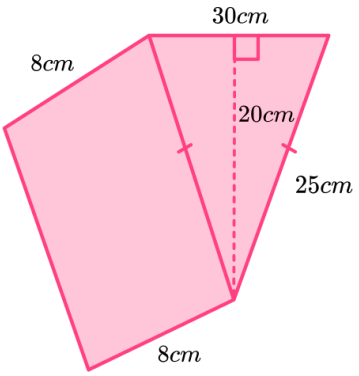


8)



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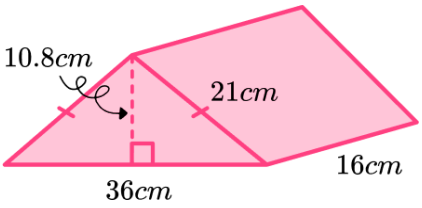
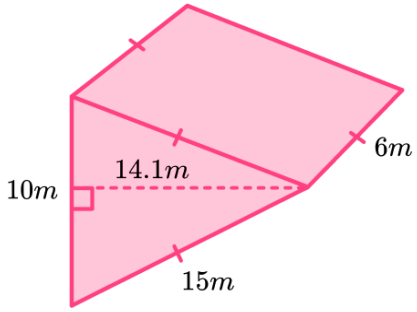
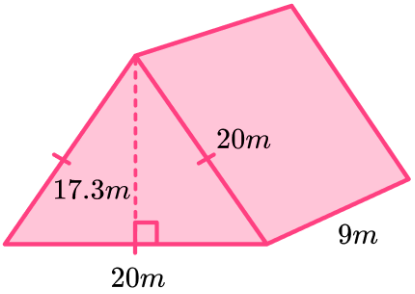


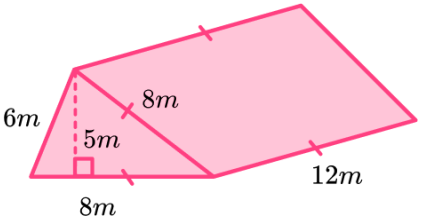
10)



11)



12)

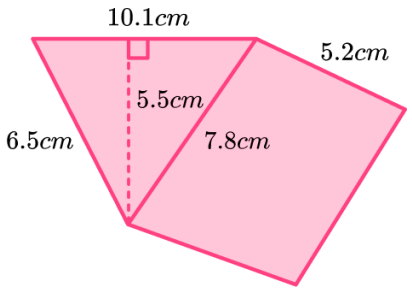


Surface Area of Triangular Prisms - Worksheet

Group C - Scalene triangles

Work out the surface area of the following:

1)



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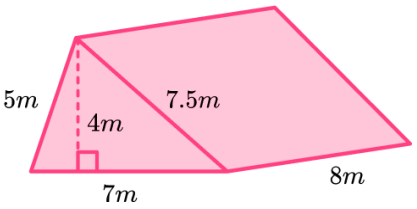

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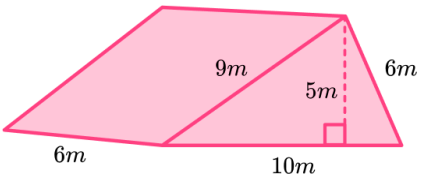

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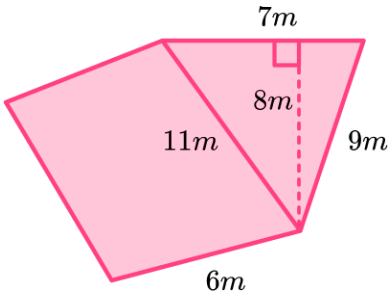

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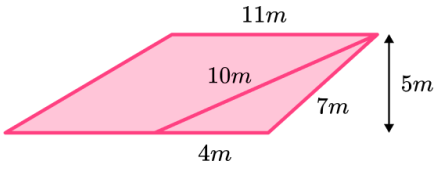
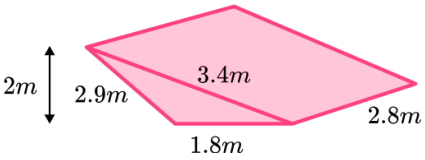


6)



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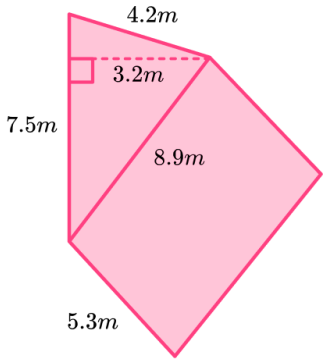
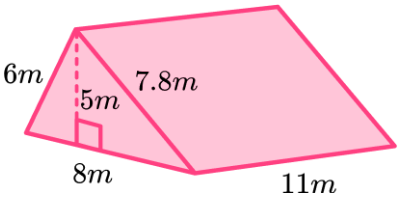


8)



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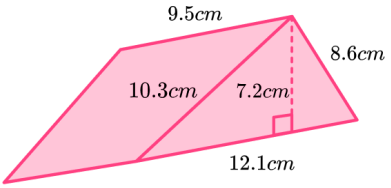
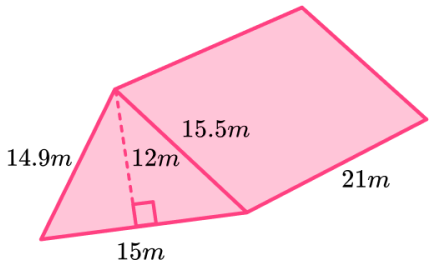
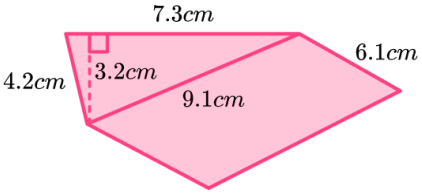


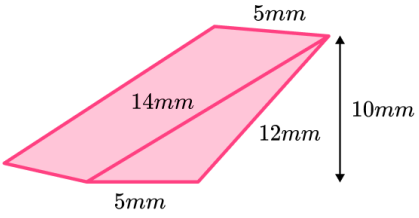
10)



11)



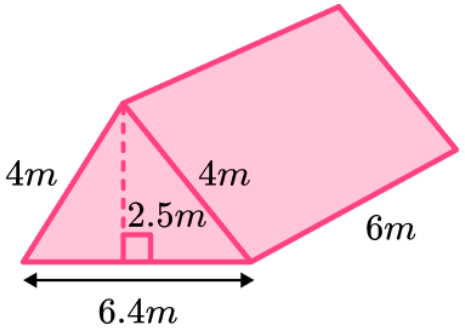
12)



Surface Area of Triangular Prisms - Worksheet

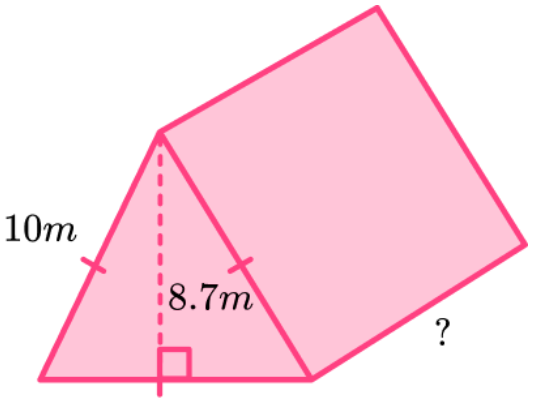
Applied

1) **(a)** Here is a sketch of a tent which is in the shape of a triangular prism. The tent is covered in canvas except the base. The canvas covering the tent costs £8 a square metre. Calculate the cost of the canvas required to cover the tent.



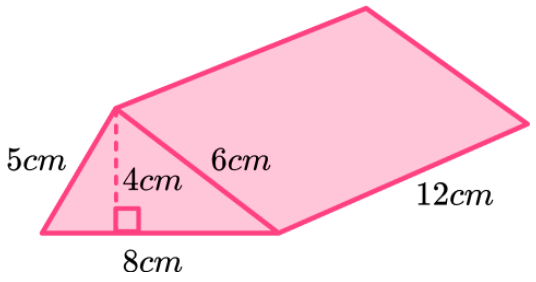
(b) What assumption has been made in your calculations?

2) The surface area of this triangular prisms is $297m^2$. Calculate the length of the missing side.



Surface Area of Triangular Prisms - Worksheet

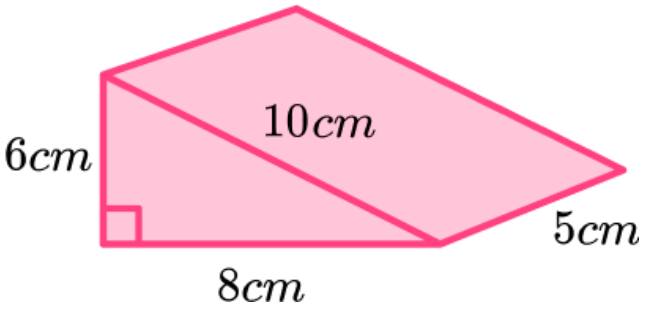
3) **(a)** Below are some calculations for working out the surface area of this triangular prism. Spot the error.



Face	Calculation	Area
Triangles	0.5 × 8 × 4	16
Base	8 × 12	96
Side	5 × 12	60
Side	6 × 12	72
Total	**16 + 96 + 60 + 72**	**244cm²**

(b) Correct the error to calculate the surface area.

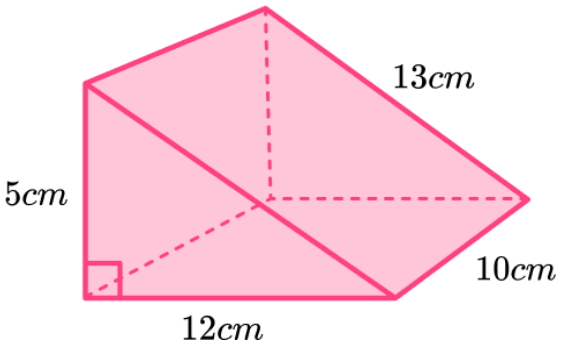
4) **(a)** A box is the shape of a triangular prism. Work out the surface area of this triangular prism.



(b) Mary wants to wrap the box in part a). Would you need to buy less/ the same/ or more wrapping paper than the surface area you calculated. Explain your answer.

Surface Area of Triangular Prisms - Exam Questions

1) This diagram shows a triangular prism.



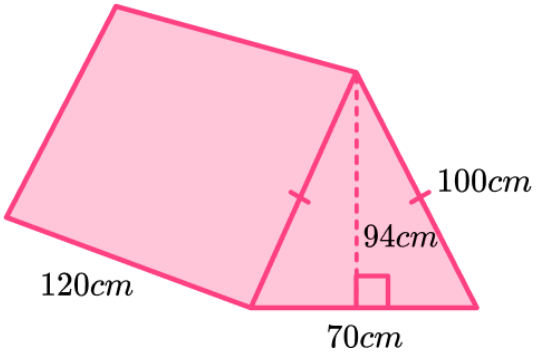
Find the total surface area of the triangular prism.

.....

(3 marks)

Surface Area of Triangular Prisms - Exam Questions

2) This diagram shows a box which is a triangular prism.



5 of these boxes are going to be painted.

Each pot of paint can cover $6m^2$.

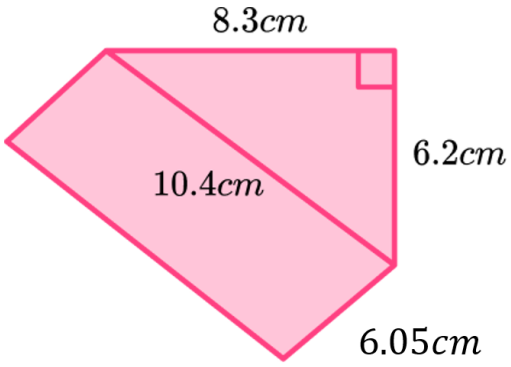
How many pots of paint are needed to paint the 5 boxes?

.....tins

(5 marks)

Surface Area of Triangular Prisms - Exam Questions

3) **(a)** This diagram shows a triangular prism.



Estimate the total surface area of the triangular prism.

.....cm^2

(3)

(b) Is your answer an underestimate or an overestimate? Explain your answer.

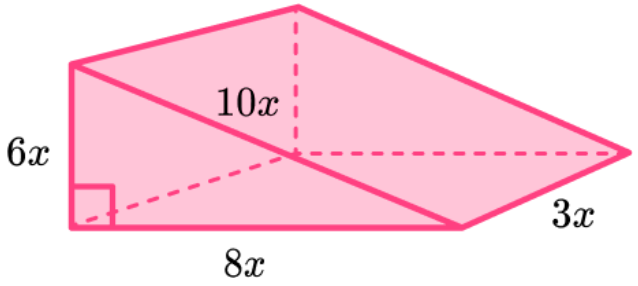
.....

(1)

(4 marks)

Surface Area of Triangular Prisms - Exam Questions

4) This diagram shows a triangular prism.



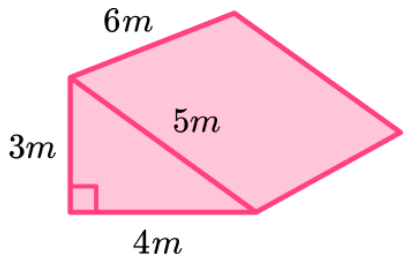
Write an expression to represent the surface area of the triangular prism.

.....

(3 marks)

Surface Area of Triangular Prisms - Answers

<table>
<tr><th></th><th>Question</th><th>Answer</th></tr>
<tr><td></td><td>Skill Questions</td><td></td></tr>
<tr><td>Group A</td><td>Work out the surface area of the following:

1)
 

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 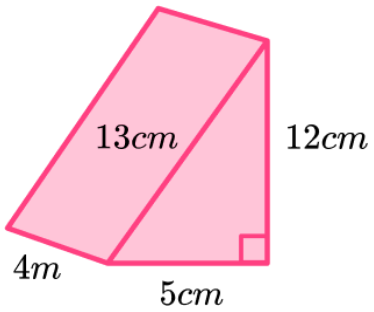

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 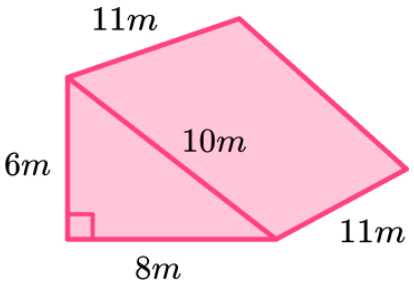

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 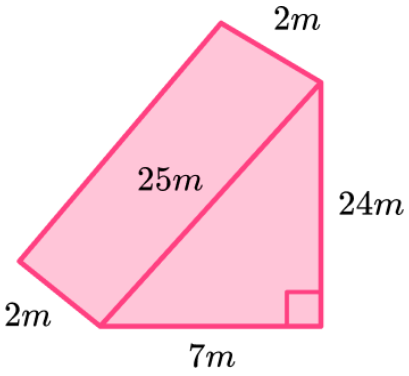
</td><td>1)
<table>
<tr><th>Face</th><th>Calculation</th><th>Area</th></tr>
<tr><td>Triangles</td><td>0.5 × 4 × 3</td><td>6 × 2 = 12</td></tr>
<tr><td>Base</td><td>4 × 6</td><td>24</td></tr>
<tr><td>Side</td><td>3 × 6</td><td>18</td></tr>
<tr><td>Side</td><td>5 × 6</td><td>30</td></tr>
<tr><td>Total</td><td>12 + 24 + 18 + 30</td><td>84m²</td></tr>
</table>
2)
<table>
<tr><th>Face</th><th>Calculation</th><th>Area</th></tr>
<tr><td>Triangles</td><td>0.5 × 5 × 12</td><td>30 × 2 = 60</td></tr>
<tr><td>Base</td><td>5 × 4</td><td>20</td></tr>
<tr><td>Side</td><td>13 × 4</td><td>52</td></tr>
<tr><td>Side</td><td>12 × 4</td><td>48</td></tr>
<tr><td>Total</td><td>60 + 20 + 52 + 48</td><td>180cm²</td></tr>
</table>
3)
<table>
<tr><th>Face</th><th>Calculation</th><th>Area</th></tr>
<tr><td>Triangles</td><td>0.5 × 6 × 8</td><td>24 × 2 = 48</td></tr>
<tr><td>Base</td><td>8 × 11</td><td>88</td></tr>
<tr><td>Side</td><td>6 × 11</td><td>66</td></tr>
<tr><td>Side</td><td>10 × 11</td><td>110</td></tr>
<tr><td>Total</td><td>48 + 88 + 66 + 110</td><td>312m²</td></tr>
</table>
4)
<table>
<tr><th>Face</th><th>Calculation</th><th>Area</th></tr>
<tr><td>Triangles</td><td>0.5 × 7 × 24</td><td>84 × 2 = 168</td></tr>
<tr><td>Base</td><td>7 × 2</td><td>14</td></tr>
<tr><td>Side</td><td>24 × 2</td><td>48</td></tr>
<tr><td>Side</td><td>25 × 2</td><td>50</td></tr>
<tr><td>Total</td><td>168 + 14 + 48 + 50</td><td>280m²</td></tr>
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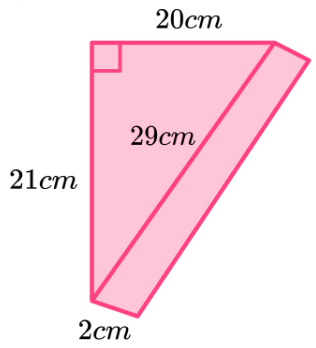
</table>

Surface Area of Triangular Prisms - Answers

Group A contd

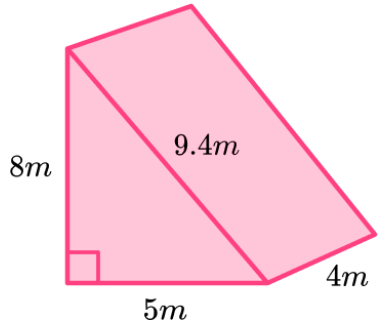
5)



5)

Face	Calculation	Area
Triangles	0.5 × 20 × 21	210 × 2 = 420
Base	20 × 2	40
Side	21 × 2	42
Side	29 × 2	58
Total	**420 + 40 + 42 + 58**	**560cm²**

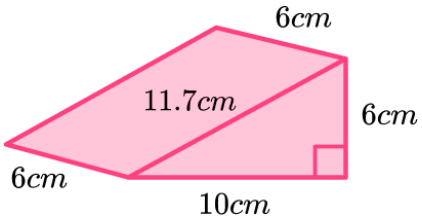
6)



6)

Face	Calculation	Area
Triangles	0.5 × 5 × 8	20 × 2 = 40
Base	5 × 4	20
Side	8 × 4	32
Side	9.4 × 4	37.6
Total	**40 + 20 + 32 + 37.6**	**129.6m²**

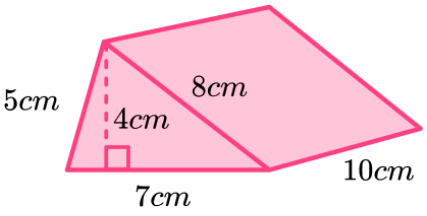
7)



7)

Face	Calculation	Area
Triangles	0.5 × 10 × 6	30 × 2 = 60
Base	10 × 6	60
Side	6 × 6	36
Side	11.7 × 6	70.2
Total	**60 + 60 + 36 + 70.2**	**226.2cm²**

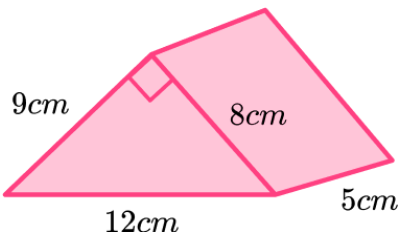
8)



8)

Face	Calculation	Area
Triangles	0.5 × 7 × 4	14 × 2 = 28
Base	7 × 10	70
Side	8 × 10	80
Side	5 × 10	50
Total	**28 + 70 + 80 + 50**	**228cm²**

9)



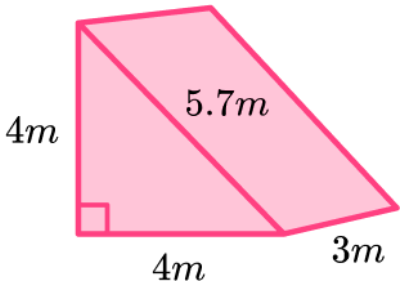
9)

Face	Calculation	Area
Triangles	0.5 × 8 × 9	36 × 2 = 72
Base	12 × 5	60
Side	8 × 5	40
Side	9 × 5	45
Total	**72 + 60 + 40 + 45**	**217cm²**

Surface Area of Triangular Prisms - Answers

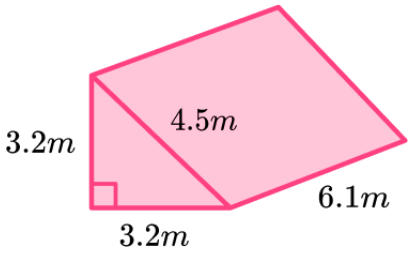
Group A contd

10)



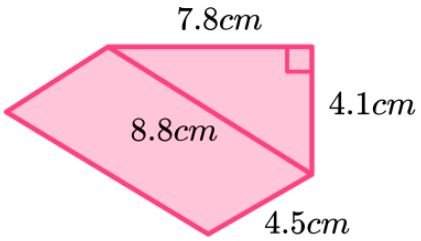
Face	Calculation	Area
Triangles	0.5 × 4 × 4	8 × 2 = 16
Base	4 × 3	12
Side	4 × 3	12
Side	5.7 × 3	17.1
Total	**16 + 12 + 12 + 17.1**	**57.1m²**

11)



Face	Calculation	Area
Triangles	0.5 × 3.2 × 3.2	5.12 × 2 = 10.24
Base	3.2 × 6.1	19.52
Side	3.2 × 6.1	19.52
Side	4.5 × 6.1	27.45
Total	**10.24 + 19.52 + 19.52 + 27.45**	**76.73m²**

12)

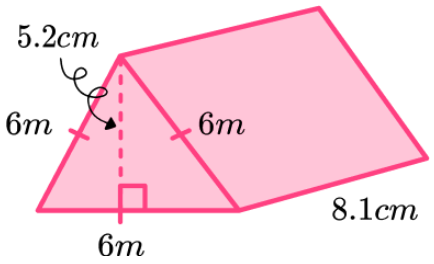


Face	Calculation	Area
Triangles	0.5 × 7.8 × 4.1	15.99 × 2 = 31.98
Base	7.8 × 4.5	35.1
Side	4.1 × 4.5	18.45
Side	8.8 × 4.5	39.6
Total	**31.98 + 35.1 + 18.45 + 39.6**	**125.13m²**

Group B

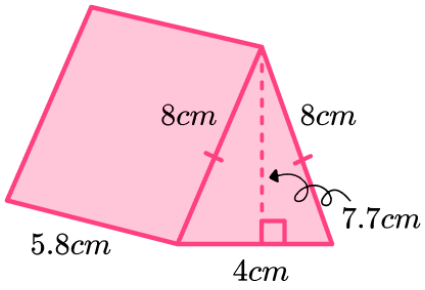
Work out the surface area of the following:

1)



Face	Calculation	Area
Triangles	0.5 × 6 × 5.2	15.6 × 2 = 31.2
Sides	6 × 8.1	48.6 × 3 = 145.8
Total	**31.2 + 145.8**	**177cm²**

2)

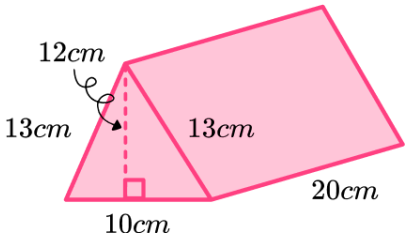


Face	Calculation	Area
Triangles	0.5 × 4 × 7.7	15.4 × 2 = 30.8
Base	4 × 5.8	23.2
Sides	8 × 5.8	46.4 × 2 = 92.8
Total	**30.8 + 23.2 + 92.8**	**146.8cm²**

Surface Area of Triangular Prisms - Answers

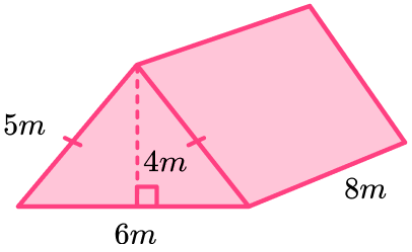
Group B contd

3)



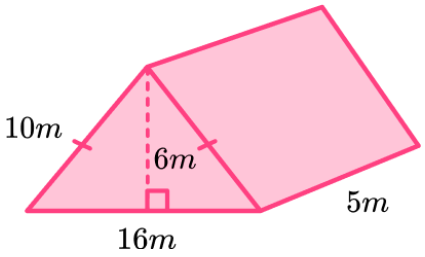
Face	Calculation	Area
Triangles	0.5 × 10 × 12	60 × 2 = 120
Base	10 × 20	200
Sides	13 × 20	260 × 2 = 520
Total	**120 + 200 + 520**	**840cm²**

4)



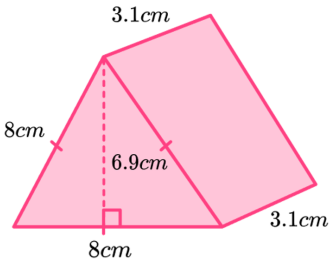
Face	Calculation	Area
Triangles	0.5 × 6 × 4	12 × 2 = 24
Base	6 × 8	48
Sides	5 × 8	40 × 2 = 80
Total	**24 + 48 + 80**	**152m²**

5)



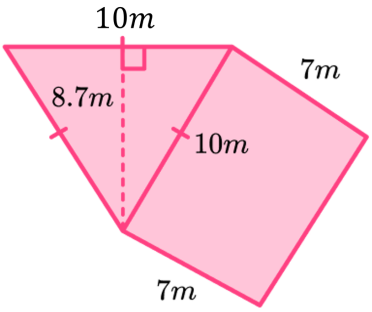
Face	Calculation	Area
Triangles	0.5 × 16 × 6	48 × 2 = 96
Base	16 × 5	80
Sides	5 × 10	50 × 2 = 100
Total	**96 + 80 + 100**	**276m²**

6)



Face	Calculation	Area
Triangles	0.5 × 8 × 6.9	27.6 × 2 = 55.2
Sides	8 × 3.1	24.8 × 3 = 74.4
Total	**55.2 + 74.4**	**129.6cm²**

7)

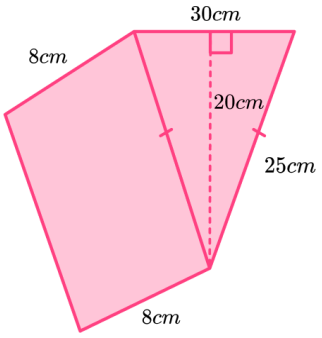


Face	Calculation	Area
Triangles	0.5 × 10 × 8.7	43.5 × 2 = 87
Sides	10 × 7	70 × 3 = 210
Total	**87 + 210**	**297m²**

Surface Area of Triangular Prisms - Answers

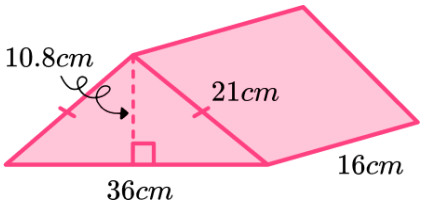
Group B contd

8)



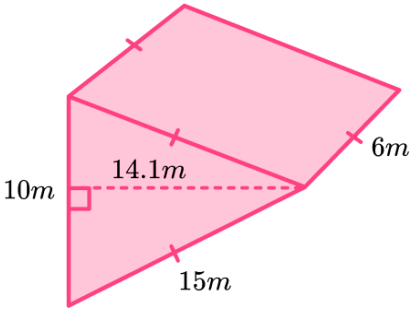
Face	Calculation	Area
Triangles	0.5 × 30 × 20	300 × 2 = 600
Base	30 × 8	240
Sides	25 × 8	200 × 2 = 400
Total	**600 + 240 + 400**	**1240m²**

9)



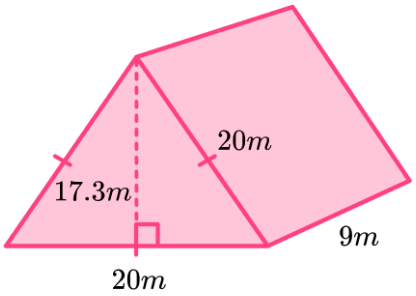
Face	Calculation	Area
Triangles	0.5 × 36 × 10.8	194.4 × 2 = 388.8
Base	36 × 16	576
Sides	16 × 21	336 × 2 = 672
Total	**388.8 + 576 + 672**	**1636.8cm²**

10)



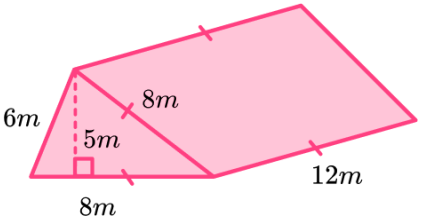
Face	Calculation	Area
Triangles	0.5 × 10 × 14.1	70.5 × 2 = 141
Base	10 × 6	60
Sides	15 × 6	90 × 2 = 180
Total	**141 + 60 + 180**	**381m²**

11)



Face	Calculation	Area
Triangles	0.5 × 20 × 17.3	173 × 2 = 346
Sides	20 × 9	180 × 3 = 540
Total	**346 + 540**	**886cm²**

12)



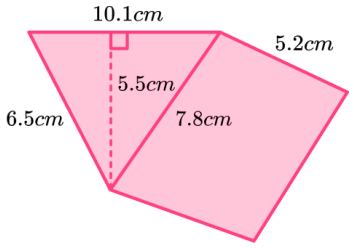
Face	Calculation	Area
Triangles	0.5 × 8 × 5	20 × 2 = 40
Base	6 × 12	72
Sides	8 × 12	96 × 2 = 192
Total	**40 + 72 + 192**	**304m²**

Surface Area of Triangular Prisms - Answers

Group C

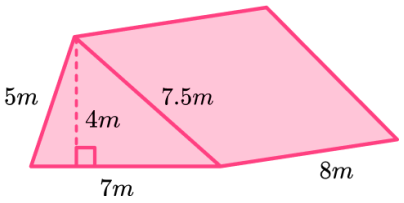
Work out the surface area of the following:

1)



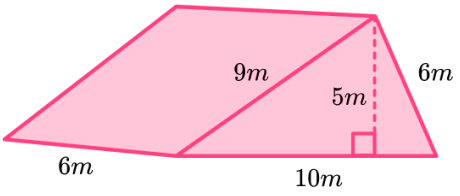
Face	Calculation	Area
Triangles	0.5 × 5.5 × 10.1	27.775 × 2 = 55.55
Base	10.1 × 5.2	52.52
Side	6.5 × 5.2	33.8
Side	7.8 × 5.2	40.56
Total	55.55 + 52.52 + 33.8 + 40.56	**182.43cm²**

2)



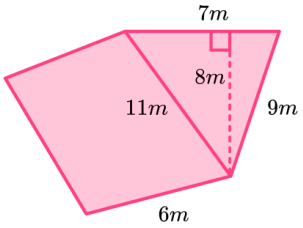
Face	Calculation	Area
Triangles	0.5 × 7 × 4	14 × 2 = 28
Base	7 × 8	56
Side	5 × 8	40
Side	7.5 × 8	60
Total	**28 + 56 + 40 + 60**	**184m²**

3)



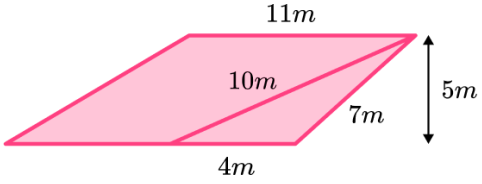
Face	Calculation	Area
Triangles	0.5 × 10 × 5	25 × 2 = 50
Base	10 × 6	60
Side	6 × 6	36
Side	9 × 6	54
Total	**50 + 60 + 36 + 54**	**200m²**

4)



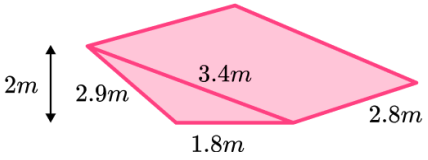
Face	Calculation	Area
Triangles	0.5 × 7 × 8	28 × 2 = 56
Base	7 × 6	42
Side	9 × 6	54
Side	11 × 6	66
Total	**56 + 42 + 54 + 66**	**218m²**

5)



Face	Calculation	Area
Triangles	0.5 × 4 × 5	10 × 2 = 20
Base	4 × 11	44
Side	7 × 11	77
Side	10 × 11	110
Total	**20 + 44 + 77 + 110**	**251m²**

6)

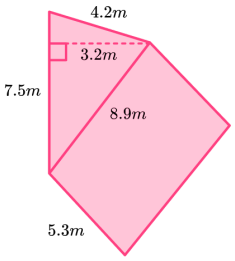


Face	Calculation	Area
Triangles	0.5 × 1.8 × 2	1.8 × 2 = 3.6
Base	1.8 × 2.8	5.04
Side	3.4 × 2.8	9.52
Side	2.9 × 2.8	8.12
Total	**3.6 + 5.04 + 9.52 + 8.12**	**26.28m²**

Surface Area of Triangular Prisms - Answers

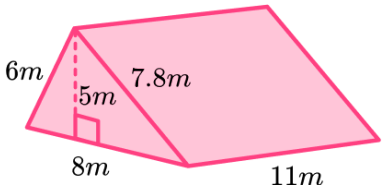
Group C contd

7)



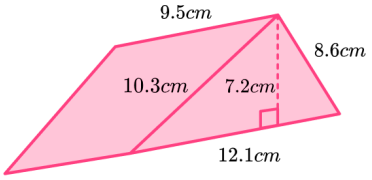
Face	Calculation	Area
Triangles	0.5 × 7.5 × 3.2	12 × 2 = 24
Base	7.5 × 5.3	39.75
Side	8.9 × 5.3	47.17
Side	4.2 × 5.3	22.26
Total	24 + 39.75 + 47.17 + 22.26	**133.18m²**

8)



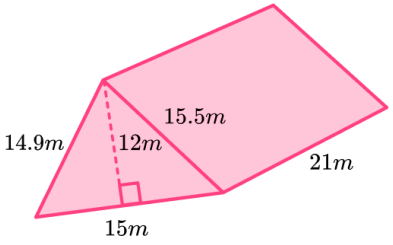
Face	Calculation	Area
Triangles	0.5 × 8 × 5	20 × 2 = 40
Base	8 × 11	88
Side	6 × 11	66
Side	7.8 × 11	85.8
Total	40 + 88 + 66 + 85.8	**279.8m²**

9)



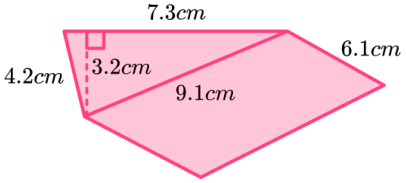
Face	Calculation	Area
Triangles	0.5 × 12.1 × 7.2	43.56 × 2 = 87.12
Base	12.1 × 9.5	114.95
Side	8.6 × 9.5	81.7
Side	10.3 × 9.5	97.85
Total	87.12 + 114.95 + 81.7 + 97.85	**381.62cm²**

10)



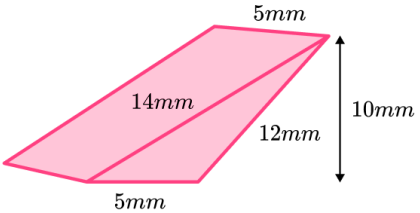
Face	Calculation	Area
Triangles	0.5 × 15 × 12	90 × 2 = 180
Base	15 × 21	315
Side	15.5 × 21	325.5
Side	14.9 × 21	312.9
Total	180 + 315 + 325.5 + 312.9	**1133.4m²**

11)



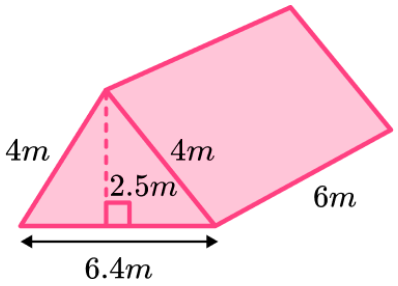
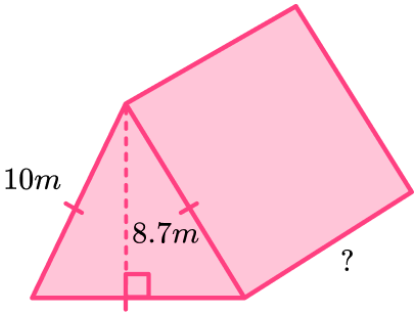
Face	Calculation	Area
Triangles	0.5 × 7.3 × 3.2	11.68 × 2 = 23.36
Base	7.3 × 6.1	44.53
Side	9.1 × 6.1	55.51
Side	4.2 × 6.1	25.62
Total	23.36 + 44.53 + 55.51 + 25.62	**149.02mm²**

12)



Face	Calculation	Area
Triangles	0.5 × 5 × 10	25 × 2 = 50
Base	5 × 5	25
Side	14 × 5	70
Side	12 × 5	60
Total	50 + 25 + 70 + 60	**205mm²**

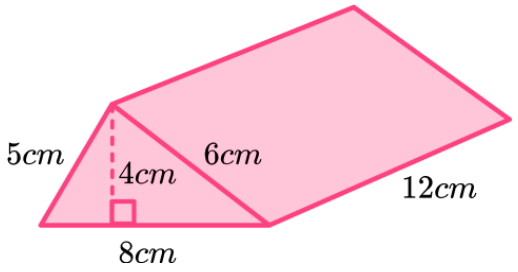
Surface Area of Triangular Prisms - Answers

	Question	Answer
	Applied Questions	
1)	**a)** Here is a sketch of a tent which is in the shape of a triangular prism. The tent is covered in canvas except the base. The canvas covering the tent costs £8 a square metre. Calculate the cost of the canvas required to cover the tent.  **b)** What assumption has been made in your calculations?	**a)** Face / Calculation / Area Triangles: 0.5 × 2.5 × 6.4 / 8 × 2 = 16 Sides: 6 × 4 / 24 × 2 = 48 **Total: 16 + 48 / 64m²** **b)** $64 \times 8 = £512$ There is no overlap of fabric at the seams etc.
2)	The surface area of this triangular prisms is $297m^2$. Calculate the length of the missing side.  	Face / Calculation / Area Triangles: 0.5 × 8.7 × 10 / 43.5 × 2 = 87 Sides: 10 × 7 / 70 × 3 = 210 **Total: 210 + 87 / 297m²** $297 - 87 = 210$ $210 \div 3 = 70$ $70 \div 10 = 7m$

Surface Area of Triangular Prisms - Answers

3)

a) Below are some calculations for working out the surface area of this triangular prism. Spot the error.



Face	Calculation	Area
Triangles	0.5 × 8 × 4	16
Base	8 × 12	96
Side	5 × 12	60
Side	6 × 12	72
Total	**16 + 96 + 60 + 72**	**244cm²**

b) Correct the error to calculate the surface area.

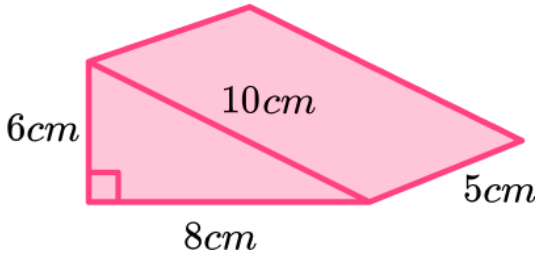
a) The area of the triangle has not been doubled, therefore only one triangle face has been counted.

b)

Face	Calculation	Area
Triangles	0.5 × 8 × 4	16 × 2
Base	8 × 12	96
Side	5 × 12	60
Side	6 × 12	72
Total	**32 + 96 + 60 + 72**	**260cm²**

4

a) A box is the shape of a triangular prism. Work out the surface area of this triangular prism.



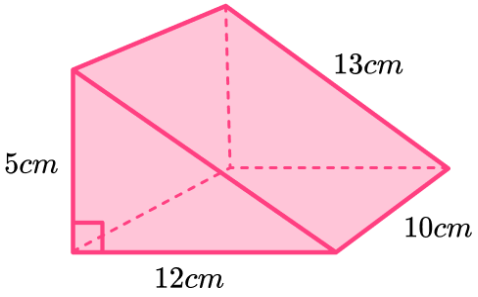
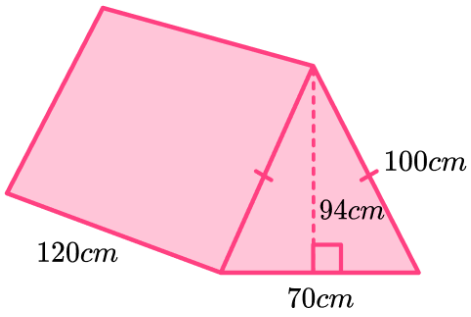
b) Mary wants to wrap the box in part a). Would you need to buy less/ the same/ or more wrapping paper than the surface area you calculated. Explain your answer.

a)

Face	Calculation	Area
Triangles	0.5 × 8 × 6	24 × 2 = 48
Base	8 × 5	40
Side	6 × 5	30
Side	10 × 5	50
Total	**48 + 40 + 30 + 50**	**168cm²**

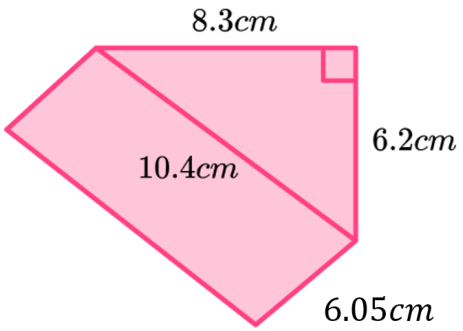
b) You would need more as some of the paper would be folded over and overlap.

Surface Area of Triangular Prisms - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	This diagram shows a triangular prism. Find the total surface area of the triangular prism.  	<table><tr><th>Face</th><th>Calculation</th><th>Area</th></tr><tr><td>Triangles</td><td>0.5 × 12 × 5</td><td>30 × 2 = 60</td></tr><tr><td>Base</td><td>12 × 10</td><td>120</td></tr><tr><td>Side</td><td>5 × 10</td><td>50</td></tr><tr><td>Side</td><td>13 × 10</td><td>130</td></tr><tr><td>Total</td><td>60 + 120 + 50 + 130</td><td>360cm²</td></tr></table> Area of the triangles Area of the 3 rectangles Correct total surface area	 **(1)** **(1)** **(1)**
2)	This diagram shows a box which is a triangular prism. 5 of these boxes are going to be painted. Each pot of paint can cover $6m^2$. How many pots of paint are needed to paint the 5 boxes?  	<table><tr><th>Face</th><th>Calculation</th><th>Area</th></tr><tr><td>Triangles</td><td>0.5 × 0.7 × 0.94</td><td>0.329 × 2 = 0.658</td></tr><tr><td>Base</td><td>0.7 × 1.2</td><td>0.84</td></tr><tr><td>Sides</td><td>1 × 1.2</td><td>1.2 × 2 = 2.4</td></tr><tr><td>Total</td><td>0.56 + 0.84 + 2.4</td><td>3.898m²</td></tr></table> Area of two faces correctly calculated Total surface area $38\,980\ cm^2$ or $3.898\ m^2$ Surface area of 5 boxes $38980 \times 5 = 194\,900\ cm^2$ Or $3.898 \times 5 = 19.49\ m^2$ $194\,600 \div 60\,000 = 3.24\ldots$ $19.49 \div 6 = 3.24\ldots$ 4 tins needed	 **(1)** **(1)** **(1)** **(1)** **(1)**

Surface Area of Triangular Prisms - Mark Scheme

3) (a) This diagram shows a triangular prism.



Estimate the total surface area of the triangular prism.

(a)

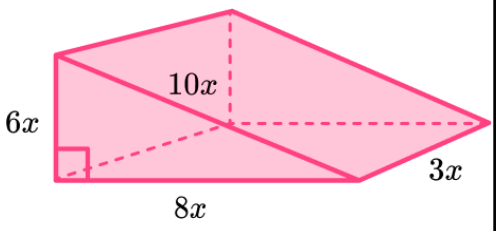
Face	Calculation	Area
Triangles	0.5 × 8 × 6	24 × 2 = 48
Base	8 × 6	48
Side	10 × 6	60
Side	6 × 6	36
Total	**48 + 48 + 60 + 36**	**192cm²**

Side lengths rounded to 1 significant figure **(1)**
Area of at least two faces calculated **(1)**
Total surface area estimated **(1)**

(b) Is your answer an underestimate or overestimate? Explain your answer.

(b) Underestimate as all values have been rounded down **(1)**

4) This diagram shows a triangular prism. Write an expression to represent the surface area of the triangular prism.



Face	Calculation	Area
Triangles	$0.5 \times 6x \times 8x$	$24x^2 \times 2 = 48x^2$
Base	$8x \times 3x$	$24x^2$
Side	$6x \times 3x$	$18x^2$
Side	$10x \times 3x$	$30x^2$
Total	$48x^2 + 24x^2 + 18x^2 + 30x^2$	$120x^2$

Expression for at least one face **(1)**
Expression for each face **(1)**
$120x^2$ **(1)**