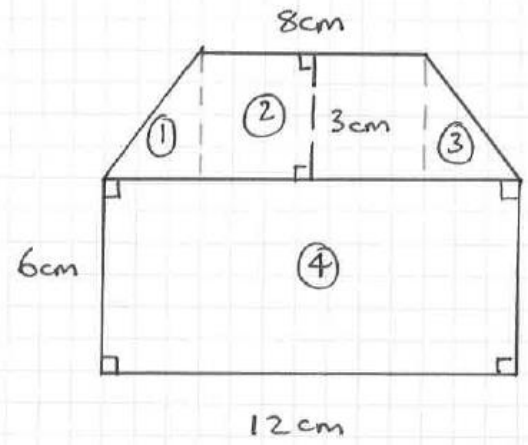
Geometry and Measures



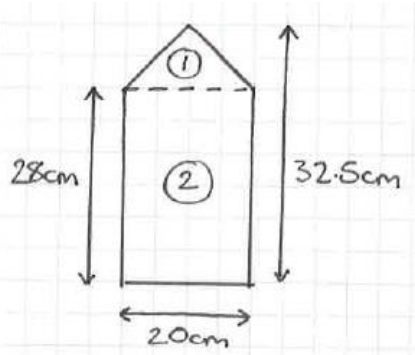
Area ① $= \frac{1}{2}bh$
$= \frac{1}{2} \times 2 \times 3$
$= 3\text{cm}^2$

Area ② $= lb$
$= 8 \times 3$
$= 24\text{cm}^2$

Area ③ $= \frac{1}{2}bh$
$= \frac{1}{2} \times 2 \times 3$
$= 3\text{cm}^2$

Area ④ $= lb$
$= 12 \times 6$
$= 72\text{cm}^2$

TOTAL $= 3 + 3 + 24 + 72$
$= 102\text{cm}^2$

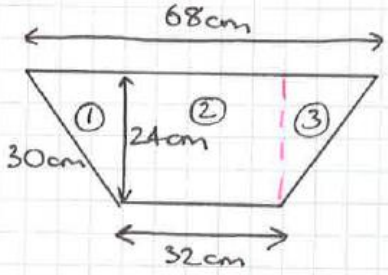


Area ① $= \frac{1}{2}bh$
$= 20 \times 4.5 \div 2$
$= 45\text{cm}^2$

Area ② $= lb$
$= 28 \times 20$
$= 560\text{cm}^2$

TOTAL Area $= 605\text{cm}^2$

Volume $= 605 \times 9$
$= 5445\text{cm}^3 = 5$ Litres

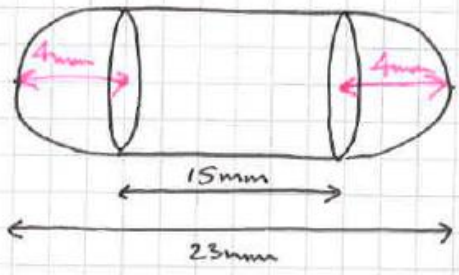


Area ① $= \frac{1}{2}bh$
$= 18 \times 24 \div 2$
$= 216\text{cm}^2$

Area ② $= lb$
$= 32 \times 24$
$= 768\text{cm}^2$

Area ③ $= \frac{1}{2}bh$
$= 18 \times 24 \div 2$
$= 216\text{cm}^2$

TOTAL Area $= 216 + 768 + 216$
$= 1200\text{cm}^2$



$V_{sphere} = \frac{4}{3}\pi r^3$

$= \frac{4}{3} \times \pi \times 4^3$

$= 268.08 \text{ mm}^3$

$V_{cylinder} = \pi r^2 h$

$= \pi \times 4^2 \times 15$

$= 753.98 \text{ mm}^3$

$V_{TOTAL} = 268.08 + 753.98$

$= 1022.06 \text{ mm}^3$

$V_{cube} = 10 \times 10 \times 10$

$= 1000 \text{ cm}^3$

8% off :

10% = 100

1% = 10

8% = 80

$V_{cone} = 1000 - 80$

$= 920 \text{ cm}^3$

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

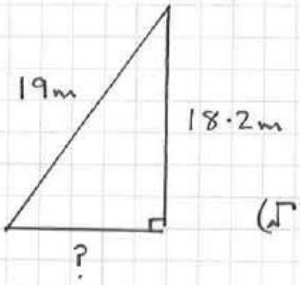
$920 = \frac{1}{3} \times \pi \times 8^2 \times h$

(×3) $2760 = \pi \times 64 \times h$

(÷64) $43.125 = \pi \times h$

(÷π) $13.727\ldots = h$

$h = 14 \text{ cm}$ (2 s.g f.g)



$a^2 = c^2 - b^2$

$= 19^2 - 18.2^2$

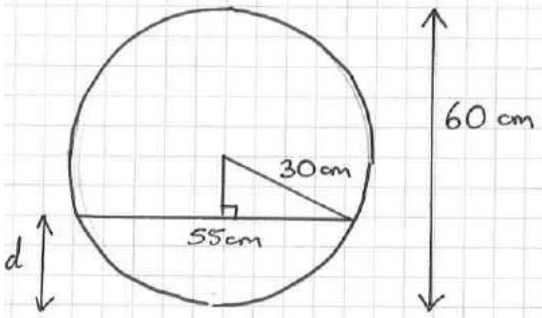
$= 29.76$

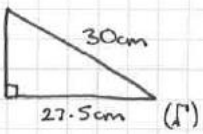
$(\sqrt{}) \quad a = 5.46\ m$

Circumference $= \pi d$

$= \pi \times 10.92$

$= \underline{34.31\ m}$





$a^2 = c^2 - b^2$

$= 30^2 - 27.5^2$

$= 143.75$

$(\sqrt{}) \quad a = 11.99\ cm$

$d = 30 - 11.99$

$= \underline{18.01\ cm}$

1 cake $\rightarrow \frac{2}{5}$ block of butter

$\frac{2}{5} \times ? = 7$

$(\times 5) \quad 2 \times ? = 35$

$(\div 2) \quad ? = 17.5$

Jamie can make <u>17 cakes</u>

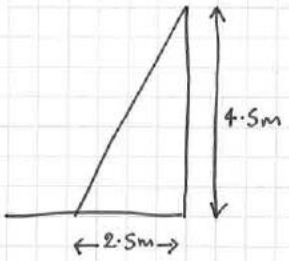
$$A = \frac{1}{2}(a+b)h$$

$$= \frac{1}{2}(12+18)(6)$$

$$= 3 \times (30)$$

$$= \underline{90 \text{ units}^2}$$

a)

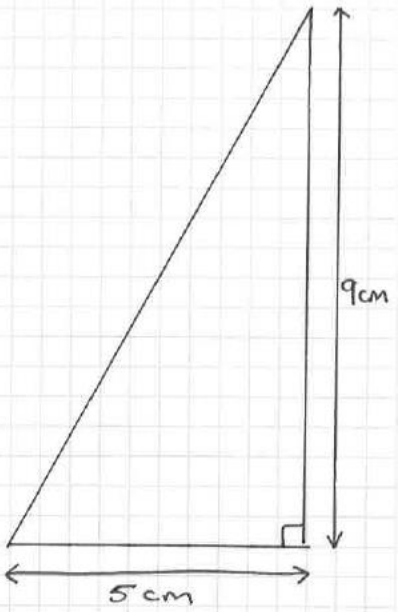


scale 2cm → 1m

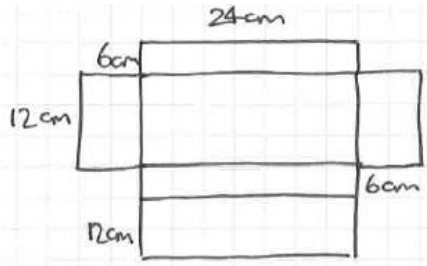
2cm → 1m

(×2·5) 5cm ← 2·5m

(×4·5) 9cm ← 4·5m



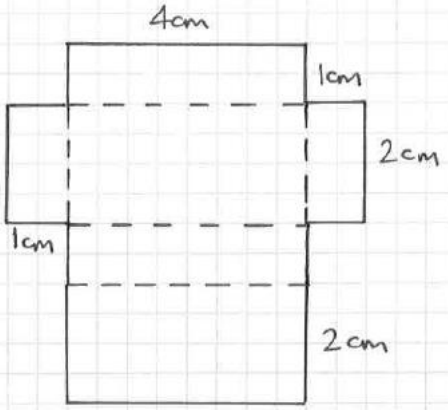
b) The angle is 61° therefore is <u>not</u> safe to use.

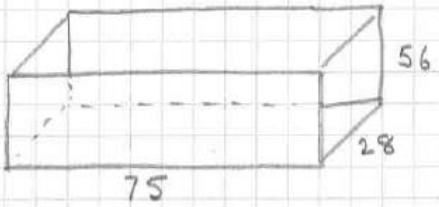


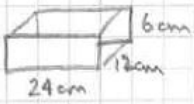
Scale 1:6 Dimensions: 6cm 12cm 24cm

÷ 6 ÷ 6 ÷ 6

Drawing : 1cm 2cm 4cm





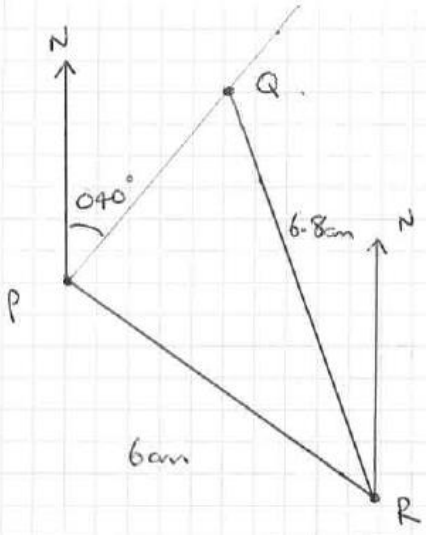


$15 \div 24 = 3.125$ i.e. 3
$28 \div 12 = 2.3$ i.e. 2
$56 \div 6 = 9.3$ i.e. 9

$3 \times 2 \times 9 = 54$

Debbie can fit 54 boxes when the 24 cm is matched with the 75 cm, etc.

There may be a better way but yes, she can fit at least 48 biscuits in the shelf space.

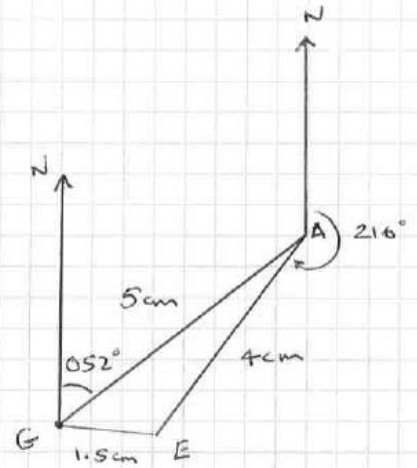


Scale 1 cm rep. 5 km.

$\therefore 30 \div 5 = 6$ cm

So, $6.8 \times 5 = 34$ km.

So the ship at R is 34 km from the lighthouse, Q.

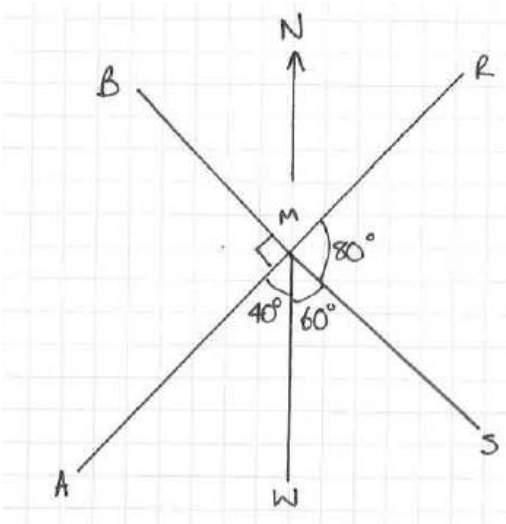


Scale 1 cm represents 40 km

$\therefore 200 \div 40 = 5$

$160 \div 40 = 4$

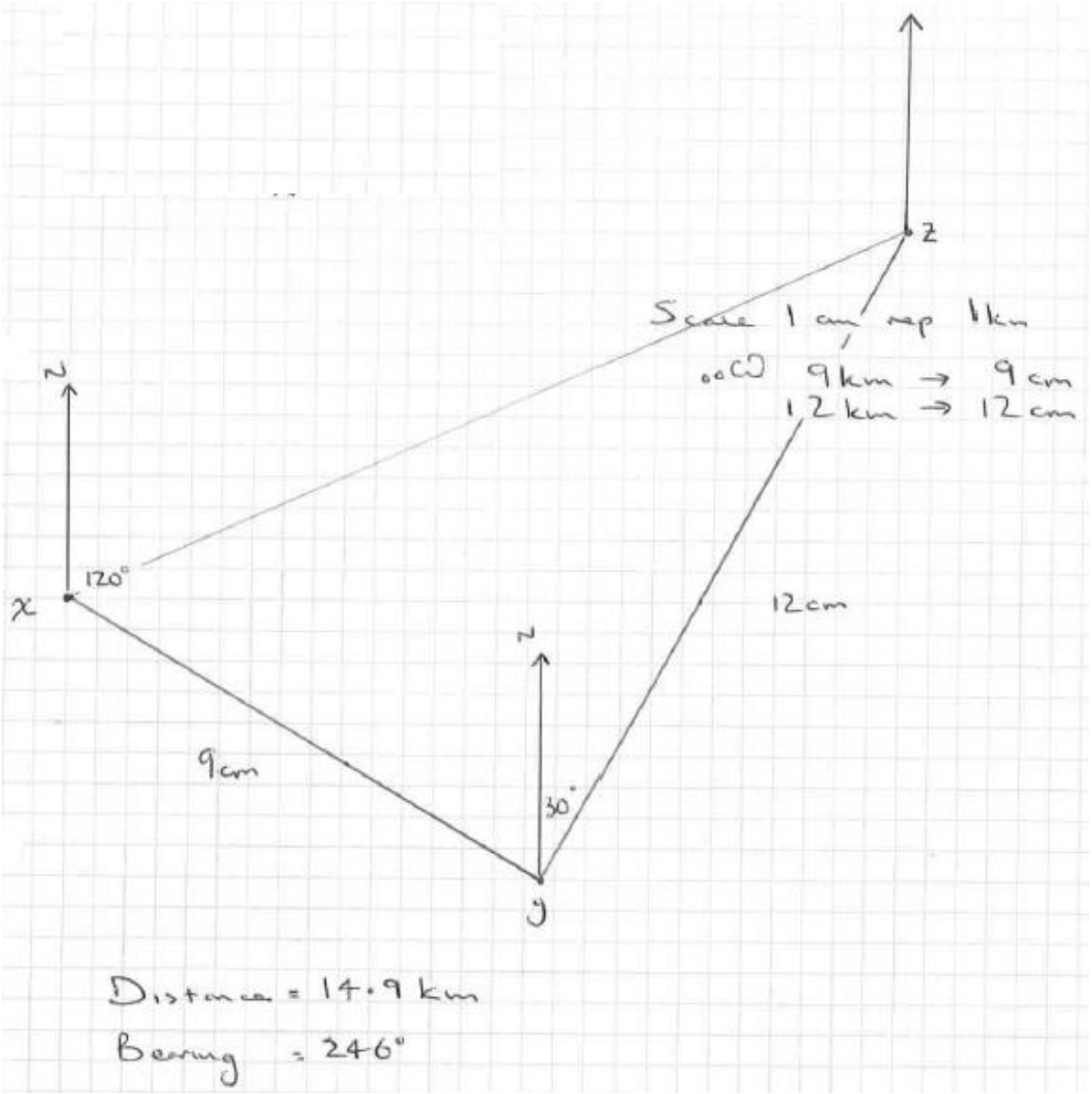
So, $1.5 \times 40 = 60$ km



a) AMR = 180° so it is a straight line.

b) 040°

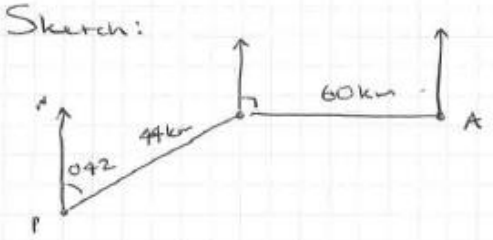
c) 220°



Distance = 14.9 km

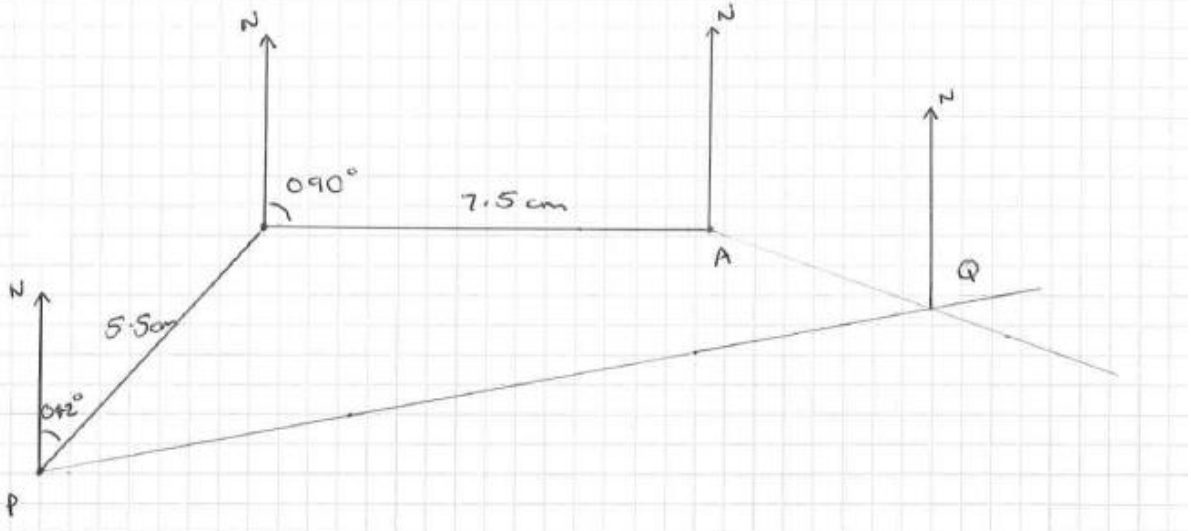
Bearing = 246°

Sketch:



Scale: 1cm rep 8km.

So, $44 \div 8 = 5.5$ cm
$60 \div 8 = 7.5$ cm.



Distance PQ = 15.3 cm

$\Rightarrow (15.3 \times 8)$ km

$= 122.4$ km

29, 52, 73, 87, 74, 47, 38, 61, 41

29, 38, 41, 47, 52, 61, 73, 74, 87

Tape 1	Tape 2	Tape 3	Tape 4
29	73	87	74
52			

Tape 5	Tape 6	Tape 7
47	61	41
38		

first-fit

Tape 1	Tape 2	Tape 3	Tape 4
87	74	73	61
			38

Tape 5	Tape 6
52	41
47	29

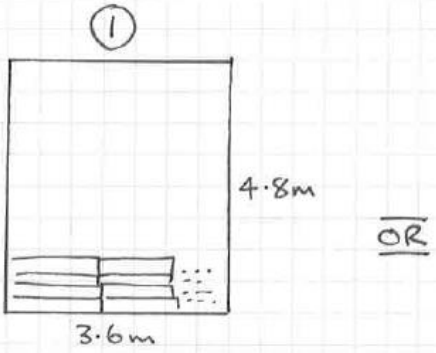
first-fit decreasing

41, 28, 42, 31, 36, 32, 29

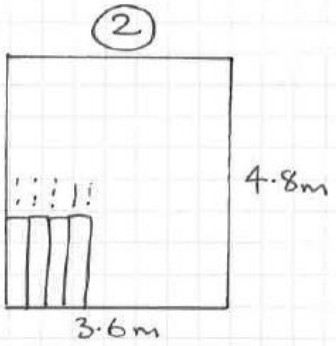
42, 41, 36, 32, 31, 29, 28

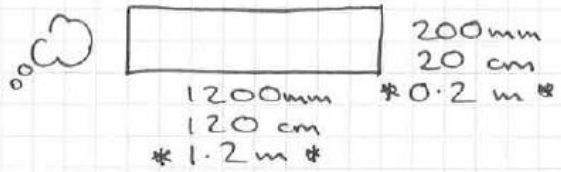
Crate 1	Crate 2	Crate 3	Crate 4	Crate 5	Crate 6
41	28	42	36	32	29
	31				

Crate 1	Crate 2	Crate 3	Crate 4	Crate 5
42	41	36	32	31
			28	29



OR





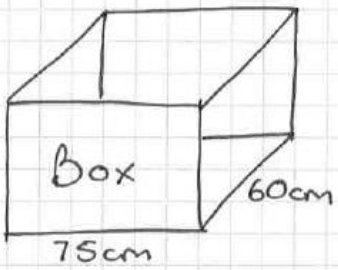
① $3.6 \div 1.2 = 3$
$4.8 \div 0.2 = 24$

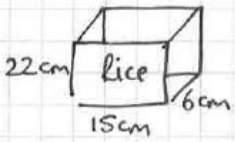
$3 \times 24 = 72$ pieces

② $3.6 \div 0.2 = 18$
$4.8 \div 1.2 = 4$

$18 \times 4 = 72$ pieces

So, James needs 72 pieces $\Rightarrow$ he needs $72 \div 8 = 9$ packs
Since he bought 10 packs he has enough.





Method 1

Match 75 with 15
and 60 with 6

i.e. $75 \div 15 = 5$
$60 \div 6 = 10$

i.e. $5 \times 10 = 50$

Method 2

Match 75 with 6
and 60 with 15

i.e. $75 \div 6 = 12.5$ so, 12
$60 \div 15 = 4$

i.e. $12 \times 4 = 48$

So, the max number of packets is <u>50</u>. (number of layers)

b) The height of the box is $22\text{cm} \times 3 = \underline{66\text{cm}}$

c) $5\text{m} \div 0.22\text{m} = 22.72$ so, <u>22 boxes</u>

0900	Leeds Office
0900-1030	Work
1030-1100	Travel to Urban G
1100-1230	Urban G
1230-1300	Travel to CC
1300-1345	Lunch
1400-1500	CC
1500-1545	Travel to Homeless Centre
1545-1715	Homeless Centre
1715-1745	Travel to Leeds

← 15 min gap for e.g extra travel time, etc.

0935	9°C
0945	8°C
0955	7°C
1005	6°C
1015	5°C
1022	(collection)
+30 seconds	
1032	(pack up)

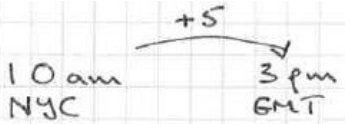
How long will it take to collect 2500ℓ

- 20000ℓ in 60 minutes
- 2000ℓ in 6 minutes
- 1000ℓ in 3 minutes
- 500ℓ in 1.5 minutes

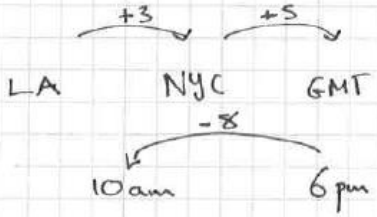
So, 2500ℓ in 7 min 30 seconds

Dave will be ready by 1032 (+30 seconds) and so will leave by 10.45 am.

a)



b)



She needs to phone at the latest at 10am so at 9.30 am she meets the deadline.

mean = $246 \div 6 = \underline{41}$

x	$\bar{x}$	$x - \bar{x}$	$(x - \bar{x})^2$
43	41	2	4
39	41	-2	4
41	41	0	0
40	41	-1	1
39	41	-2	4
44	41	3	9
			22

$$\text{s.d.} = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}}$$

$$= \sqrt{\frac{22}{5}}$$

$$= \underline{2.10}$$

5)

	mean	s.d.
our calculation	41	2.1
company statement	40 ± 2	< 3

The data in part (a) does support the claim since 41 lies within the 40 ± 2 tolerance (i.e. min 38 max 42) and $2.1 < 3$.

$1.2 \pm 0.05 \rightarrow$ min 1.15 and max 1.25

max height $= 1.25 \times 3 = \underline{3.75}$ m