"Full Coverage": Non-Right Angled Triangles

This worksheet is designed to cover one question of each type seen in past papers, for each GCSE Higher Tier topic. This worksheet was automatically generated by the DrFrostMaths Homework Platform: students can practice this set of questions interactively by going to www.drfrostmaths.com/homework, logging on, *Practise → Past Papers/Worksheets* (or *Library → Past/Past Papers* for teachers), and using the 'Revision' tab.

Question 1

Categorisation: Use the sine rule to determine a missing side.

[Edexcel IGCSE May2015-4H Q16]

Diagram **NOT** accurately drawn

105°

x cm

62°

14.6 cm
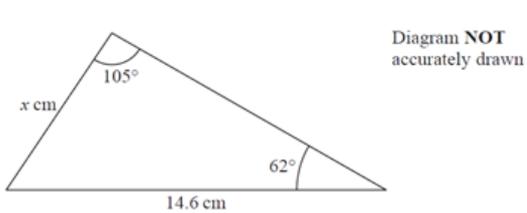
Work out the value of x .

Give your answer correct to 1 decimal place.

.... cm

Question 2

Categorisation: Use the cosine rule to determine the side opposite the known angle.

[Edexcel IGCSE Jan2016-4H Q21]

A

4.8 cm

123°

6.4 cm

Diagram **NOT** accurately drawn

B

C
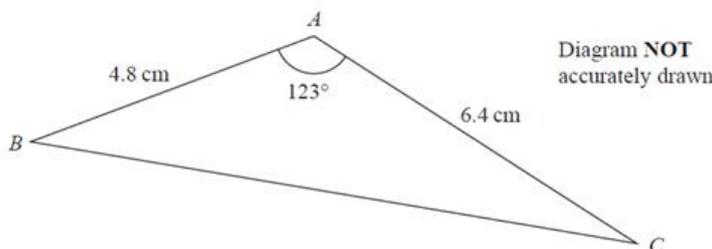
Calculate the length of BC .

Give your answer correct to 3 significant figures.

$BC = $ .... cm

Question 3

Categorisation: Use the cosine rule to determine the perimeter of a triangle.

[Edexcel GCSE March2012-4H Q20]
Here is a triangle *ABC*.

Diagram **NOT** accurately drawn
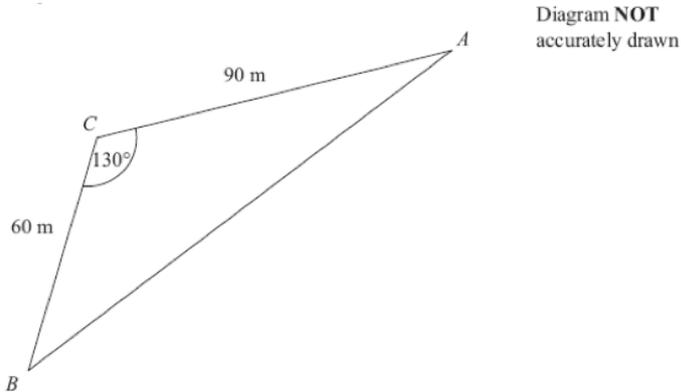
AC = 90 m.
BC = 60 m.
Angle *ACB* = 130°

Calculate the perimeter of the triangle. Give your answer correct to one decimal place.

.... m

Question 4

Categorisation: Use trigonometry of right-angled triangles to determine a side subsequently used in the sine or cosine rules.
[Edexcel, GCSE Nov2011-4H Q20b Edited]

Diagram **NOT** accurately drawn
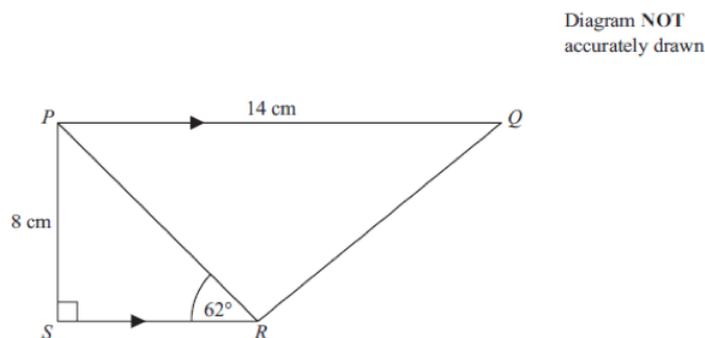
PQRS is a trapezium. *PQ* is parallel to *SR*. Angle *PSR* = 90°. Angle *PRS* = 62°
PQ = 14 cm. *PS* = 8 cm.

Determine the length of *QR*.

Give your answer correct to 3 significant figures.

.... cm

Question 5

Categorisation: As above, but in reverse; using a side determined using sine or cosine rules in a subsequent calculation involving a right-angled triangle.

[Edexcel GCSE June2006-6H Q23]
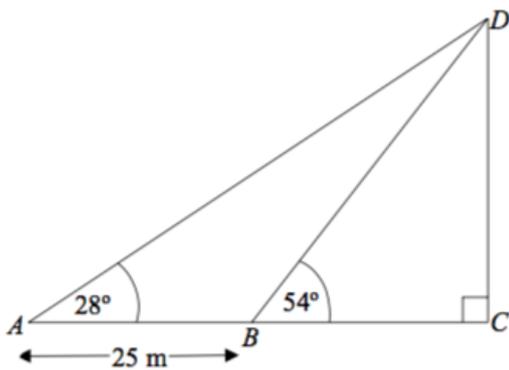
Diagram **NOT** accurately drawn

The diagram shows a vertical tower DC on horizontal ground ABC.
ABC is a straight line.

The angle of elevation of D from A is 28 °.
The angle of elevation of D from B is 54 °. AB = 25 m.

Calculate the height of the tower.
Give your answer correct to 3 significant figures.

.... m

Question 6

Categorisation: Use the cosine rule in context.

[Edexcel IGCSE Jan2014-4H Q17]

A circular clock face, centre *O*, has a minute hand *OA* and an hour hand *OB*.
OA = 10 cm. *OB* = 7 cm.

Calculate the length of *AB* when the hands show 5 o'clock.
Give your answer correct to 3 significant figures.
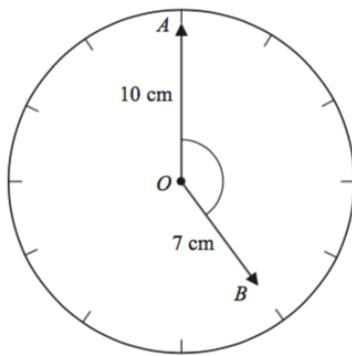
Diagram **NOT**
accurately drawn

.... cm

Question 7

Categorisation: Use the cosine rule involving algebraic sides.

[Edexcel IGCSE Jan2015-3H Q22]
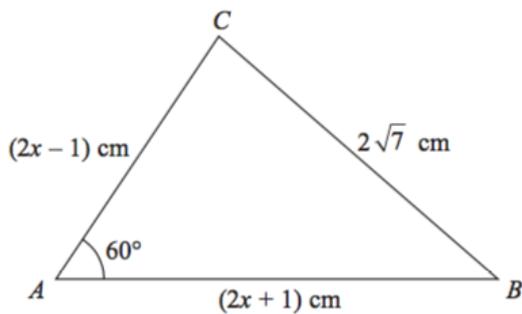
Diagram **NOT**
accurately drawn

The diagram shows a triangle *ABC*. $AB = (2x + 1)$ cm, $AC = (2x - 1)$ cm and $BC = 2\sqrt{7}$ cm. Angle *BAC* = 60°
Work out the value of x .

....

Question 8

Categorisation: Use cosine or sine rules in the context of bearings.

[Edexcel IGCSE May2014(R)-4H Q19 Edited]
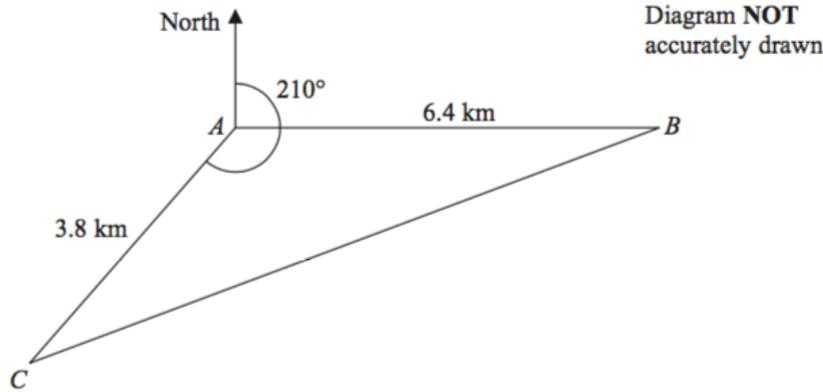
A, *B* and *C* are 3 villages. *B* is 6.4 km due east of *A*. *C* is 3.8 km from *A* on a bearing of 210°. Calculate the bearing of *B* from *C*. Give your answer correct to the nearest degree.

.... °

Question 9

Categorisation: Use the cosine rule in the context of sectors/segments.

[Edexcel IGCSE Jan2015-4H Q24]

The diagram shows a sector *OAPB* of a circle, centre *O*.
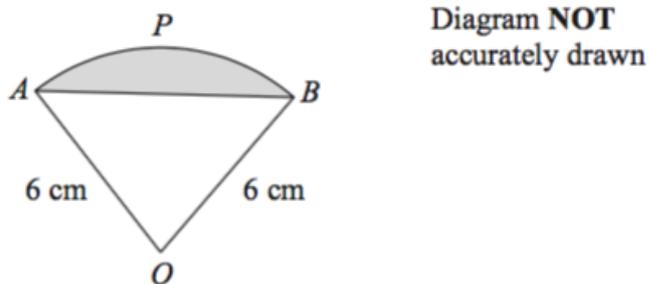
AB is a chord of the circle. *OA* = *OB* = 6 cm. The area of sector *OAPB* is 5π cm^2.

Calculate the perimeter of the shaded segment. Give your answer correct to 3 significant figures.

.... cm

Question 10

Categorisation: Use the sine rule twice within the same triangle.

[Edexcel GCSE Nov2013-2H Q26]

The diagram shows triangle *LMN*.

Diagram **NOT** accurately drawn

15.7 cm

L

M

136°

12.8 cm
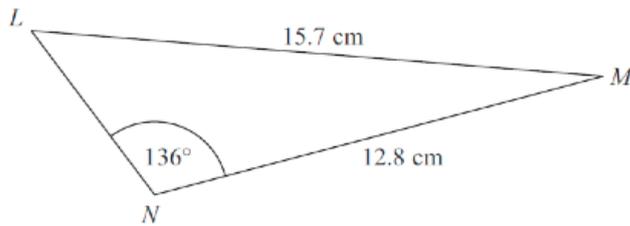
N

Calculate the length of *LN.*

Give your answer correct to 3 significant figures.

.... cm

Question 11

Categorisation: Use the cosine rule to determine an unknown angle.

[Edexcel GCSE Nov2006-6H Q20a]
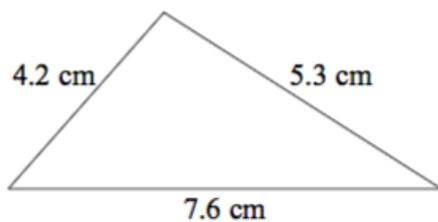
Diagram **NOT** accurately drawn

4.2 cm   5.3 cm

7.6 cm

The lengths of the sides of a triangle are 4.2 cm, 5.3 cm and 7.6 cm.

Calculate the size of the largest angle of the triangle.

Give your answer correct to 1 decimal place.

.... °

Question 12

Categorisation: Use sine and cosine rules in the context of a 3D shape.

[Edexcel GCSE Nov2007-6H Q25]

Diagram **NOT**
accurately drawn
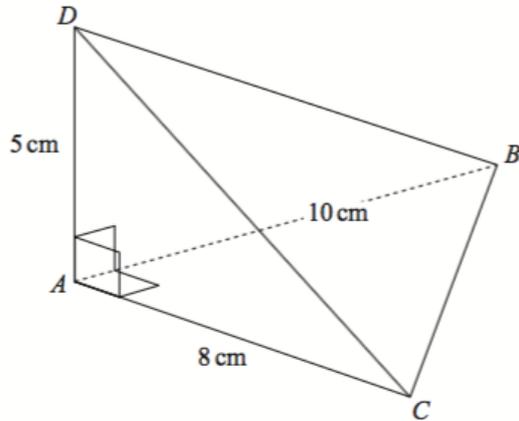
The diagram shows a tetrahedron.

AD is perpendicular to both AB and AC.

AB = 10 cm. AC = 8 cm. AD = 5 cm. Angle BAC = 90°

Calculate the size of angle BDC. Give your answer correct to 1 decimal place.

.... °

Question 13

Categorisation: Determine the area of triangle using $\frac{1}{2} ab \sin C$.

[Edexcel GCSE June2013-2H Q24a]

ABC is a triangle.
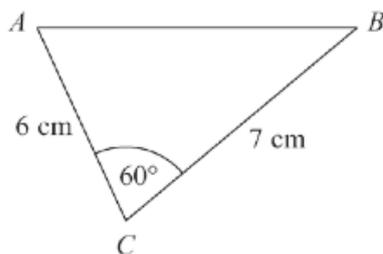
Diagram **NOT**
accurately drawn

Work out the area of triangle *ABC*. Give your answer correct to 3 significant figures.

.... cm^2

Question 14

Categorisation: Determine the area of a triangle requiring prior use of sine/cosine rules.

[Edexcel GCSE June2012-2H Q24]
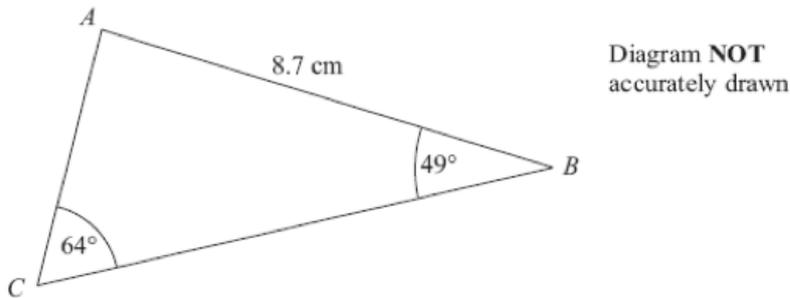
ABC is a triangle. *AB* = 8.7 cm. Angle *ABC* = 49°. Angle *ACB* = 64°

Calculate the area of triangle *ABC*.
Give your answer correct to 3 significant figures.

.... cm^2

Question 15

Categorisation: Use a known area to determine the length of a side.

[Edexcel GCSE Nov2015-2H Q24]

ABC is a triangle.
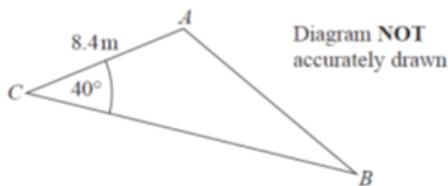
$AC = 8.4m$. Angle $ACB = 40°$. The area of the triangle = 100 m².

Work out the length of AB. Give your answer correct to 3 significant figures.
You must show all your working.

$AB = $ .... m

Question 16

Categorisation: Solve multi-step problems involving a combination of $\frac{1}{2}ab\sin C$ and trigonometry.

[Edexcel IGCSE Jan2014(R)-3H Q21]

Diagram **NOT** accurately drawn
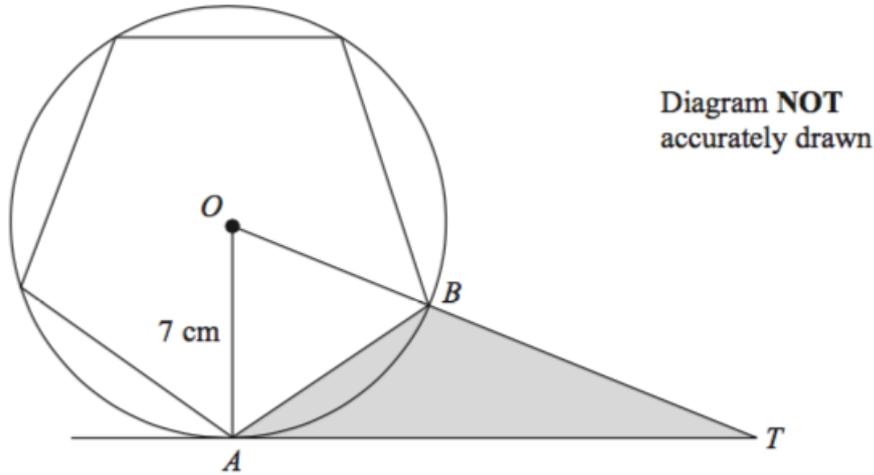
The diagram shows a regular pentagon inside a circle, centre *O*.
The points *A* and *B* lie on the circle such that *AB* is a side of the pentagon.
OA = 7 cm. *TA* is a tangent to the circle and *OBT* is a straight line.

Calculate the area of triangle *ABT*.
Give your answer correct to 3 significant figures.

.... cm^2

Question 17

Categorisation: Determine the area of a segment.

[Edexcel GCSE June2010-4H Q26]

The diagram shows a sector of a circle with centre O. The radius of the circle is 8 cm.

PRS is an arc of the circle. PS is a chord of the circle. Angle $POS = 40^{\circ}$

Diagram **NOT** accurately drawn
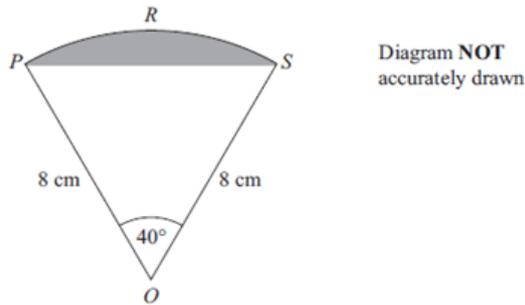
Calculate the area of the shaded segment. Give your answer correct to 3 significant figures.

.... cm^2

Question 18

Categorisation: Determine the area of a parallelogram.

[Edexcel GCSE June2014-2H Q27]

$ABCD$ is a parallelogram.

Diagram **NOT** accurately drawn
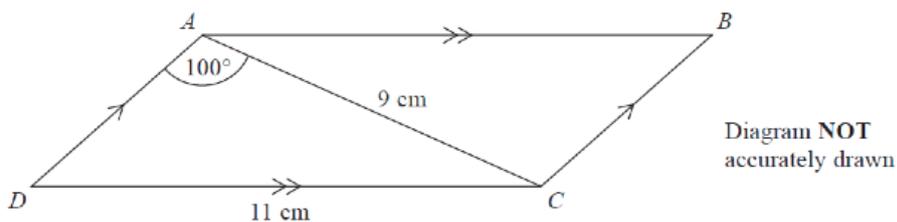
AC = 9 cm. DC = 11 cm. Angle DAC = 100°

Calculate the area of the parallelogram. Give your answer correct to 3 significant figures.

.... cm^2

Question 19

Categorisation: Determine the area of composite shapes combining triangles and sectors/segments.

[Edexcel IGCSE May2014-3H Q22b Edited]

The diagram shows a metal plate.

B

Diagram **NOT**
accurately drawn

65°

35°

A   8 cm   O   C
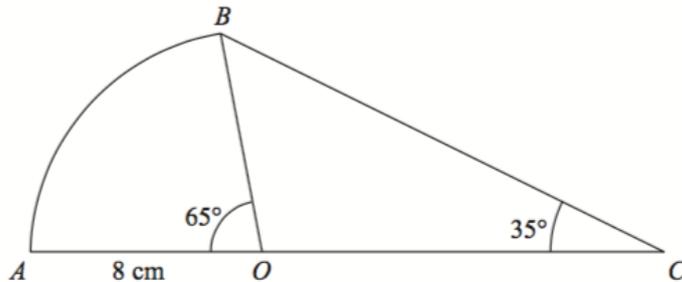
The metal plate is made from a sector *OAB* of a circle, centre *O*, and a triangle *OCB*.

Angle *AOB* = 65°   Angle *OCB* = 35°   *OA* = *OB* = 8 cm.
AOC is a straight line.

Given that $BC = 12.6$ cm correct to 3 significant figures, calculate the total area of the metal plate. Give your answer correct to 3 significant figures.

.... cm^2

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Question 20

Categorisation: Determine the area of a kite.
[Edexcel IGCSE May2015(R)-3H Q16]
ABCD is a kite.

D

Diagram **NOT**
accurately drawn

A   110°   C

3 cm

8 cm

B
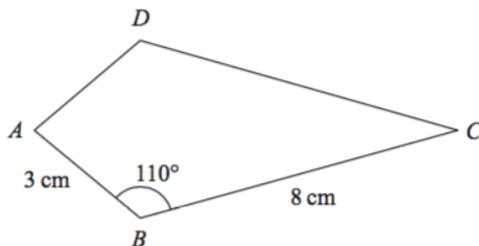
AB = 3 cm. *BC* = 8 cm. Angle *ABC* = 110°
Calculate the area of the kite *ABCD*. Give your answer correct to 3 significant figures.

.... cm^2

___

Question 21

Categorisation: Determine the area of a pentagon.

[Edexcel IGCSE May2016-3H Q22]
The diagram shows a pentagon.

12 cm   12 cm

Diagram **NOT** accurately drawn

105°   105°

8 cm   8 cm

13 cm
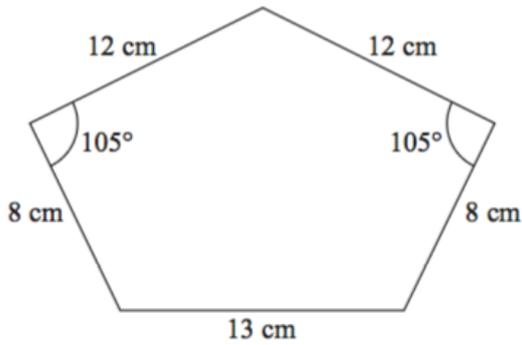
 Work out the area of the pentagon.
Give your answer correct to 3 significant figures.

.... cm^2

Question 22

Categorisation: Use the $\frac{1}{2}ab\sin C$ formula involving algebraic sides.

[Edexcel GCSE Nov2012-2H Q25 Edited]
 The diagram shows the triangle *PQR*.

R

Diagram **NOT** accurately drawn

2*x* cm

30°

P   *x* cm   *Q*
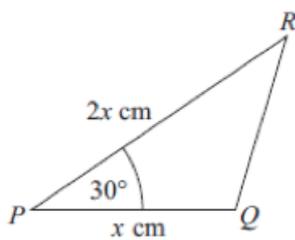
PQ = x   cm. *PR = 2x* cm. Angle *QPR* = 30°
The area of triangle *PQR* = *A* cm². Find an expression for x .

$x =$ ....

Question 23

Categorisation: Solve problems involving equating areas of triangles which use algebraic sides.

[Edexcel IGCSE May2015-4H Q22]

The diagram shows two triangles, **A** and **B**.

Diagram **NOT** accurately drawn

Triangle **A**
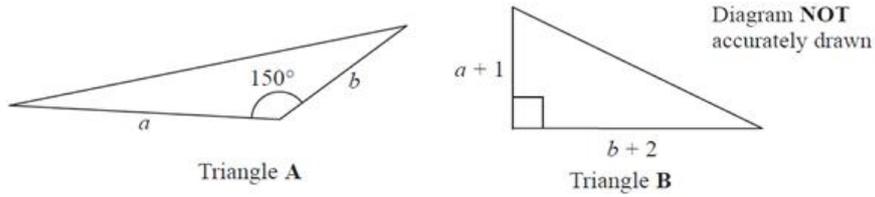
Triangle **B**

The area of triangle **B** is 3 times the area of triangle **A**.

Given that $b > 4$, find an expression for a in terms of b .

$a = $ ....

Answers

Question 1

13.3 cm

Question 2

$BC =$ 9.87 cm

Question 3

any value in the range 286 m to 287 m

Question 4

any value in the range 12.6 cm to 12.62 cm

Question 5

21.7 m

Question 6

16.4 cm

Question 7

$$x = 2.5$$

Question 8

068 $^{\circ}$

Question 9

any value in the range 10.2 cm to 10.31 cm

Question 10

any value in the range 3.73 cm to 3.74 cm

Question 11

105.7 $^{\circ}$

Question 12

76.3 $^{\circ}$

Question 13

any value in the range $18.1\ cm^2$ to $18.2\ cm^2$

Question 14

$29.3\ cm^2$

Question 15

$AB =\ 31.1$ m

Question 16

$52.1\ cm^2$

Question 17

$1.77\ cm^2$

Question 18

any value in the range $43.8\ cm^2$ to $43.9\ cm^2$

Question 19

$61.6\ cm^2$

Question 20

$22.6\ cm^2$

Question 21

any value in the range $188\ cm^2$ to $188.5\ cm^2$

Question 22

$x = \sqrt{2A}$

Question 23

$a = \frac{2b+4}{b-4}$