THE BRITISH INTERNATIONAL SCHOOL ABU DHABI

A NORD ANGLIA EDUCATION SCHOOL

Year 8 Maths

Topic 7–8–9 Workbook

In the table below translate the key terms into your home language and write a short definition for each term [if needed visit www.mathsisfun.com/definitions/].

TOPIC 7 - CONSTRUCTIONS		
Ruler		
Protractor		
Compass		
Rhombus		
Parallelogram		
Bisector		
TOPIC 8 – LINEAR EQUATIONS		
Equation		
Integer		
Coefficient		
Rearrange		
Solving		
TOPIC 9 – MENSURATION OF 2D SHAPES		
Area		
Parallelogram		
Trapezium		
Circumference		
Circle		

Constructing Triangles

'Construct' means you have to draw the shape accurately and make sure you don't rub out any of your construction marks.

1. Construct triangle ABC, where BAC is 40° and ABC is 20°.

Use a ruler and a protractor. The line AB has been drawn for you.

A ——————— B

2. Construct the isosceles triangle DEF, where $DE = 5$ cm and $DEF = 100°$.

Use a ruler and a protractor. The line EF has been drawn for you.

E ——————— F

3. Paul (P), Qiang (Q) and Ramesh (R) are sat around a campfire. Paul is sat 6 m from Qiang, Qiang is 4 m from Ramesh and Ramesh is 3 m from Paul.

Construct the triangle PQR. The line PQ has been drawn for you.
Use a ruler and a pair of compasses, and use a scale of 1 cm = 1 m.

P ——————— Q

How did you do?

Put down your hammer and nails and wipe your brow — that's enough constructing for the time being, phew! Before moving on to the next page, make sure you're able to:

- ☐ **Construct triangles when you're given two angles and one side.**
- ☐ **Construct triangles when you're given one angle and two sides.**
- ☐ **Construct triangles when you're given three sides.**

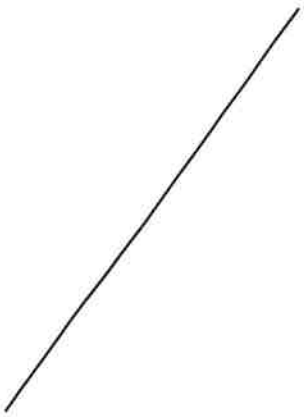
Constructions

Umm, no, put away your hammer and chisel. All you need for these constructions is a protractor, a ruler, your compasses and nice sharp pencil.

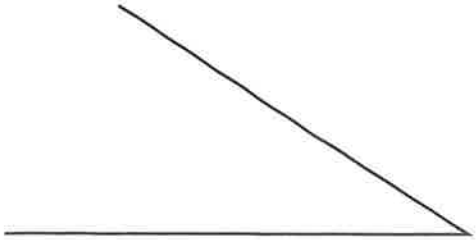
Q1 Construct triangle ABC with AB = 7 cm, BC = 5 cm, CA = 3 cm.

Q2 Make an accurate drawing of triangle MNP with angle M = 30°, MN = 6 cm, MP = 5 cm.

Q3 Using your compasses, construct a perpendicular bisector of the line below.



Q4 Using your compasses, construct the bisector of the angle below.



Constructions

Umm, no, put away your hammer and chisel. All you need for these constructions is a protractor, a ruler, your compasses and a nice sharp pencil.

Q1 Using compasses and a ruler construct these triangles.

a) triangle ABC with AB = 7 cm, BC = 5 cm, CA = 3 cm.

b) triangle DEF with DE = 8 cm, EF = 5.5 cm, FD = 6 cm.

c) triangle GHI with GH = HI = IG = 6.5 cm.

d) triangle JKL with JK = 9.3 cm, KL = 4.5 cm, LJ = 7.5 cm.

Q2 Draw accurately each of these triangles.

a) triangle MNP with angle M = 30°, MN = 6 cm, MP = 5 cm.

b) triangle QRS with angle R = 70°, QR = 9.3 cm, SR = 5.5 cm.

c) triangle TUV with angle V = 50°, VT = 7 cm, UV = 9 cm.

d) triangle WXY with angle X = 80°, XW = XY = 7 cm.

What do you notice about triangles TUV and WXY?

Q3 Draw accurately each of these triangles.

a) triangle PTO with angle P = 30°, angle T = 60°, PT = 7 cm.

b) triangle TLC with angle T = 40°, angle C = 35°, TC = 6.6 cm.

c) triangle GSH with angle S = 112°, angle H = 35°, SH = 8.3 cm.

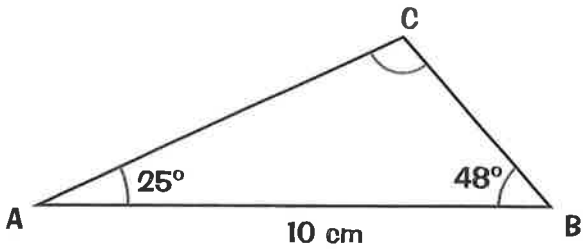
d) triangle PDQ with angle P = 28°, angle D = 39°, PD = 5.8 cm.

Q4 Construct triangle ABC accurately with length AB = 10 cm, angle ABC = 48° and angle CAB = 25°.

You'll need your compasses for this question.

a) Construct the perpendicular bisector of the line AC. Mark point K where the bisector crosses the line AB.

b) Bisect angle ACB. Mark point J where the bisector crosses the line AB. Measure the length JK.



Solving Equations

1. Solve the following equations.

a) $w + 12 = 4$

$w =$ .....

b) $2x + 5 = -11$

$x =$ .....

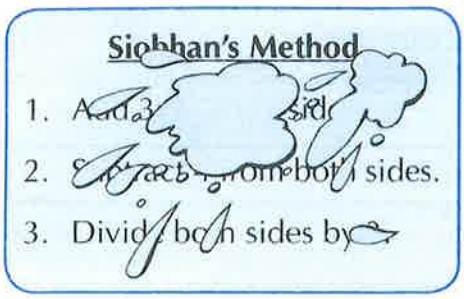
c) $-5y + 2 = 17$

$y =$ .....

d) $7 - 3z = -2$

$z =$ .....

2. Siobhan has left the following instructions on how to solve the equation $4 = 15 - 3x$.



Sadly though, I've gone and spilt my drink all over it... Fill in the blanks to recover Siobhan's method:

1. Add ..... to both sides.

2. ..... 4 ..... both sides.

3. Divide both sides by .....

3. Solve these equations. Give your answers as fractions where necessary.

a) $8w = 4$

$w =$ .....

b) $12x + 2 = 5$

$x =$ .....

c) $\frac{y}{3} + 1 = 5$

$y =$ .....

d) $\frac{2z}{5} + 7 = 11$

$z =$ .....

4. Solve these equations.

a) $2(m + 6) = 26$

$m =$ .....

b) $9(2n - 1) = 63$

$n =$ .....

5. Solve these equations. Give your answers as fractions or mixed numbers.

a) $7p + 13 = 3$

$p =$ .....

b) $20q - 13 = -21$

$q =$ .....

Solving Equations

6. The Solvenator-4000 is acting up. I've tried turning it off and on again — now I'm out of ideas and these equations won't solve themselves...

a) $3w + 7 = w + 15$

$w =$ .....

b) $5x = 6(x + 1)$

$x =$ .....

c) $8t - 1 = 2t + 17$

$t =$ .....

d) $5z + 15 = 3(z + 1)$

$z =$ .....

7. For what value of s are the expressions $3s + 4$ and $7s - 6$ equal?

$s =$ .....

8. Pair up the following equations so that each pair has the same solution.

A: $6 - x = 4x + 1$

B: $3(x + 1) = -6$

C: $2x = \frac{x+3}{2}$

D: $9(x - 1) = -2(8 - x)$

E: $\frac{1}{3}x - 8 = 3x$

F: $-x + 5 = 3(1 - x)$

..... and ..... have solution $x =$ .....

..... and ..... have solution $x =$ .....

..... and ..... have solution $x =$ .....

How did you do?

That was quite a lot of solving — were you equal to the task? After solving an equation, you can check your answer by putting it back in. You should be able to solve these types of equations:

- ☐ Equations involving negatives.
- ☐ Equations involving brackets.
- ☐ Equations involving fractions.
- ☐ Equations with the unknown on both sides.

Solving Equations

You don't need to be a super-sleuth to solve equations, but you will need practice. Always do the same thing to both sides of the equation, and you can't go far wrong. Just keep going 'til you've got the letter on its own.

Q1 Solve the following:

a) $4x = 20$

b) $7x = 28$

c) $x + 3 = 11$

d) $x + 19 = 23$

e) $x - 6 = 13$

f) $7x = -14$

g) $2x = -18$

h) $x + 5 = -3$

i) $\frac{x}{2} = 22$

j) $\frac{x}{7} = 3$

k) $\frac{x}{5} = 8$

l) $10x = 100$

m) $2x + 1 = 7$

n) $2x + 4 = 5$

Check your answer by sticking it back into the equation at the end and seeing if it works.

Q2 Solve the following equations:

a) $3(2x + 5) = 39$

b) $7(x - 2) = 126$

c) $9(3x + 4) = 306$

d) $8(5x - 3) = 136$

e) $6(4x + 7) = 282$

f) $7(9x - 8) = 6244$

Q3 Solve:

a) $5x - 9 = 41$

b) $\frac{x}{7} + 14 = 20$

c) $\frac{3x}{4} - 9 = 6$

d) $11x + 4 = 6x + 29$

e) $3x + 8 + 4x - x = 26$

f) $\frac{2x}{3} = 10$

g) $2(3x - 5) = 170$

h) $\frac{4x}{5} - 8 = 72$

i) $10x - 9 - 3x = 40$

j) $x + 2x + 3x + 4x = 1000$

Q4 Solve the following:

a) $5(x - 1) + 3(x - 4) = -11$

b) $3(x + 2) + 2(x - 4) = x - 3(x + 3)$

c) $\frac{3x}{2} + 3 = x$

d) $3(4x + 2) = 2(2x - 1)$

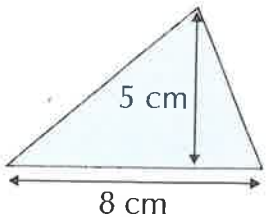
e) $5x + \frac{7}{9} = 3$

f) $2x + \frac{7}{11} = 3$

Area

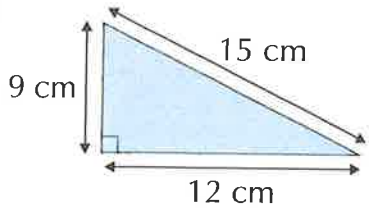
1. Find the area of each shape.

a)



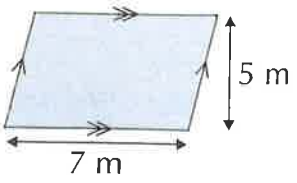
..... cm^2

b)



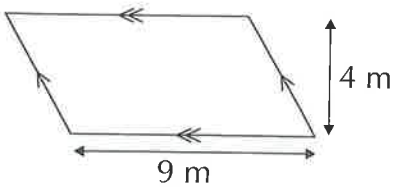
..... cm^2

c)



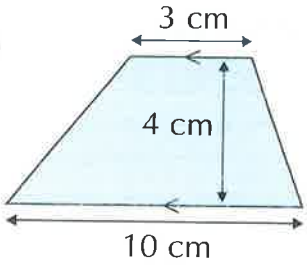
..... m^2

d)



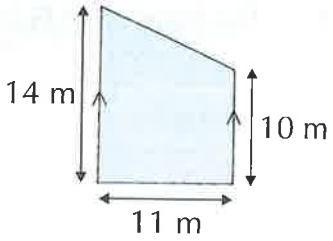
..... m^2

e)



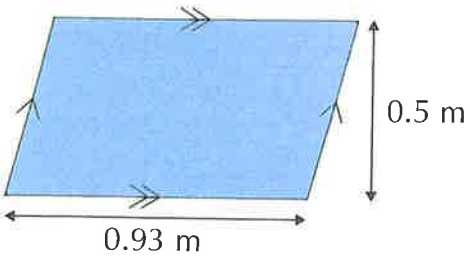
..... cm^2

f)



..... m^2

2. Pam Parallelogram has a new TV, as shown below. She wants to put it on her wall, but only has 0.45 m^2 of wall space left.



a) What is the area of the new TV?

A = ... m^2

b) Will it fit on the wall? Circle: Yes / No

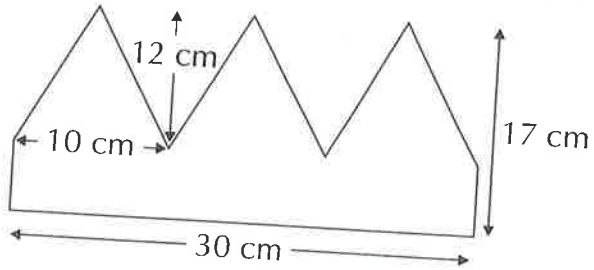
3. A trapezium has two parallel sides of 6.5 cm and 9.2 cm which are 12 cm apart. What is the area of the trapezium?

A = ... cm^2

Area

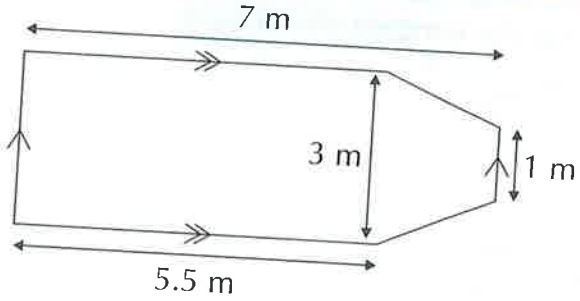
4. A primary school class is making crowns out of paper.

The template that they need to cut out and fold is shown below.
Find the area of the crown template. The three triangles are identical.



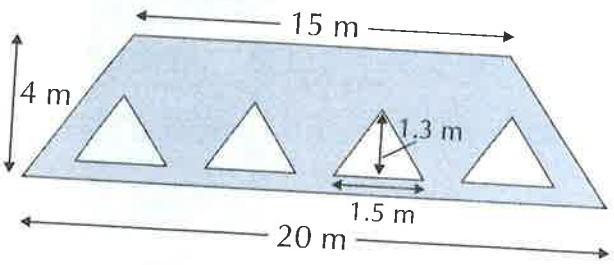
$A =$ ..... cm^2

5. A police officer sections off the scene of a crime. A diagram of the area is shown below. Work out the area that has been sectioned off.



$A =$ ..... m^2

6. The roof of two semi-detached houses needs to be tiled. It has four windows of equal size.
Work out the area of the front of the roof (shown below) that needs to be tiled.
The diagram is not drawn to scale.



$A =$ ..... m^2

How did you do?

"Alright, alright, let's clear the area. Nothing to see here, folks..."
While the police officer gets to work, check that you can use formulas to find:

- ☐ Areas of triangles.
- ☐ Areas of trapeziums.
- ☐ Areas of parallelograms.
- ☐ Areas of composite shapes.

☐ ☐ ☐

Perimeter and Area

Areas come up all the time in tests, so you need to get to grips with them. Unfortunately, there's really only one way to win here, and that's to learn the formulas.

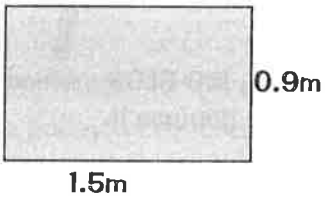
Q1 What is the area of a square field with sides 0.3 km long?

Easy marks... length times width, and there's your area. See — Maths is simple really.

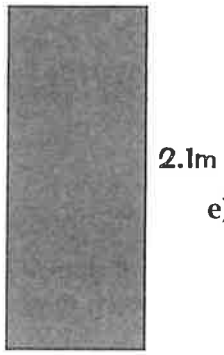
Q2 Find the areas of these rectangles in square metres:

a)

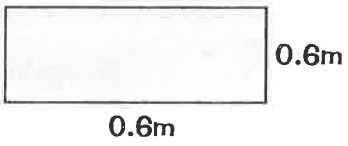
b)



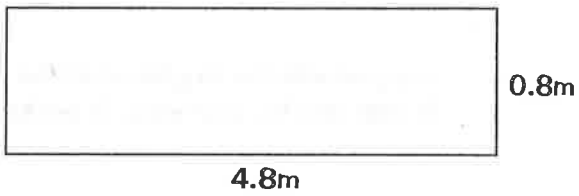
c)



d)



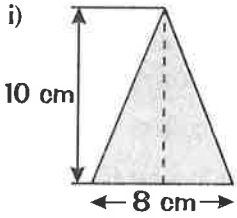
e)



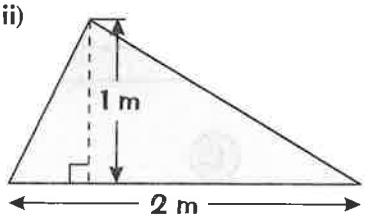
Q3 Complete these questions:

a) Find the areas of these triangles, to 1 dp:

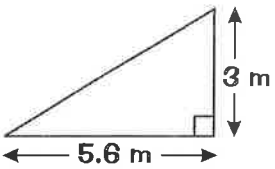
i)



ii)

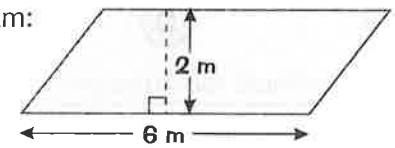


iii)

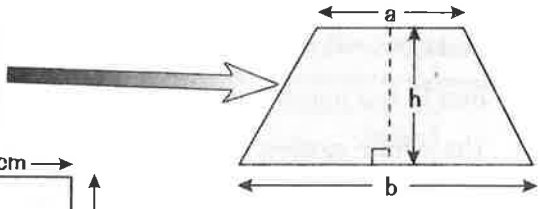


b) If a triangle has an area of 10 cm^2 and a base of 5 cm, what is its vertical height?

c) Find the area of this parallelogram:

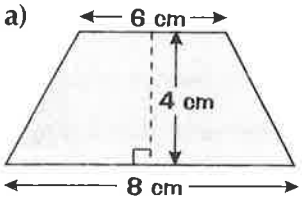


Q4 Write the formula for the area of a trapezium, using the letters given in the diagram to the right.

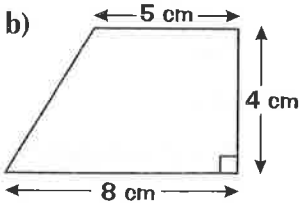


Use it to find the area of the following trapeziums:

a)



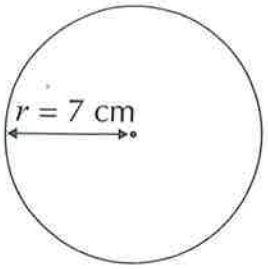
b)



Circles

1. Work out the circumference and area of each circle below. Give your answers to 1 d.p.

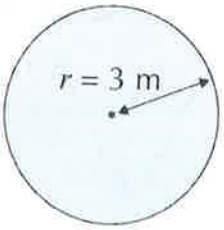
a)



C = ... cm

A = ... cm^2

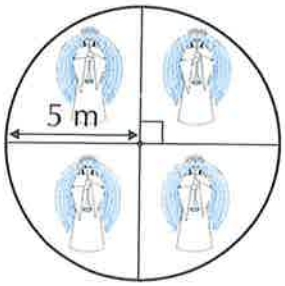
b)



C = ... m

A = ... m^2

2. A giant circular window in an old house is being removed and cleaned section by section. Each section is a quarter of the window.



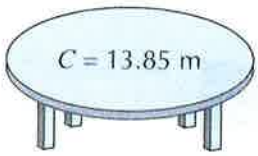
a) Find the area of the whole window. Give your answer to 1 d.p.

..... m^2

b) One section is removed for cleaning. Find the area of the remaining window. Give your answer to 1 d.p.

..... m^2

3. The circumference of Arthur's round table is 13.85 m.



a) Work out the diameter to 1 d.p.

d = ... m

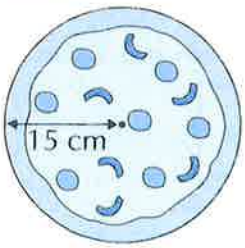
b) Work out the area to 1 d.p.

Use your unrounded value from part a). If you use the rounded value, you'll lose some accuracy.

A = ... m^2

Circles

4. Afia makes a pizza with a radius of 15 cm.



a) Find the circumference of the whole pizza to 2 d.p.

C = ... cm

b) Use your unrounded answer from a) to find the perimeter of half the pizza to 1 d.p.

Don't forget about the straight edge.

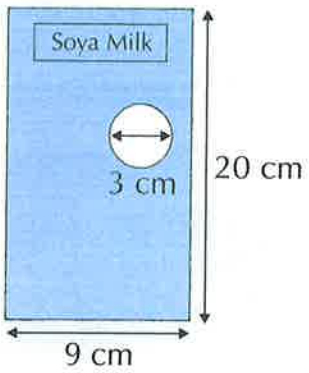
half = ... cm

c) Afia cuts the pizza into 6 equal slices. Use your unrounded answer from a) to find the perimeter of a single slice to 1 d.p.

single slice = ... cm

5. The front of a carton of soya milk is a rectangle made out of cardboard. It has a circular plastic window with a diameter of 3 cm.

Work out the area of the cardboard part of the front of the carton to 1 d.p.



A = ... cm^2

How did you do?

You don't need to go round in circles on these pages (although, thinking about it, that might be useful). As long as you apply the right formula to the question you'll be fine. Check you can:

- ☐ **Use the formulas for the circumference and area of circles.**
- ☐ **Find the area and perimeter of composite shapes involving circles.**

☹ ☐ 😐 ☐ 🙂 ☐