Interactive I.T. Student Activity Sheets Junior Certificate Strand 2

- **Student Activities written to match the I.T. interactive modules on the Project Maths Junior Certificate Student's CD Strand 2**
- **Interactive Activity Sheets included to enhance students' understanding of mathematical concepts**
- **Simple and clear guidelines are provided to facilitate learning**
- **Interesting questions are provided to lead students to explore, construct and consolidate their learning**

Preface

The NCCA have pointed out particular key skills in their Draft Syllabus. "While particular emphasis is placed in mathematics on the development and use of information processing, logical thinking and problem-solving skills, the new approach being adopted in the teaching and learning of mathematics will also give prominence to students being able to develop their skills in communicating and working with others. By adopting a variety of approaches and strategies for solving problems in mathematics, students will develop their self-confidence and personal effectiveness." To help our students to adapt to and take advantage of this new spirit of the syllabus, we have produced Interactive I.T. Student Activity Sheets which incorporate an innovative and diversified learning environment for mathematics.

As we all know, the advancement in technology has changed the way we can learn mathematics. Therefore we have developed a number of interactive modules on our student's CD to match this new development. With the help of these interactive modules, students can not only enhance their understanding in mathematics, but they can also enjoy learning it.

In order to help our students use the I.T. tools more effectively, ***Interactive I.T. Student Activity Sheets Junior Certificate Strand 2*** are produced in this booklet. A student activity sheet is designed for the majority of the interactive modules on the CD. All student activity sheets provide simple and clear guidelines including:

1. Reference to the related topics in ***Project Maths Student's CD Junior Certificate Strand 2 section***
2. Purpose of the I.T. tools
3. Instructions for using the I.T. tools.

These Student Activity Sheets, which include many interesting questions, will lead students to explore, construct, and consolidate their knowledge of mathematics on their own with ease. We believe that with the help of these activities, students' knowledge and understanding of mathematics will grow

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Instructions for use

This booklet contains student activities to accompany the majority of the interactive files on the Junior Certificate Strand 2 section of the student disk. The specific theorem, construction or section of the course that the activity relates to is specified in the name of the activity. At the top of each student activity the students are told what interactive file on the student disk is to accompany the student activity.

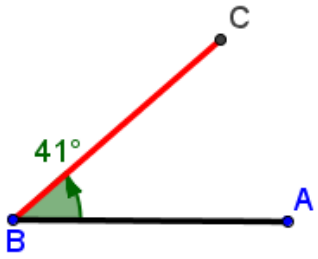
Technical Problems

The student disk has a link situated on the left hand side of its front page called "Troubleshooting" this section gives instructions, if any of the following problems are encountered:

- Problems opening Office 2007 documents
- You do not have Java on your machine
- You do not have a PDF reader on your machine.

Student Activity Axiom

Use in connection with interactive file "Axiom" on the Student's CD.



1. Drag the slider to the right what do you notice?

   _____

2. Drag the slider to the left. What do you notice?

   _____

3. Drag the slider to make the measure of the angle ABC = 45°. What do you think is the measure of the reflex angle ABC? _____

4. Drag the slider to make the measure of the angle ABC = 180°, notice that text: "The angle ABC is NOT a straight angle" disappears . What can you conclude?

   _____

5. Drag the slider to make the measure of the angle ABC = 90°. What is the name given to an angle of this measure?

   _____

6. When you drag the slider along the full line from left to right, how many degrees will the point C have travelled? _____

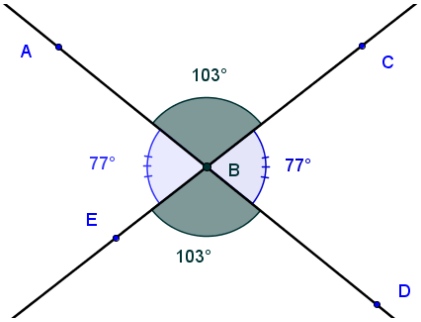
7. When you drag the slider to make the angle ABC = 180°. What can we say about the points A, B and C? _____

8. Drag the slider to make the measure of the angle ABC = 120°. Give a name for this type of angle. _____

9. Drag the slider to make the measure of the angle ABC = 38°. Give a name for this type of angle. _____

Student Activity Theorem 1

Use in connection with interactive file "Theorem 1" on the Student's CD.



1. Drag the point C to make the measure of angle CBA equal to 90^{o}. What do you notice about the measure of the angle EBD? _____

2. When the measure of the angle CBA is 90^{o} What do notice about the measures of the angles EBD, ABE and CBD.
   a. _____
3. What conclusion can be drawn from adding all the angles in question 2?
   a. _____

4. Drag the point C to make the measure of the angle CBD equal to 70^{o}. Write down the measures of the angles ABE, ABC and EBD.
   a. ABE = _____, ABC = _____ and EBD = _____

5. Drag the point C to make the measure of the angle ABE 60^{o}. Is the measure of the angle CBD the same? _____
   a. What is the measure of the angle ABC? _____ Is the measure of the angle EBD equal to the measure of the angle ABC? _____
6. Drag the point C to make the measure of the angle ABC 130^{o}. Is the measure of the angle EBD the same? _____
   What is the measure of the angle ABE?_____ Is the measure of the angle CBD equal to the measure of the angle ABE? _____
7. By dragging the point C make the measure of the angle ABC 93^{o}. When you add the measure of angle ABC to the measure of angle CBD what answer do you get?_____
   a. What does this tell you about the points A, B and D?
      _____

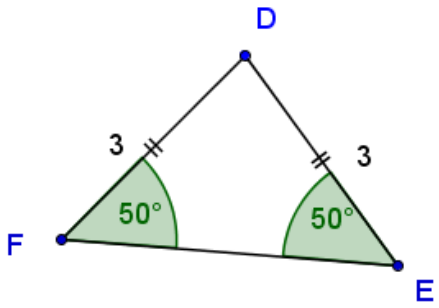
8. Make the measure of the angle EBD = 100^{o}. What are the measures of the following angles (i) ABC = _____ (ii) EBA = _____ (iii) CBD = _____What does this show you?_____

    a. When you add the measures of the angles EBD, ABE, ABC and CBD you get _____

9. Click on the Tick Box on the interactive file to reveal the wording of this theorem. Did you come to this conclusion? _____

Student Activity Theorem 2

Use in connection with interactive file "Theorem 2" on the Student's CD.



1. Drag the point D to make the measure of the angle DEF 50^{o}.

   What is the measure of the angle DFE? _____ . Are the two angles equal in measure? _____

   Write down the lengths of the sides DE and DF. Are these lengths equal? _____

2. Drag the point D to make the length of the side DE = 4.
   What is the length of the side DF? _____ .
   Are the two sides equal? _____
   Write down the measures of the angles DEF and DFE.
   DEF = _____, DFE = _____
   Are the measures of the two angles equal? _____

3. Drag the point D to make the measure of the angle DFE = 70^{o} . What is the measure of the angle DEF? _____ . Are the two angles equal in measure? _____
   Write down the lengths of the sides DF and DE. Are these lengths equal? _____

4. Drag the point D to make the length of the side DF = 8.
   What is the length of the side DE? _____ .
   Are the two sides equal? _____
   Write down the measures of the angles DFE and DEF.
   DFE = _____, DEF = _____
   Are the measures of the two angles equal? _____

5. What conclusion can be drawn from the answers in questions 1, 2, 3, and 4 when

   (i) the sides are equal:

   Conclusion_____

   (ii) the angles are equal:

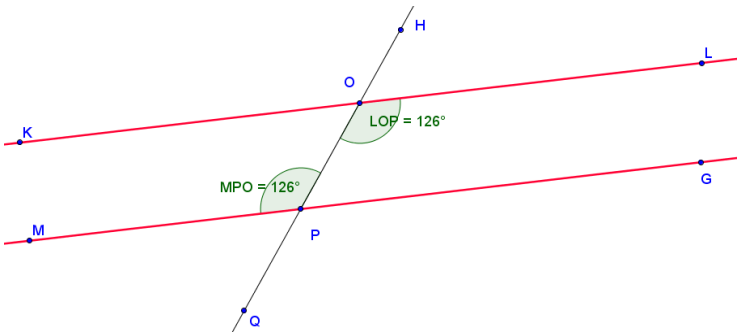
   Conclusion_____

6. Click on the Tick Box 1 and Tick Box 2 on the interactive file to reveal the wording of this theorem and the converse of this theorem.

   Did you come to these conclusions? _____.

Student Activity Theorem 3

Use in connection with interactive file "Theorem 3" on the Student's CD.



1. What do you notice about the measure of the angles LOP and MPO?

   _____

   a. Drag the point H to make the measure of the angle LOP = 100^{o} .
   b. Write down the measure of the angle MPO. MPO = _____
   c. Are the measures of the two angles LOP and MPO equal in measure? _____.

2. Drag the point H to make the measure of the angle MPO = 73^{o}.
   a. What is the measure of the angle LOP? _____ .
   b. Are the measures of the two angles MPO and LOP equal? _____

3. The angles LOP and MOP are called ALTERNATE angles. Drag the point H to various positions. Are these angles LOP and MOP always equal? _____

4. Click on Tick Box 1 to show the wording of this theorem. Are the lines *a* and *b* parallel in this case? _____

5. Name another pair of alternate angles in the diagram.
   (i) _____ (ii) _____
   Write down the measure of these angles (i) _____ (ii)_____
   Are the measures of these angles equal? _____

6. Click on Tick Box 2 to show the wording of the converse of this theorem.

7. If you were told that the line segments [KL] and [MG] were parallel what can we say about the measures of the following pairs of angles,

LOP and MOP _____

KOP and OPG _____

Drag the point H to make the angle MPO equal to 50^{o} and then write down the measures of the following angles.

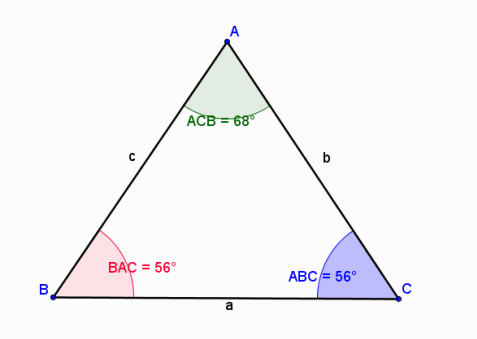
(i) LOP _____

(ii) KOP _____

(iii) GPO _____

Student Activity Theorem 4

Use in connection with interactive file "Theorem 4" on the Student's CD.



Give all answers correct to the nearest degree.

1. What shape is ABC? _____

2. How many sides make up the shape ABC? _____

3. Move the point B, so that the angle ABC equals 58°. What are the measures of the angle BCA and BAC. BCA = _____. BAC = _____.

4. When angle ABC equals 58° what is the sum of the measures of the angles ABC, BCA and BAC? Measure of ABC + Measure of BCA + Measure of BAC = _____

5. Move the point C, so that the angle BCA equals 60°.

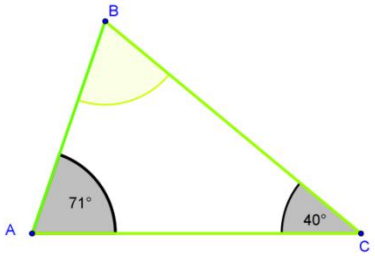
   Read the values of the angle ABC and BAC. ABC = _____. BAC = _____.

6. When the angle BCA equals 60°, what is the sum of the values of the angles BCA, ABC and BAC? Measure of ABC + Measure of BCA + Measure of BAC = _____

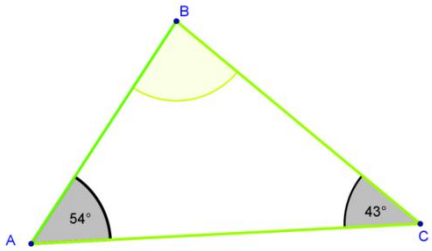
7. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

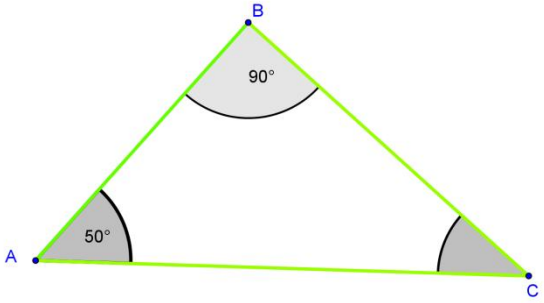
   Did you come to this conclusion? _____.

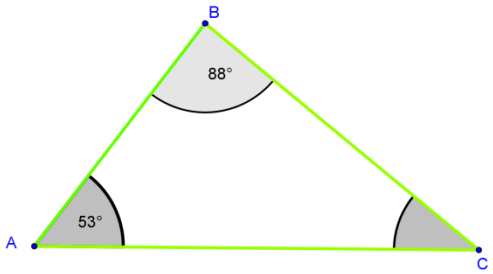
8. What is the measure of the angle ABC in each of the following triangles?



9. What are the values of the angles ACB in each of the following diagrams?

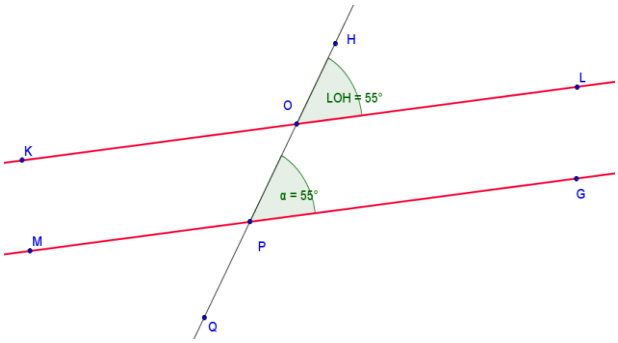






Student Activity Theorem 5

Use in connection with interactive file "Theorem 5" on the Student's CD.



1. What do you notice about the measure of the angles
   LOH and GPO? _____
   Drag the point H to make the measure of the angle LOH = 30^o .
   Write down the measure of the angle GPO. GPO = _____
   Are the measures of the two angles LOH and GPO equal in measure? _____.
2. Drag the point H to make the measure of the angle LOH = 100^o.
   What is the measure of the angle GPO? _____ .
   Are the measures of the two angles LOH and GPO equal? _____
3. The angles LOH and GOP are called CORRESPONDING angles. Drag the point H to various positions. Are these angles LOH and GOP always equal? _____
4. Click on Tick Box to show the wording of this theorem. Are the lines *a* and *b* parallel?_____

5. Name another pair of corresponding angles in the diagram.
   (i) _____ (ii) _____
   Write down the measure of these angles (i) _____ (ii)_____
   Are the measures of these angles equal? _____
6. If you were told that the lines a and b are parallel what can we say about the measures of the following pairs of angles,

   HOL and OPG _____

   QPG and POL _____

   QPM and POK _____

   Drag the point H to make the angle OPG equal to 90^o and then write down the measures of the following angles.

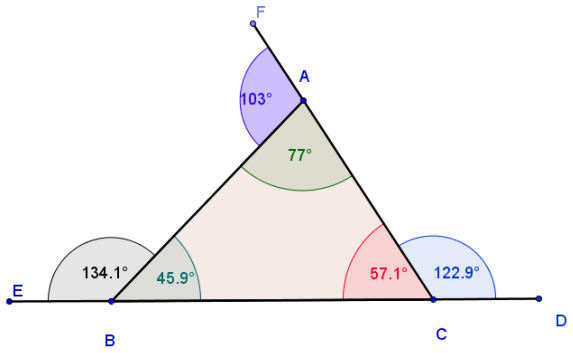
   (i) KOH _____

   (ii) MPO _____

   (iii) QPG _____

Student Activity Theorem 6

Use in connection with interactive file "Theorem 6" on the Student's CD.



Give all answers correct to the nearest degree.

1. Drag the point A to make the measure of the angle EBA = 130°
   What is the measure of the angle BAC? _____ .
   What is the measure of the angle BCA? _____ .
   What is the sum of the measures of the angles BAC and BCA?
   Measure of the angle BAC + Measure of BCA = _____
   Is this sum equal to the measure of the angle EBA? _____

2. Drag the point A to make the measure of the angle DCA = 100° .
   What is the measure of the angle CBA? _____ .
   What is the measure of the angle CAB? _____ .
   What is the sum of the measures of the angles CBA and CAB?
   Measure of the angle CBA + Measure of CAB = _____
   Is this sum equal to the measure of the angle DCA? _____

3. Drag the point A to make the measure of the angle FAB = 110°.
   What is the measure of the angle ABC? _____ .
   What is the measure of the angle ACB? _____ .
   What is the sum of the measures of the angles ABC and ACB?_____
   Measure of the angle ABC + Measure of ACB = _____
   Is this sum equal to the measure of the angle FAB? _____

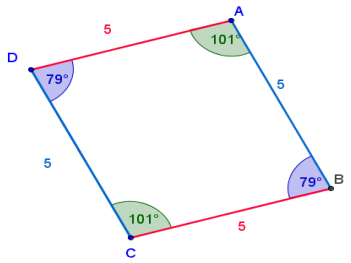
4. Drag the point A to make the measure of the angle DCA = 84°.
   What is the measure of the angle CBA? _____ .
   What is the measure of the angle CAB? _____ .
   What is the sum of the measures of the angles CBA and CAB?_____
   Measure of the angle CBA + Measure of CAB = _____
   Is this sum equal to the measure of the angle DCA? _____

5. What conclusion can you deduce from the measurements in Q 1, Q2, Q3, and Q4.
   Conclusion. _____
   _____

6. Click on the Tick Box on the interactive file to reveal the wording of this theorem.
   Did you come to this conclusion? _____.

Student Activity Theorem 9

Use in connection with interactive file "Theorem 9" on the Student's CD.



1. In the diagram ABCD is a parallelogram. Drag the point A to the right and then write down the lengths of the following line segments

   [AB] = _____

   [DC] = _____

   [DA] = _____

   [BC] = _____

   What can be concluded from these measurements?

   _____

2. In the diagram ABCD is a parallelogram. Drag the point D to the left and then write down the lengths of the following line segments

   [AB] = _____

   [DC] = _____

   [DA] = _____

   [BC] = _____

   What can be concluded from these measurements?

   _____

3. In the diagram ABCD is a parallelogram. Drag the point A to the right and then write down the measures of the following angles

   DAB = _____

   DCB =_____

   ADC =_____

   ABC =_____

   What can be concluded from these measurements?

   _____

4. In the diagram ABCD is a parallelogram. Drag the point D to the left and then write down the measures of the following angles

   DAB = _____

   DCB =_____

   ADC =_____

   ABC =_____

What can be concluded from these measurements?

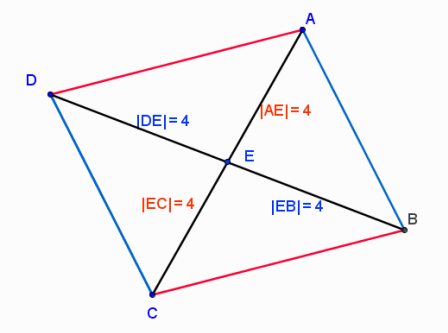
_____

5. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

   Did you come to this conclusion? _____.

Student Activity Theorem 10

Use in connection with interactive file "Theorem 10" on the Student's CD.



1. ABCD is a parallelogram. Drag the point D to the left and then write down the lengths of the following line segments

   [AE] = _____

   [EC] = _____

   [DE] = _____

   [EB] = _____

   Is the length of [AE] = the length of [EC]? _____

   Is the length of [DE] = the length of [EB]? _____

2. ABCD is a parallelogram. Drag the point A to the right and then write down the lengths of the following line segments

   [AE] = _____

   [EC] = _____

   [DE] = _____

   [BE] = _____

   Is the length of [AE] = the length of [EC]? _____

   Is the length of [DE] = the length of [EB]? _____

3. ABCD is a parallelogram. Drag the point A to make the length of [AE] = 3

   Is the length of [AE] = [EC]? _____

   Is the length of [DE] = [EB]? _____

4. Write down in your own words what conclusion can be drawn from the answers to questions 1, 2 and 3 _____

   _____

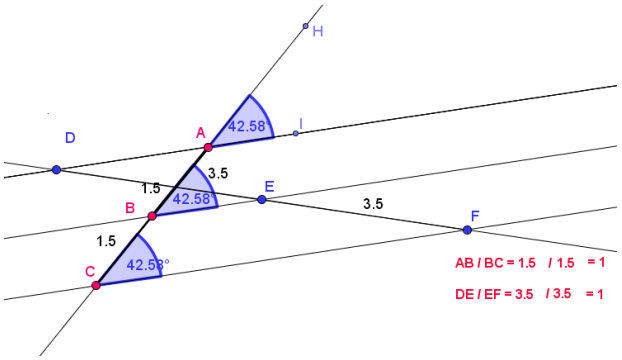
5. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

   Did you come to this conclusion? _____.

Student Activity Theorem 11

Use in connection with interactive file "Theorem 11" on the Student's CD.

(Higher Level only)



1. What is meant by parallel lines and name three sets of parallel lines in the interactive file?

   _____

2. How can you tell that the lines selected by you in Q.1 above are parallel in the interactive file? _____

   _____

3. What is meant by a transversal line and name two transversal lines in the interactive file?

   _____

4. What are the lengths of AB and BC in the interactive file? Are they equal?

   _____

5. What are the lengths of DE and EF in the interactive file? Are they equal?

   _____

   _____

6. Move the point A and see what the ratio of AB : BC is and calculate the ratio of DE: EF for the same location. Repeat for three different locations. Show calculations.

_____

_____

_____

7. Did you see a pattern develop in question 6 and if so explain it in your own words?

_____

_____

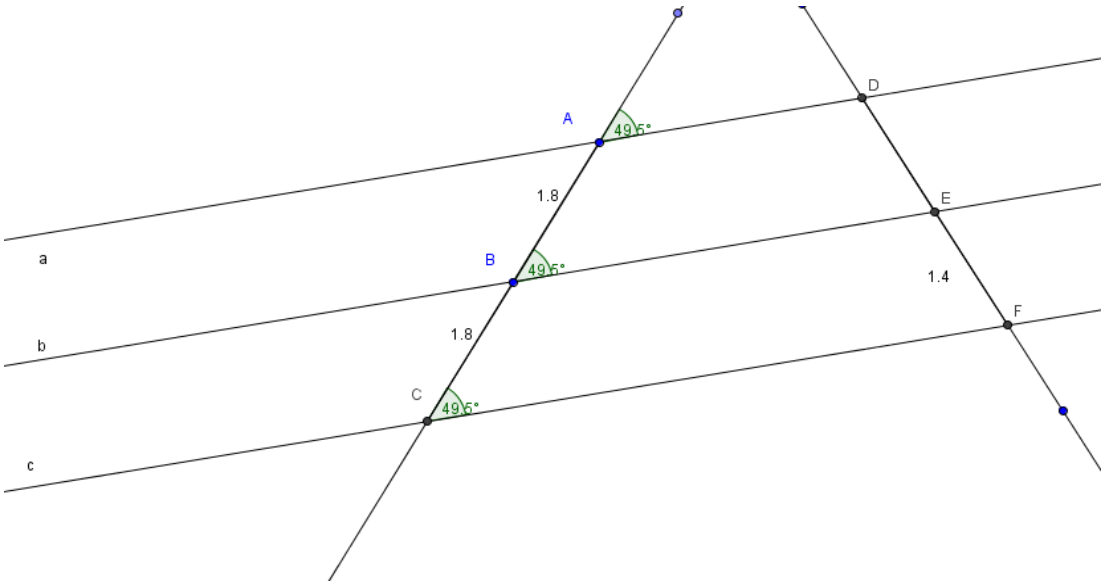
8. Click on the Tick Box to show the wording of this theorem.

Explain in your own words the meaning of this theorem._____

_____

_____

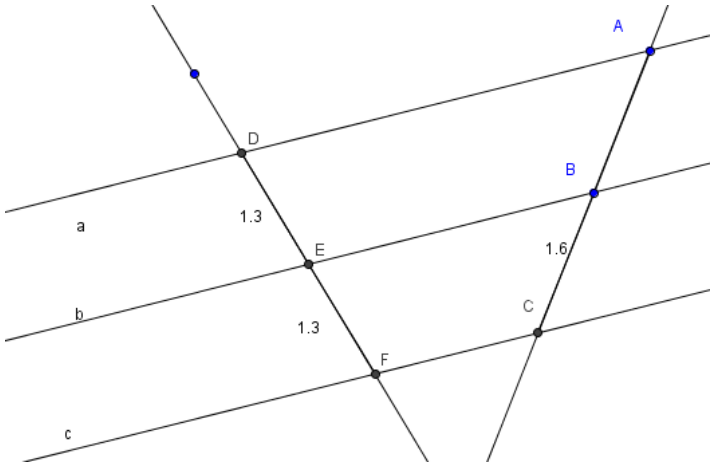
9. In the diagram below, if you know lines a, b and c are parallel, find the length of DE.



Explain your answer. _____

_____

10. In the diagram below, if you know lines a, b and c are parallel, find the length of AB.



Explain your answer. _____

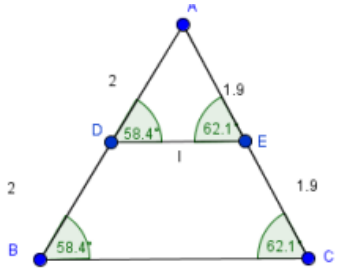
_____

_____

Student Activity Theorem 12

Use in connection with interactive file "Theorem 12" on the Student's CD.

(Higher Level only)



1. How can you tell, if the line l is parallel to the BC?

   _____

   _____

2. What is the length of AD and DB in the interactive file?

   _____

   _____

3. What is the value of AD/ DB?

   _____

   _____

4. What is the value of AE and EC and what is the value of AE/ EC?

   _____

   _____

5. Has AE/ EC the same value as AD/DB?

   _____

6. Move some of the points. What happens to the angles in the triangle ABC and the triangle ADE? Is there any relationship between them?

   _____

   _____

7. As you move the points, what happens to the ratios AE/ EC and AD/DB?

   _____

   _____

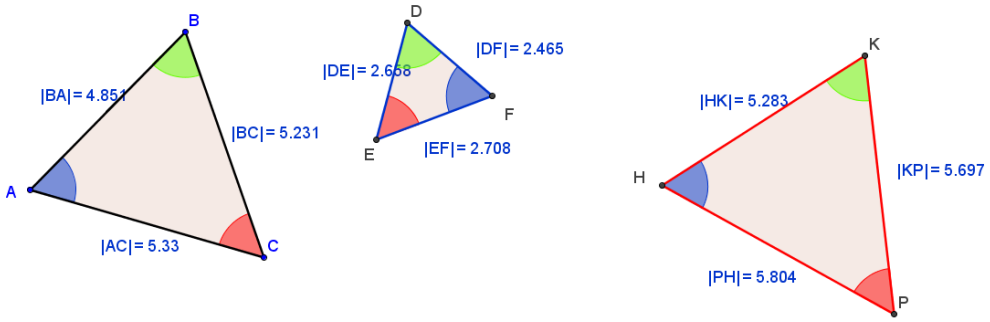
8. What can you conclude from the answers to the questions above?

   Conclusion _____

9. Click on the Tick Box on the interactive file to reveal the wording of this theorem. Did you come to this conclusion? _____.

Student Activity Theorem 13

Use in connection with interactive file "Theorem 13" on the Student's CD.



Give answers correct to two decimal places

1. The triangles ABC, DEF and HKP are equiangular. What does this mean?

   _____

2. Name the sides across from (opposite) the following equal angles

   (i) Angle BAC , Opposite Side = _____ Angle EFD , Opposite Side =_____

   Angle KHP , Opposite Side = _____

   (ii) Angle ABC , Opposite Side = _____ Angle EDF , Opposite Side =_____

   Angle HKP , Opposite Side = _____

   (iii) Angle ACB , Opposite Side = _____ Angle DEF, Opposite Side =_____

   Angle HPK , Opposite Side = _____

3. Sides across from equal angles are called corresponding sides.
   Complete the following.
   [AC] corresponds to [EF] and [HP],
   [AB] corresponds to _____ and _____,
   [BC]corresponds to _____ and _____.

4. Write down the following ratios in decimal form (correct to two decimal places).
   (i) |AC| : |EF| _____ (ii) |BC| : |DE| _____ (iii) |AB| : |DF| _____

5. Write down the following ratios in decimal form (correct to two decimal places).
   (i) |AC| : |HP| _____ (ii) |BC| : |KP| _____ (iii) |AB| : |HK| _____

6. Write down the following ratios in decimal form (correct to two decimal places).
   (i) |EF| : |HP| _____ (ii) |DF| : |HK| _____ (iii) |DE| : |KP| _____

7. Move the point B and write down the ratios in questions 4, 5 and 6 again.

(i) |AC| : |EF| _____ (ii) |BC| : |DE| _____ (iii) |AB| : |DF| _____

(i) |AC| : |HP| _____ (ii) |BC| : |KP| _____ (iii) |AB| : |HK| _____

(i) |EF| : |HP| _____ (ii) |DF| : |HK| _____ (iii) |DE| : |KP| _____

8. Move the point B again to write down the same ratios again.

(i) |AC| : |EF| _____ (ii) |BC| : |DE| _____(iii) |AB| : |DF| _____

(i) |AC| : |HP| _____ (ii) |BC| : |KP| _____(iii) |AB| : |HK| _____

(i) |EF| : |HP| _____ (ii) |DF| : |HK| _____ (iii) |DE| : |KP| _____

9. What can you conclude from the calculations above.

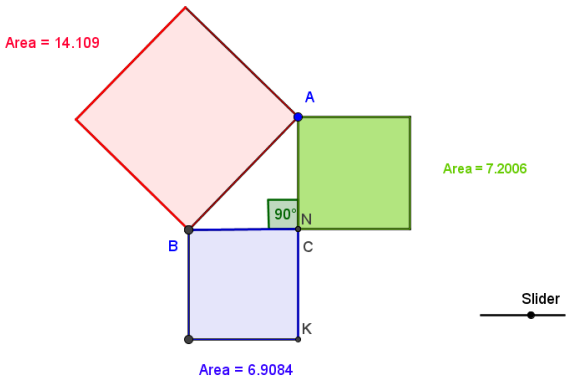
Conclusion _____

_____

10. Click on the Tick Box on the interactive file to reveal the wording of this theorem.
Did you come to this conclusion? _____.

Student Activity Theorem 14

Use in connection with interactive file "Theorem 14" on the Student's CD.



1. There are three squares built on the sides of the right angled triangle in the diagram.
   Write down the areas of the three squares.
   Red Square _____
   Blue Square _____
   Green Square _____
   Add the area of the Blue Square to the area of the Green Square
   Area of Blue Square + Area of Green Square = _____
   Does this total Area equal the Area of the Red Square? _____

2. Drag the slider to the left.
   Now write down the areas of the three squares.
   Red Square _____
   Blue Square _____
   Green Square _____
   Add the area of the Blue Square to the area of the Green Square
   Area of Blue Square + Area of Green Square = _____
   Does this total Area equal the Area of the Red Square? _____

3. Drag the slider to the right.
   Now write down the areas of the three squares.
   Red Square _____
   Blue Square _____
   Green Square _____
   Add the area of the Blue Square to the area of the Green Square
   Area of Blue Square + Area of Green Square = _____
   Does this total Area equal the Area of the Red Square? _____

4. Write down in your own words what conclusion can be drawn from the answers to questions 1, 2 and 3 _____

   _____

5. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

   Did you come to this conclusion? _____.

6. If the Area of the Red Square is a^2, the Area of the Blue Square is b^2 and the Area of the Green Square is c^2 can we conclude that

   $a^2 = b^2 + c^2$ _____

7. If the Area of the Red Square is a^2, the Area of the Blue Square is b^2 and the Area of the Green Square is c^2 can we conclude that

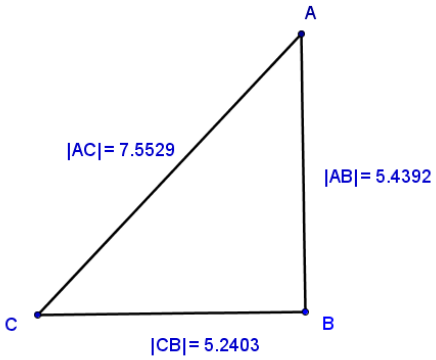
   $b^2 = a^2 + c^2$ _____

8. If the Area of the Red Square is r^2, the Area of the Blue Square is b^2 and the Area of the Green Square is g^2 can we conclude that

   $r^2 = b^2 + g^2$ _____

Student Activity Theorem 15

Use in connection with interactive file "Theorem 15" on the Student's CD.



1. Write down the lengths of the following

   |AC| = _____

   |AB| = _____

   |BC| = _____

   Using your calculator find, correct to two decimal places

   (i) $|AC|^2$ = _____ (ii) $|AB|^2$ = _____ (iii) $|BC|^2$ = _____

   Using your calculator find if $|AC|^2 = |AB|^2 + |BC|^2$ Is this true? _____

   Using this result can you write down the measure of the angle ABC.

   $|\angle ABC|$ = _____

2. Drag the point A to a different position.

   Now write down the lengths of the following

   |AC| _____

   |AB| _____

   |BC| _____

   Using your calculator find, correct to two decimal places

   (i) $|AC|^2$ = _____ (ii) $|AB|^2$ = _____ (iii) $|BC|^2$ = _____

   Using your calculator find if $|AC|^2 = |AB|^2 + |BC|^2$ Is this true? _____

   Using this result can you write down the measure of the angle ABC.

   $|\angle ABC|$ = _____

3. Drag the point A to a different position.

   Now write down the lengths of the following

   |AC| _____

   |AB| _____

   |BC| _____

   Using your calculator find, correct to two decimal places

   (i) $|AC|^2$ = _____ (ii) $|AB|^2$ = _____ (iii) $|BC|^2$ = _____

Using your calculator find if $|AC|^2 = |AB|^2 + |BC|^2$ Is this true? _____

Using this result can you write down the measure of the angle ABC.

$|\angle ABC|$ = _____

4. From the results in questions 1, 2 and 3 what can you conclude.

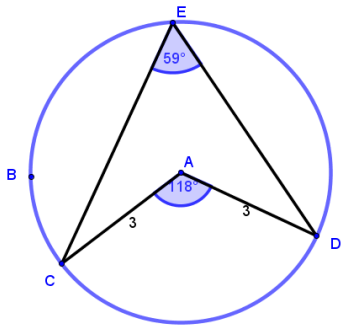
   Conclusion _____

5. Click on the Tick Box on the interactive file to reveal the wording of this theorem.
   Did you come to this conclusion? _____

Student Activity Theorem 19

Use in connection with interactive file "Theorem 19" on the Student's CD.

(Higher Level only)



1. Name the two line segments that are the radii of the circle. _____

2. Name the centre of the circle. _____

3. Move the point B around, what do you notice about the relationship between |AC| and |AD|? _____

4. Move the point D in the interactive file, so that the angle CAD is 120°.
   What is the measure of the angle CED? _____

5. Move the point D in the interactive file, so that the angle CAD is 140°.
   What is the measure of the angle CED? _____

6. Move the point D in the interactive file, so that the angle CAD is 80°.
   What is the measure of the angle CED? _____

7. Move the point D in the interactive file, so that the angle CED is 50°.
   What is the measure of the angle CAD? _____

8. Move the point D in the interactive file, so that the angle CED is 70°.
   What is the measure of the angle CAD? _____

9. What is the relationship between angle CAD and the angle CED?
   _____

10. Move B to the left and make the circle bigger, does the relationship between the angles CAD and CED change? _____Explain. _____

11. Move B to the right and make the circle smaller, does the relationship between the angles CAD and CED change? _____Explain. _____
_____

12. What can you conclude from the answers above?

    Conclusion _____

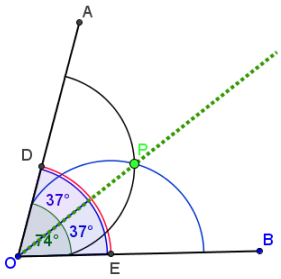
13. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

    Did you come to this conclusion? _____.

Student Activity Construction 1

Use in connection with the interactive file "construction 1" on the Student's CD.

Construction 1: To construct the bisector of any given angle, using only compass and straight edge.



1. Move the slider to the right on the interactive file to make the measure of the angle AOB = 110°.

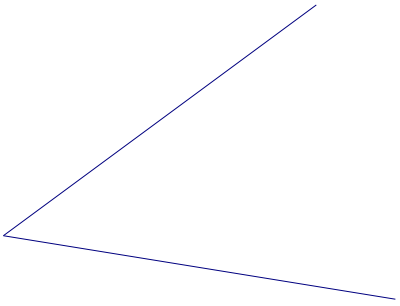
   Are the measures of the angles AOP and BOP equal? _____ Is the angle AOB bisected?

2. Move the slider to the left on the interactive file to make the measure of the angle AOB = 60°.

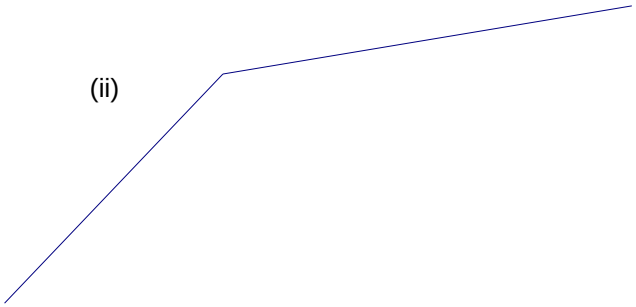
   Are the measures of the angles AOP and BOP equal? _____ Is the angle AOB bisected?

3. Bisect the following angles and then measure to verify they are bisected correctly.

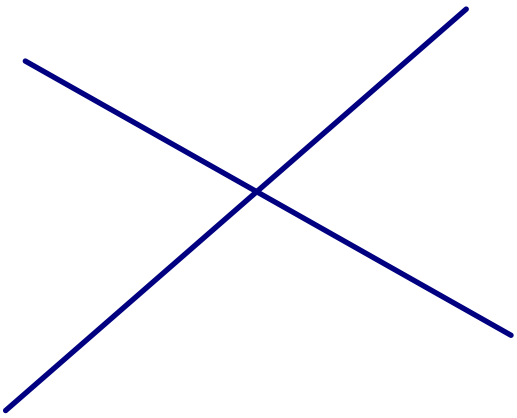
(i)



(ii)



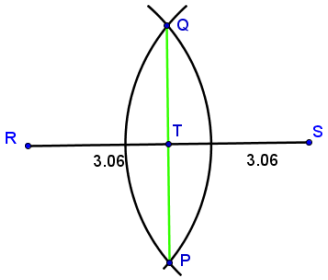
4. Bisect all 4 angles using the least number of lines and arcs.



Student Activity Construction 2

Use in connection with the interactive file "construction 2" on the Student's CD.

Construction 2: To construct the Perpendicular bisector of a segment, using compass and straight edge.



1. Move the slider to the right on the interactive file to make |RT| = 3.6.

   Is |RT| = |TS|? _____ What can we then conclude about the point T ?

   _____

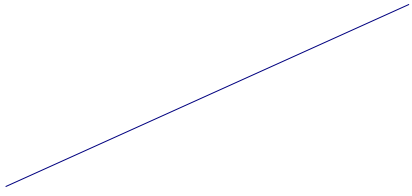
2. Move the slider to the left on the interactive file to make |TS| = 3.3.

   Is |TS| = |TR|? _____ What can we then conclude about the point T ?

_____

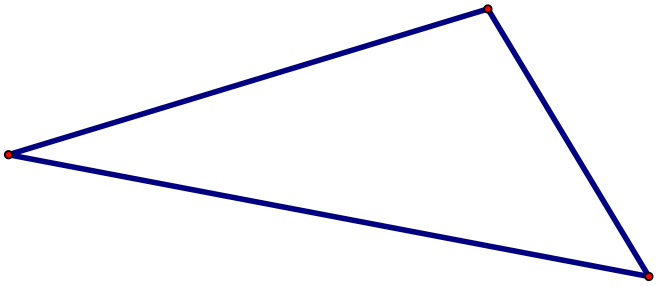
3. Construct the perpendicular Bisector of the following line segments. Verify answers

(i)



(ii)

4. Construct the perpendicular bisectors of the sides of the triangle.

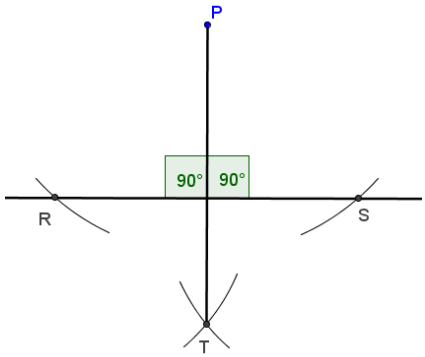


What do you notice about the three perpendicular bisectors?

Student Activity Construction 3

Use in connection with the interactive file "construction 3" on the Student's CD.

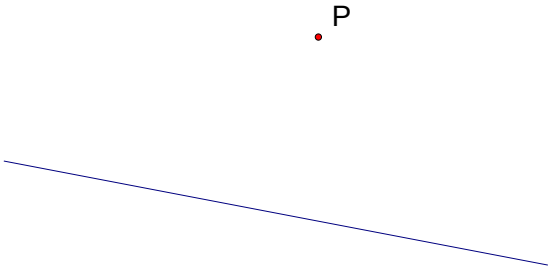
Construction 3: To construct a Line perpendicular to a given line l, passing through a given point not on l.(Compass)



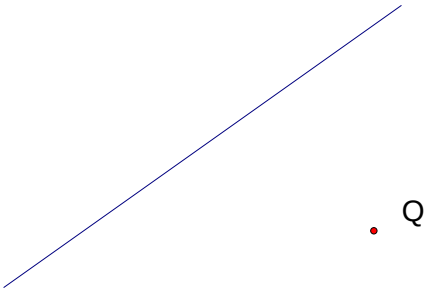
1. Construct a line through P and a line through Q perpendicular to the lines given.

   Verify the lines are perpendicular.

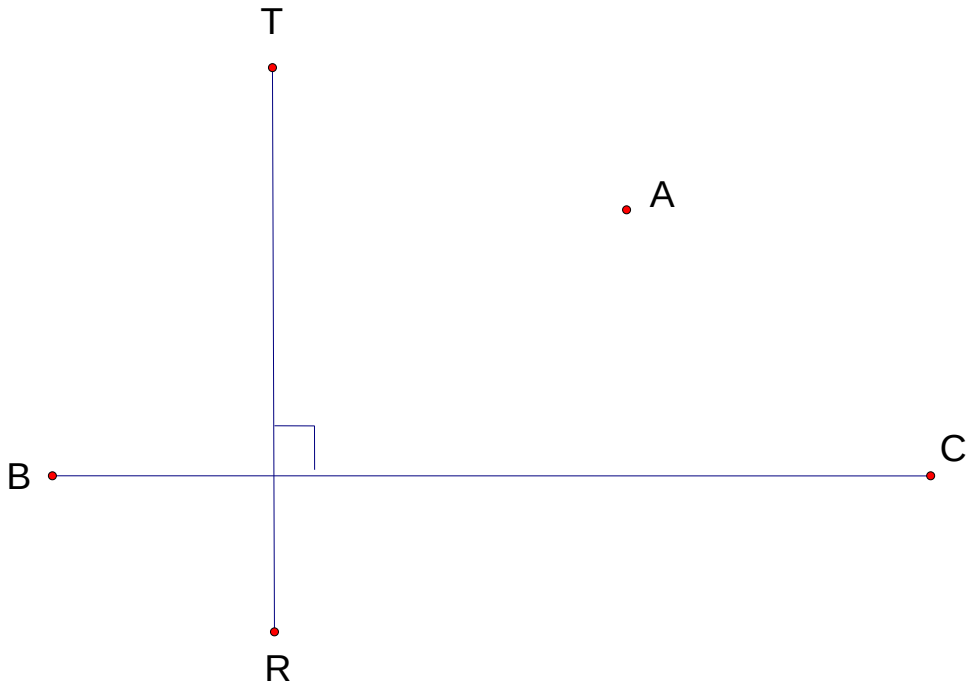
(i)



(ii)



2. Construct a line through A perpendicular to [BC] and construct a line through A perpendicular to [RT]



What do you call the resulting four sided figure? _____

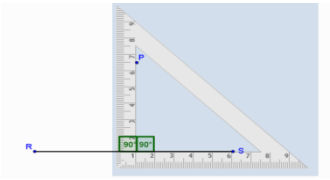
Measure the lengths of the sides of the four sided. What can you conclude?

_____

Student Activity Construction 3a

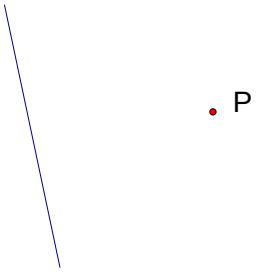
Use in connection with the interactive file "construction 3a" on the Student's CD.

Construction 3a: To construct a Line perpendicular to a given line l, passing through a given point not on l. (Set Square)

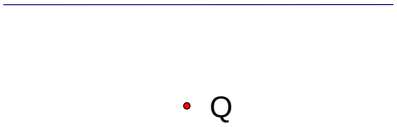


1. Construct a line through P and a line through Q perpendicular to the lines given. Verify answers.

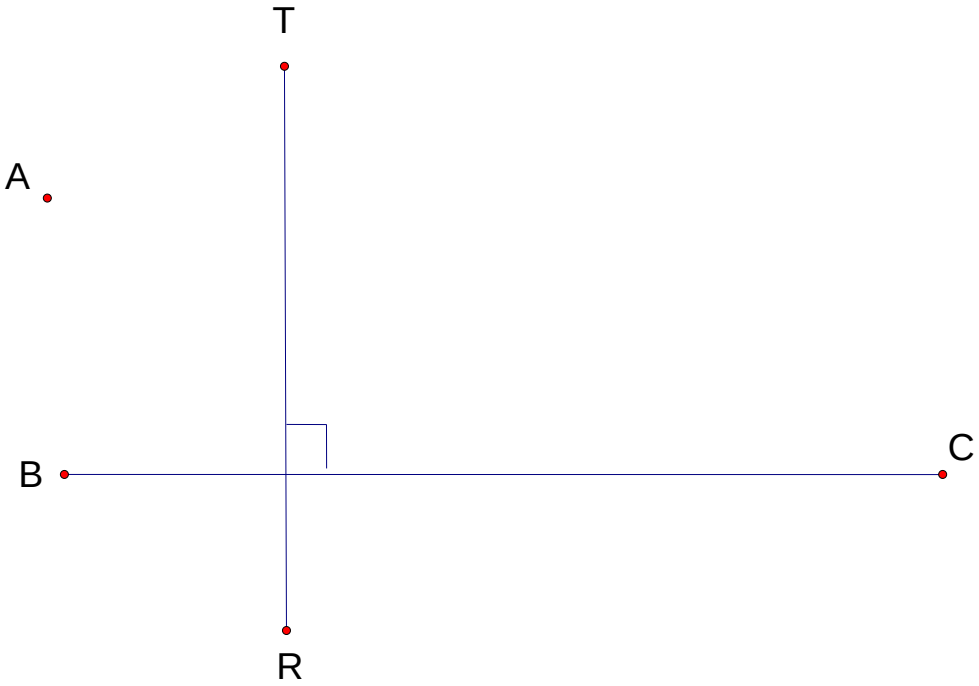
(i)



(ii)



2. Construct a line through A perpendicular to [BC] and construct a line through A perpendicular to [RT]



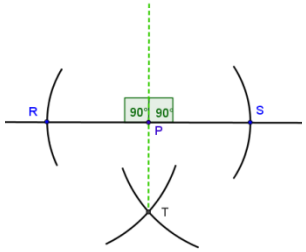
What do you call the resulting four sided figure? _____

Measure the lengths of the sides of the four sided. What can you conclude?_____

Student Activity Construction 4

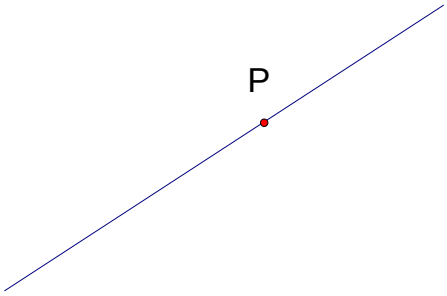
Use in connection with the interactive file "construction 4" on the Student's CD.

Construction 4: To construct a line perpendicular to a given line l, passing through a given point on l. (Compass)

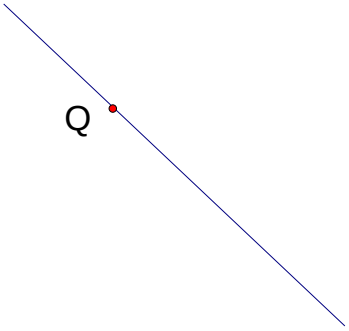


1. Construct a line through P and a line through Q perpendicular to the lines segments given. Verify answers.

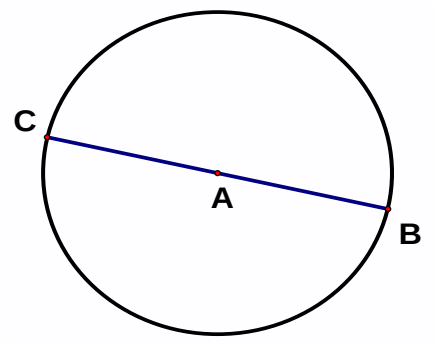
(i)



(ii)



2. Construct a line through A perpendicular to [BC] and construct a line through B perpendicular to [CB]



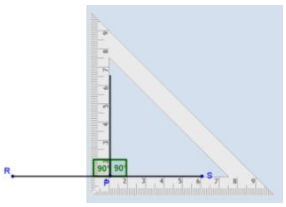
Are these perpendicular lines passing through A and B parallel? _____

Give a reason for your answer. Reason _____

Student Activity Construction 4a

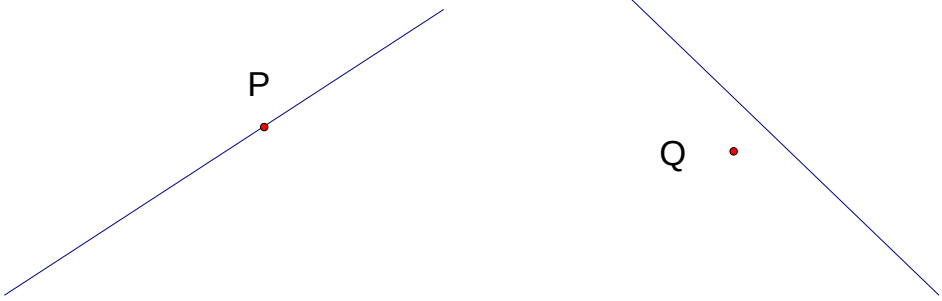
Use in connection with the interactive file "construction 4a" on the Student's CD.

Construction 4a: To construct a line perpendicular to a given line l, passing through a given point on l. (Set Square)



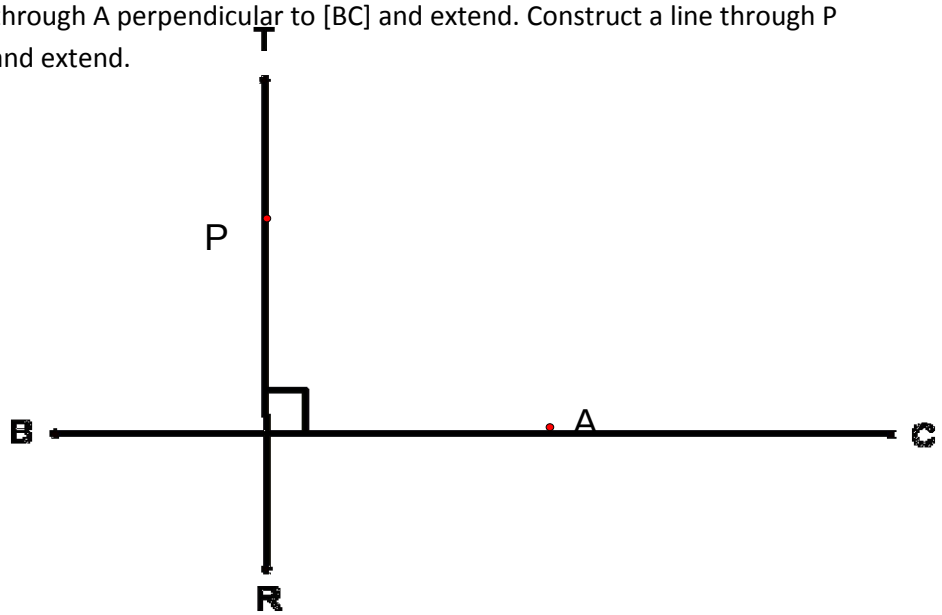
(i)

1. Construct a line through P and a line through Q perpendicular to the lines given. Verify answers.



(ii)

2. Construct a line through A perpendicular to [BC] and extend. Construct a line through P perpendicular to [RT] and extend.



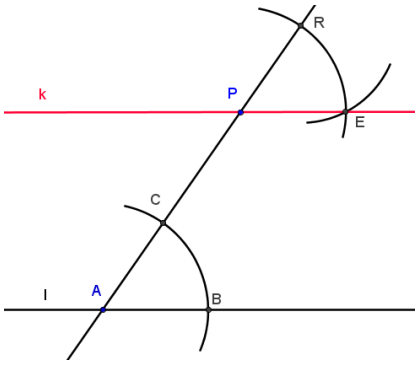
What do you call the resulting four sided figure?

Measure the lengths of the sides of the four sided. What can you conclude?

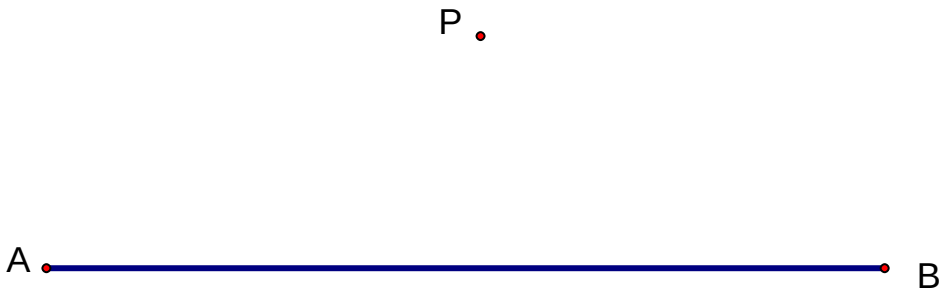
Student Activity Construction 5

Use in connection with the interactive file "construction 5" on the Student's CD.

Construction 5: To construct a line parallel to a given line, through given point.

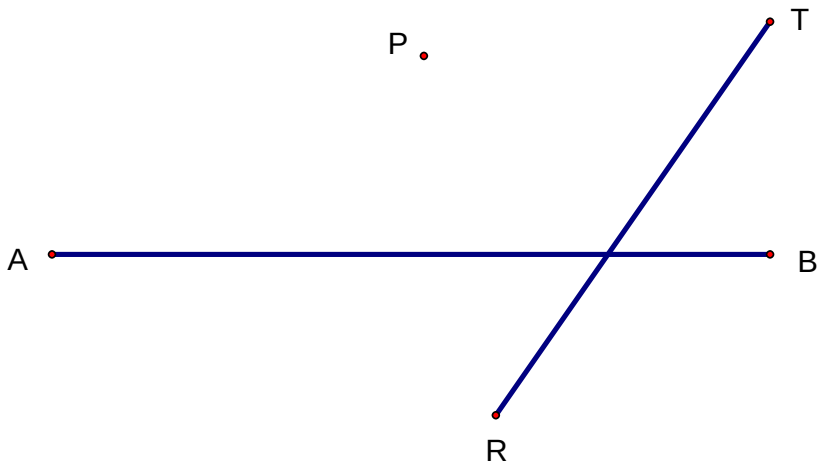


1. Construct a line through P parallel to [AB].



2. Construct a line through P parallel to [AB] and construct a line through P parallel to [RT].

   Extend these lines to form a four sided figure.



What do you call the resulting four sided figure? _____

Measure the lengths of the sides of the four sided.

What can you conclude?_____

Measure the internal angles of the four sided figure.

What conclusions can you make when you measure these angles.

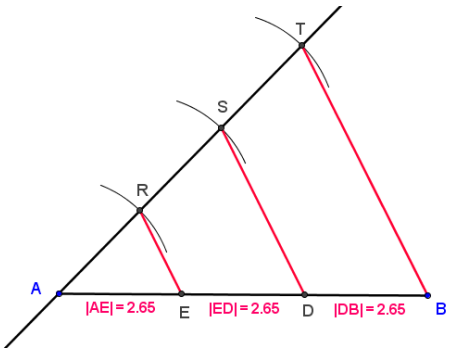
(i) _____

(ii) _____

Student Activity Construction 6

Use in connection with the interactive file "construction 6" on the Student's CD.

Construction 6: The division of a segment into 2 or 3 equal segments without measuring it.



1. Move the point B on the interactive file to make |AE| = 3. Write down the lengths of |ED| and |DB|

   |ED| = _____ |DB| = _____

2. Move the point B on the interactive file to make |AE| = 2.5. Write down the lengths of |ED| and |DB|

   |ED| = _____ |DB| = _____

   What conclusion can you draw from the answers to questions 1 and 2 above?

   Conclusion _____

3. Divide the line segment [AB] into 3 equal parts.

A B

4. If you were asked to divide the line segment [AB] above into 5 equal parts, what would you change in the text in tick box C of the interactive file?

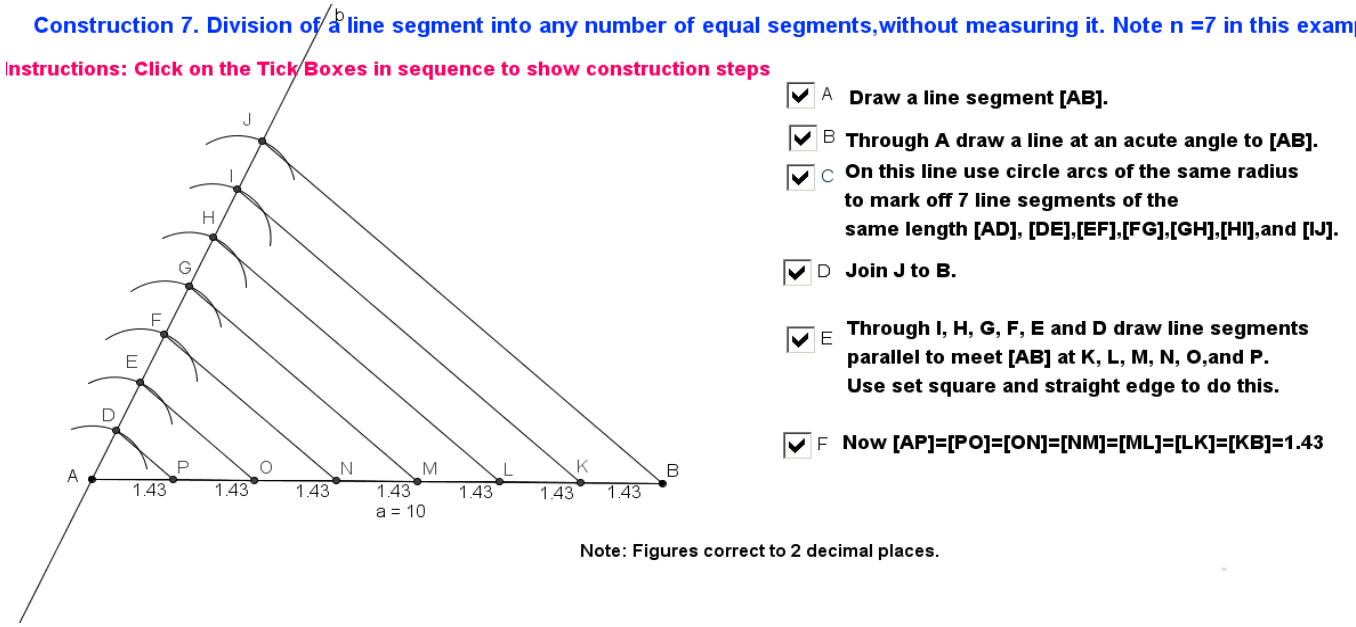
Text for Tick Box C: On this line use_____

_____

Student Activity Construction 7

Use in connection with the interactive file, 'Construction 7', on the Student's CD.

Construction 7: Division of a line segment into any number of equal segments, without measuring it.



1. Move the point B on the interactive file to make |AB| = 10. Write down the lengths of |AP|, |PO|,|ON|,|NM|, |ML|, |LK| and |KB|

   |AP| = _____ |PO| = _____

   |ON| = _____ |NM| = _____

   |ML| = _____ |LK| = _____

   |KB| = _____

2. Move the point B on the interactive file to make |AB| =7.98. Write down the lengths of |AP|, |PO|,|ON|,|NM|, |ML|, |LK| and |KB|

   |AP| = _____ |PO| = _____

   |ON| = _____ |NM| = _____

   |ML| = _____ |LK| = _____

   |KB| = _____

   What conclusion can you draw from the answers to questions 1 and 2 above?

   Conclusion

   _____

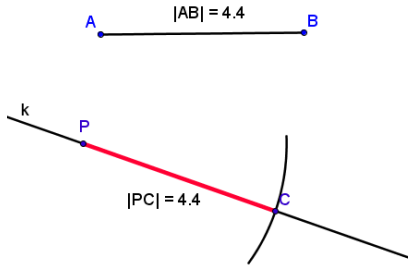
3. Divide the line segment [AB] into 7 equal parts without measuring it.

4. Divide the line segment [AB] into 5 equal parts without measuring it.

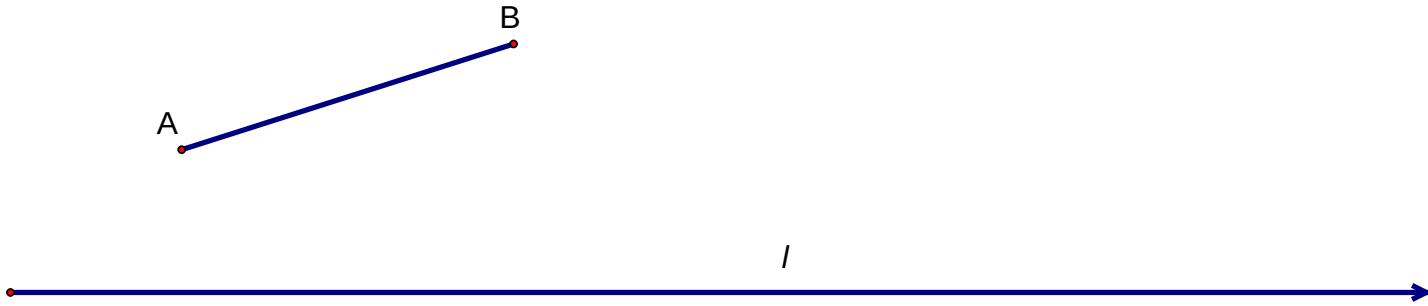
Student Activity Construction 8

Use in connection with the interactive file "construction 8" on the Student's CD.

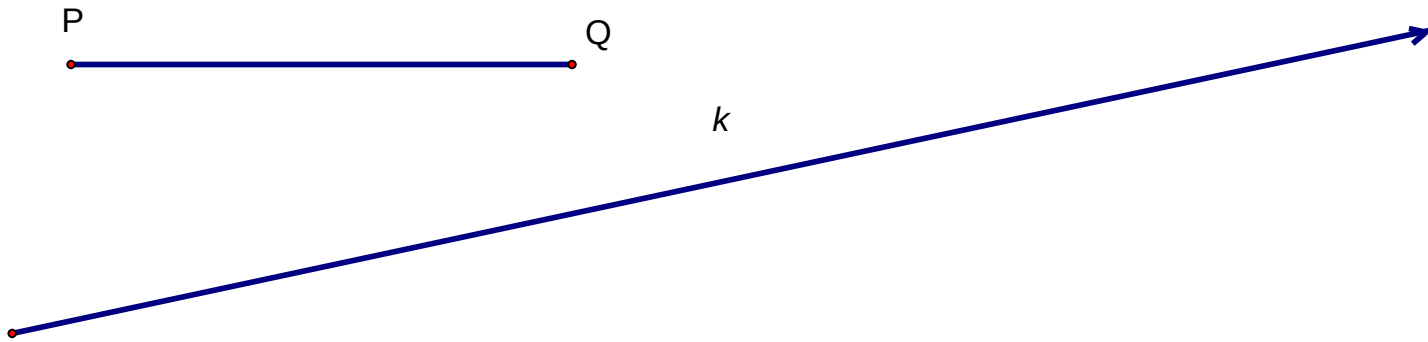
Construction 8: To construct a line segment of a given length on a given ray.



1. Mark of on the ray *l* a line segment equal in length to the line segment AB



2. Mark off on the ray *k* a line segment equal in length to the line segment PQ

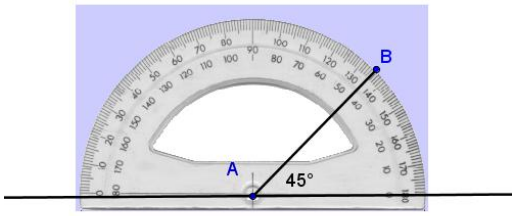


3. [RS] is a line segment on the ray *p*. Construct a copy of [RS] above and parallel to the ray *p*.

Student Activity Construction 9

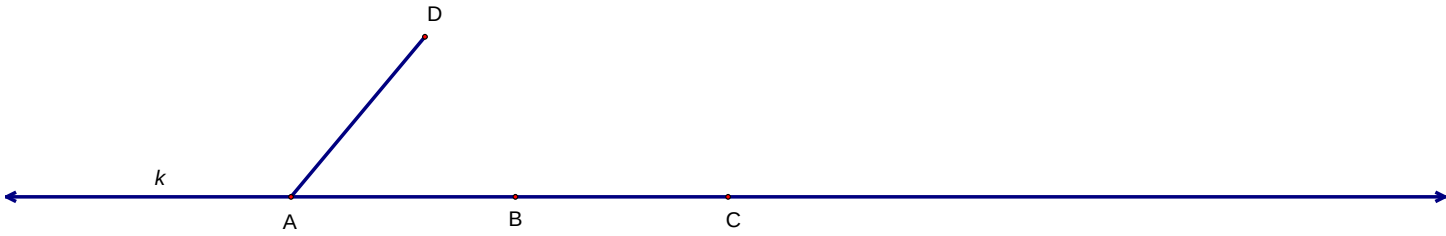
Use in connection with the interactive file "construction 9" on the Student's CD.

Construction 9: To construct an angle of a given number of degrees with a given ray as one arm.

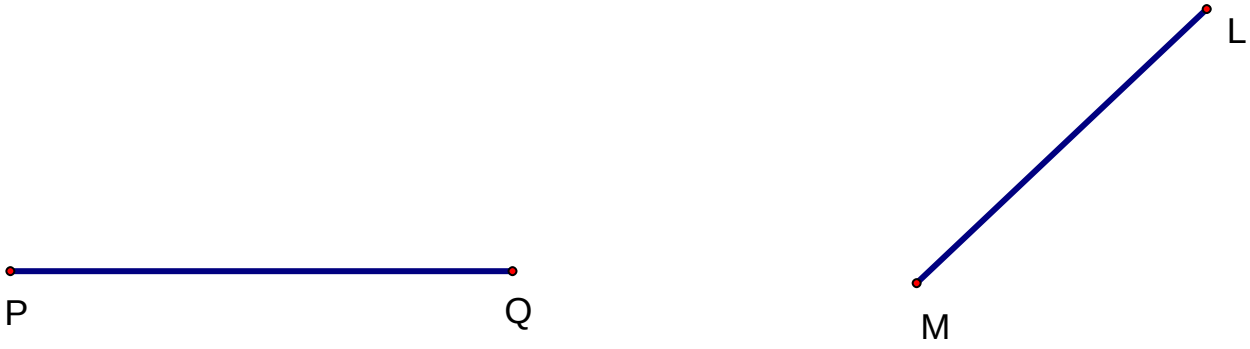


1. Measure the angle DAB. _____

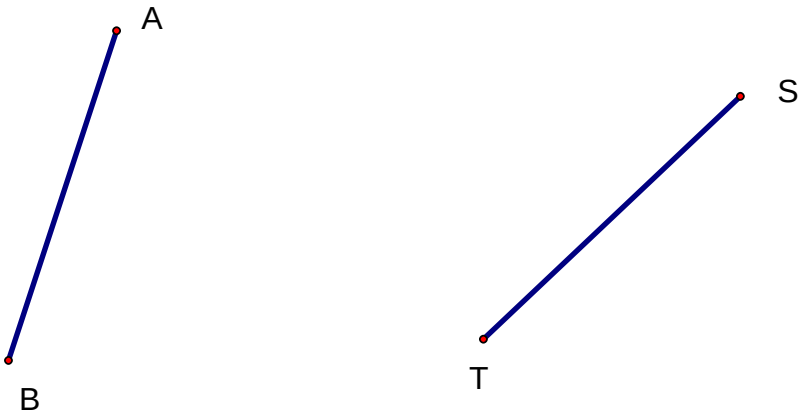
From the points B and C on the line *k* construct angles equal in measure to the angle DAB.



2. Construct angles QPR and LMO such that the measure of QPR = 63° and the measure of LMO = 75°



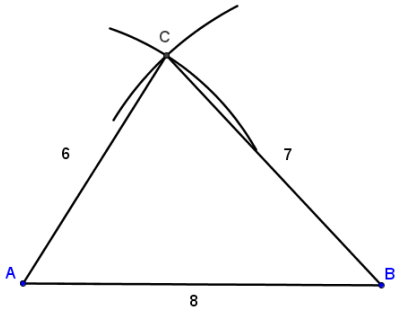
3. Construct angles ABC and STR such that the measure of ABC = 100^o and the measure of STR = 120^o



Student Activity Construction 10

Use in connection with the interactive file "construction 10" on the Student's CD.

Construction 10: To construct a triangle given lengths of three sides.



1. Construct a triangle ABC given the |AB| = 4 cm, |AC|= 5 cm and |BC|= 6 cm.

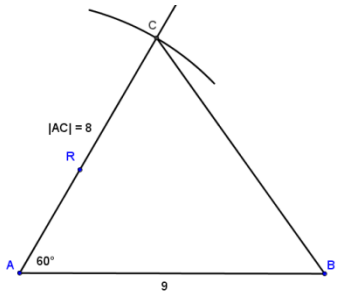
2. Construct a triangle PQR such that |PQ| = 3·5 cm, |PR| = 4·2 cm and |RQ| = 5·5 cm

3. Construct a triangle RST such that |RS| = 2·5 cm, |RT| = 3·3 cm and |ST| = 4 cm

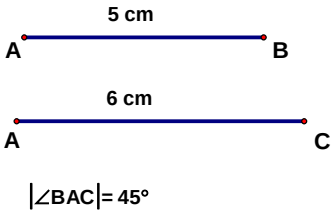
Student Activity Construction 11

Use in connection with the interactive file "construction 11" on the Student's CD.

Construction 11: To construct a triangle given SAS data.



1. Construct a triangle ABC given the lengths of two sides and one angle as shown.



2. In the triangle drawn in question 1 measure the other two angles. _____

_____

Find the sum of the three angles _____

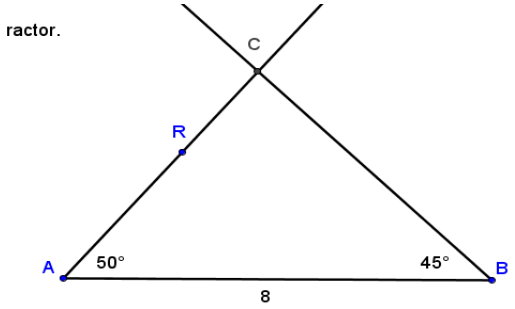
Find the measure of the third side of the triangle. _____

3. Construct a triangle PQR such that |PQ| = 4·5 cm, |QR| = 5·5 cm and |∠PQR| = 50^{o}.

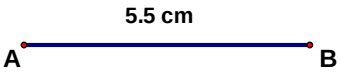
Student Activity Construction 12

Use in connection with the interactive file "construction 12" on the Student's CD.

Construction 12: To construct a triangle given ASA data.



1. Construct a triangle ABC given the lengths of two angles and one side as shown.



$|\angle ABC| = 30°$

$|\angle BAC| = 40°$

2. In the triangle drawn in question 1 measure the other angle. _____

   Find the sum of the three angles _____

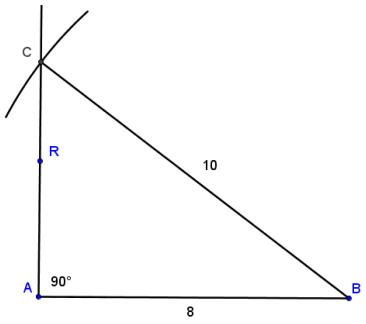
   Find the measure of the other sides of the triangle. _____ _____

3. Construct a triangle PQR such that $|PQ| = 6{\cdot}5$ cm, $|\angle RPQ| = 55^{o}$ cm and $|\angle PQR| = 50^{o}$.

Student Activity Construction 13

Use in connection with the interactive file "construction 13" on the Student's CD.

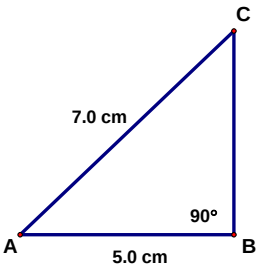
Construction 13: To construct a Right-angled triangle, given the length of the hypotenuse and one other side.



1. The triangle ABC as shown is not drawn to scale.

   Construct the a triangle ABC using the measurements

   as shown in the non scaled diagram.



2. In the triangle constructed in question 1 measure the other angles. _____

   Find the sum of the three angles _____

   Find the measure of the other side of the triangle. _____

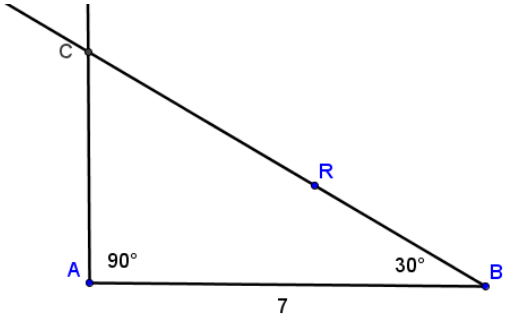
   Is $|AC|^2 = |AB|^2 + |BC|^2$ _____

3. Construct a triangle PQR such that $|PQ| = 5$ cm, $|QR| = 4$ cm and $|\angle PQR| = 90^o$.

Student Activity Construction 14

Use in connection with the interactive file "construction 14" on the Student's CD.

Construction 14: To construct a Right-angled triangle, given one side and one of the acute angles (several cases).



1. Construct a right angled triangle ABC given the lengths |AB| = 6 cm |∠ABC| = 50° and |∠ACB| = 90°.

2. In the triangle drawn in question 1 measure the other angle. _____

   Find the sum of the three angles _____

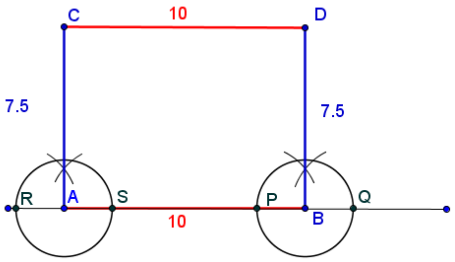
   Find the measure of the other sides of the triangle. _____ _____

3. Construct a triangle PQR such that |PQ| = 7·5 cm, |∠RPQ| = 60° cm and |∠PQR| = 90°.

Student Activity Construction 15

Use in connection with the interactive file "construction 15" on the Student's CD.

Construction 15: To construct a rectangle given side lengths. (Compass)



1. Move Slider A to change the width. Are the opposite sides still equal? _____

   Move Slider B to change the height. Are the opposite sides still equal? _____

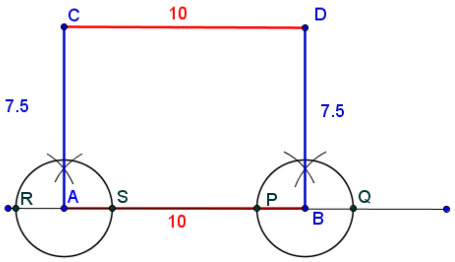
2. Construct a rectangle ABCD given |AB| = 6cm and |BC| = 7 cm.

3. Construct a rectangle PQRS given |PQ| = 8cm and given its perimeter as 24 cm in length.

Student Activity Construction 15a

Use in connection with the interactive file "construction 15" on the Student's CD.

Construction 15: To construct a rectangle given side lengths. (Compass)



1. Move Slider A to change the width. Are the opposite sides still equal? _____

   Move Slider B to change the height. Are the opposite sides still equal? _____

2. Construct a rectangle ABCD given |AB| = 6cm and |BC| = 7 cm.

3. Construct a rectangle PQRS given |PQ| = 8cm and given its perimeter as 24 cm in length.

Reflection in a Point

Use in connection with the interactive file "Reflection in a point" on the Student's CD.

1. In the interactive file, what do you notice about the size of the original cat and the size of the image?

   _____

   _____

   _____

   _____

2. Name the point of reflection for the cat.

   _____

   _____

3. What do you notice about the distance between the points BA and the points AB'? Also what do you notice about the distance between the points CA and the points AC'?

   _____

   _____

4. Move the point A and describe what happens to the image of the cat. Also describe what happens to the relationship between the distances BA and AB' and the relationship between the distance between CA and AC'.

   _____

   _____

   _____

   _____

5. What do you notice about the size of the shape F, when it is reflected in the point J?

   _____

   _____

6. What do you notice about the direction of the shape F, when it is reflected in the point J?

   _____

7. Move the point J and describe how the image of the shape F now relates to the original in both direction and size.

   _____

   _____

8. Describe how to find the image of an object in a point.

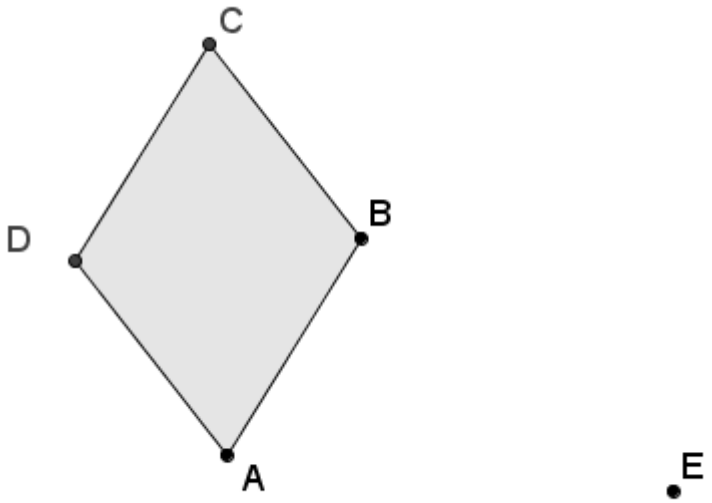
_____

_____

_____

_____

9. Find the image of the following shape in the point E.



Reflections in the x and y axis

Use in connection with the interactive file "Reflection in axes" on the Student's CD.

1. When you reflect the cat into the y axis, what do you notice about the size of the picture of the cat and the direction the cat is facing?

   _____

2. When you reflect the original cat into the x axis, what do you notice about the size of the picture of the cat and the direction the cat is facing?

   _____

3. When you reflect the shape F in the y axis, what do you notice about the shape's size and direction?

   _____

   _____

4. When you reflect the shape F in the x axis, what do you notice about the shape's size and direction?

   _____

   _____

5. Move the points A, B or C, what do you now notice about the reflection in the x axis?

   _____

   _____

6. Move the points A, B or C, what do you now notice about the reflection in the y axis?

   _____

   _____

7. Describe how to reflect something in the y axis?

   _____

   _____

10. Describe how to reflect something in the x axis?

Student Activity Translation

Use in connection with the interactive file "Translation" on the Student's CD.

1. In the interactive file, what do you notice about the size of the original cat and the size of the image?

   _____

   _____

2. In the interactive file what do you notice about the direction of the original cat and the direction of the image?

   _____

   _____

3. Move the point A and as the translation changes, record what you notice about the size and direction of the image?

   _____

   _____

4. What is the effect of moving point A or point B on the interactive file?

   _____

   _____

5. As you move the points I and J, what effect has it on the size and direction of the shape F?

   _____

   _____

6. Describe what is meant by a translation and how the image and the original compare in terms of size and direction.

   _____

   _____

Quiz on Triangles

Use in connection with the interactive file "Quiz on Triangles" on the Student's CD.

1. A triangle has 2 right angles.
   A. Always true
   B. Sometimes true
   C. Never True
2. A triangle has an obtuse angle.
   A. Always true
   B. Sometimes true
   C. Never True
3. If I know the size of 2 angles in a triangle, I can work out the size of the third angle.
   A. Always true
   B. Sometimes true
   C. Never True
4. A triangle can have 2 obtuse angles.
   A. Always true
   B. Sometimes true
   C. Never True
5. If I know the size of 1 angle in a triangle I can work out the size of the other two angles.
   A. Always true
   B. Sometimes true
   C. Never True
6. A triangle has all angles the same size.
   A. Always true
   B. Sometimes true
   C. Never True
7. A triangle has at least 2 acute angles.
   A. Always true
   B. Sometimes true
   C. Never True

8. A right angled triangle is also isosceles.
   A. Always true

   B. Sometimes true

   C. Never True

9. A scalene triangle is also a right-angled triangle.
   A. Always true

   B. Sometimes true

   C. Never True

10. In a triangle there is 1 angle which is bigger than the sum of the other 2 angles.
   A. Always true

   B. Sometimes true

   C. Never True

11. An equilateral triangle is also an isosceles triangle.
   A. Always true

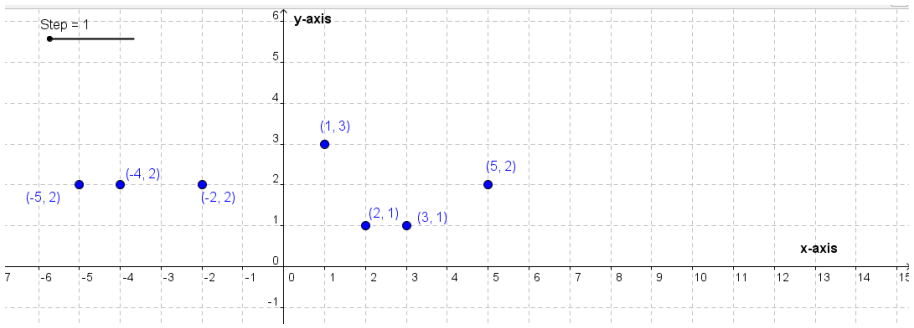
   B. Sometimes true

   C. Never True

Student Activity on Axes and Quadrants

Use in connection with the interactive file "Axes and Quadrants" on the Student's CD.

To explore the relationship between the coordinates of points and the plane



The slider called "Step" is used to change the information on the screen.

To start set the slider to "Step = 1"

1. Move all the blue dots to the x-axis. What do you notice about the coordinates of all the points?_____

_____

2. Move all the blue dots to the y-axis. What do you notice about the coordinates of all the points?_____

_____

3. How many points are on the x-axis?_____

4. How many points are on the y-axis?_____

5. How many points are on the x-axis **and** the y-axis?_____

6. Write down the coordinates of this point?_____

7. The point where the x-axis and y-axis meets has a name. Write down this name if you know it._____

8. Move "Step" along so it says "2". The x-axis and y-axis divide the plane into a certain number of parts. How many parts?_____

9. Each of these parts is called a quadrant. Move the blue point around. The text beside the point should tell where the point is. Can you think of any possible reason why the first quadrant is where it is?_____

10. There are lots of points that aren't in any quadrant. If a point is not in any of the quadrants it must be where? _____

11. Move "Step" along so it says "3".

What is the same for all points on the x-axis?_____

What is the same for all points on the y-axis?_____

Write down the coordinates of the origin._____

Complete the following sentences:

(a) All points in the first quadrant_____

_____

(b) All points in the second quadrant_____

_____

(c) All points in the third quadrant_____

_____

(d) All points in the fourth quadrant_____

_____

(e) All points on the x-axis_____

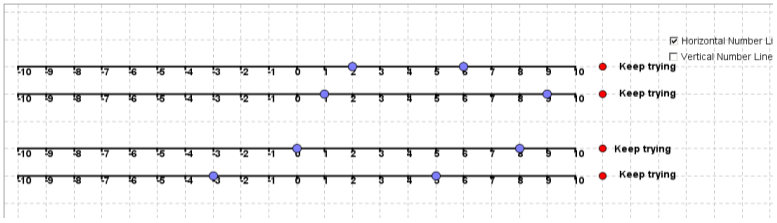
_____

(f) All points on the y-axis_____

Student Activity on Midpoint

Use in connection with the interactive file "Midpoint" on the Student's CD.

To explore the midpoint of two points that are on horizontal and vertical number lines



1. For each number line move the red dots to the midpoint of the blue dots

2. Fill in the table for all the horizontal number lines:

Column 1	Column 2	Column 3	Column 4	Column 5
Number where the left blue dot is	**Number where the right blue dot is**	**Mean of the two numbers**	**Number where the red dot is when you move it to the midpoint**	**Are the answers in columns 3 and 4 the "same" or "different"?**
2	6	$\text{Mean} = \frac{2+6}{2} = \frac{8}{2} = 4$		
1	9			
0	8			
–9	–1			

3. Untick the "Horizontal Number Lines" box and tick the "Vertical Number Lines" box.

4. For each number line move the red dots to the midpoint of the blue dots

5. Fill in the table for all the vertical number lines:

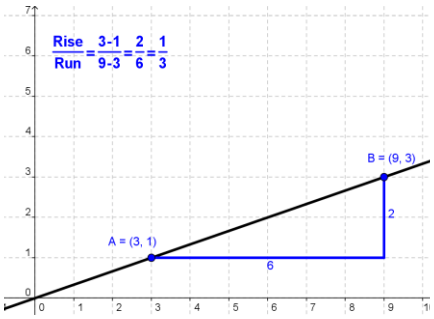
Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
Number where the bottom blue dot is	**Number where the top blue dot is**	**Mean of the two numbers**	**Number where the red dot is when you move it to the midpoint**	**Are the answers in columns 3 and 4 the "same" or "different"?**
2	8	$\text{Mean} = \frac{2+8}{2} = \frac{10}{2} = 5$		
1	7			
-1	3			
1	5			

6. If you were organising a cycle race that started in one town and ended in a town 40km away and you felt it was a good idea to have one water station somewhere along the route where would you place the water station?_____

Student Activity on Slope

Use in connection with the interactive file "Slope" on the Student's CD.

To explore the properties of slopes



The slider called "Step" is used to change the information on the screen.

To start set the slider to "Step = 1"

1. The Line x – 3y=0 has been plotted. Let's take a look at two points on this line, the points (3,1) and (9,3). To get from (3,1) to (9,3) how many units do you need to move up?__
2. This number is called the RISE. The RISE is_____
3. To get from (3,1) to (9,3) how many units do you need to move across?_____
4. This number is called the RUN. The RUN is_____
5. The ratio between the rise and the run is called the SLOPE.
6. The Slope = $\frac{\text{Rise}}{\text{Run}} = \_\_\_\_ = \_\_\_\_$
7. Looking at the points, which values do you compare to work out the RISE?_____

   _____
8. Looking at the points, which values do you compare to work out the RUN?_____

9. Move the “Step” slider to 2.

10. Move the two blue dots over any two black dots. Take note of the slope and try two different black dots. What do you notice about the slope between any two points on the line?_____

_____

11. Move the “Step” slider to 3. Drag the points round creating many different lines that all go upwards from left to right. What is always true about the slopes of these lines?_____

_____

12. Drag the points round creating slopes that go downward from left to right. What is always true about the slopes of these lines?_____

13. What is the slope of a line that doesn’t go up or down?_____

14. If you keep the rise the same and increase the run describe what happens to the slope?_____

15. If you keep the rise the same and decrease the run describe what happens to the slope?_____

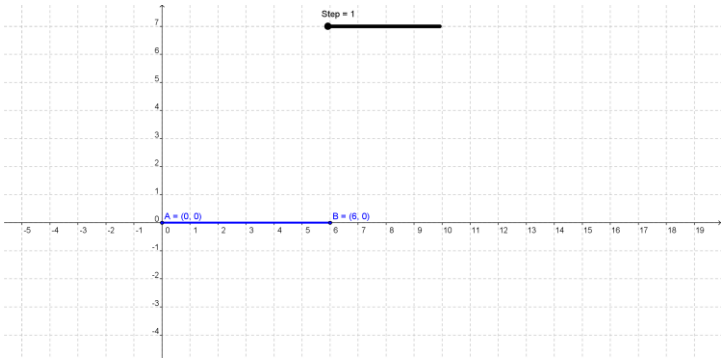
16. If you keep the run the same and decrease the rise describe what happens to the slope?_____

17. Move the “Step” slider to 4, 5, 6 etc. and adjust the sliders to calculate the slope between the two points you are given. **Note:** Try and do a couple of these questions without using the “Hint”.

Student Activity on Distance

Use in connection with the interactive file "Distance" on the Student's CD.

To explore how to work out the distance between two points



The slider called "Step" is used to change the information on the screen.

To start set the slider to "Step = 1"

1. With the slider "Step" at 1, write down the distance between the points A and B._____

2. Move "Step" along so it says "2".

   Write down the distance between the points C and D._____

3. Move "Step" along so it says "3".

   Write down the distance between the points E and F._____

4. Move "Step" along so it says "4". By working out the distances $|PQ|$ and $|QR|$ write down the distance between the points P and R._____

5. Move "Step" along so it says "5". By working out the distances $|UT|$ and $|TS|$ write down the distance between the points U and S._____

6. The distances you've found so far have all been either horizontal distances or vertical distances. Calculating diagonal distances involves using the skills you have just practiced and Pythagoras' Theorem. Move "Step" along so it says "6".

   Write down the distance between the points A and C._____

   Write down the distance between the points B and C._____

   The triangle ABC is a right angled triangle and we have two sides of the right angled triangle. Use Pythagoras' Theorem to calculate $|AB|$.

   _____

   _____

   _____

7. Move "Step" along so it says "7".

   Write down the distance between the points D and F._____

   Write down the distance between the points E and F._____

   The triangle DEF is a right angled triangle and we have two sides of the right angled triangle. Use Pythagoras' Theorem to calculate $|DE|$

   ._____

   _____

8. Move "Step" along so it says "8". Move the point R so that the triangle PQR is right-angled (and the base of the triangle is horizontal).

   Write down $|PR|$._____Write down $|QR|$._____

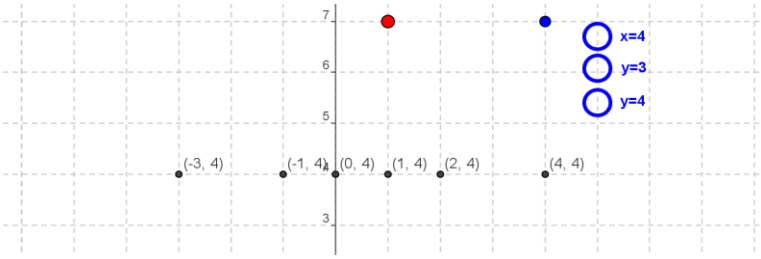
   Calculate the distance $|PQ|$._____

   _____

Student Activity on Lines Parallel to the Axes

Use in connection with the interactive file "Lines Parallel to the Axes" on the Student's CD.

To explore the properties of lines parallel to the axes



The slider called "Step" is used to change the information on the screen.

To start set the slider to "Step = 1"

1. What is common to all the points labelled on the screen?_____

   _____

2. Write down another point on this line?_____

3. Check your answer by moving the red dot onto the point you have just written down.

4. Move the green dots that have just appeared. What do you notice about the coordinates of the dots?_____

   _____

5. What line is this green line parallel to?_____

6. Move the blue dot into the circle that you think is the equation of this line.

7. Move the "Step" slider to 2. What is common to all the points shown on the screen?_____

8. Write down another point on this line?_____

9. Check your answer by moving the red dot onto the point you have just written down.

10. Move the green dots that have just appeared. What can you notice about the coordinates of the dots? _____

_____

11. What is this line parallel to?_____

12. Move the blue dot into the circle that you think is the equation of this line.

13. Move the "Step" slider to 3. Take a look at the equation of the line and the points on the line. What do you notice?_____

14. Drag the line downwards so that the equation is y=1. Write down all the points that are shown on the line_____

15. Drag the line downwards so that the equation is y=0. Write down all the points that are shown on the line_____

16. Write down another name for this line_____

17. The lines y=3, y=1, y=0, y=–3 are all..._____

18. Move the "Step" slider to 4. Take a look at the equation of the line and the points on the line. What do you notice?_____

19. Drag the line to the left so that the equation is x=1. Write down all the points that are shown on the line._____

20. Drag the line downwards so that the equation is x=0. Write down all the points that are shown on the line._____

21. Write down another name for this line._____

22. The lines x=3, x=1, x=0, x=–3 are all..._____

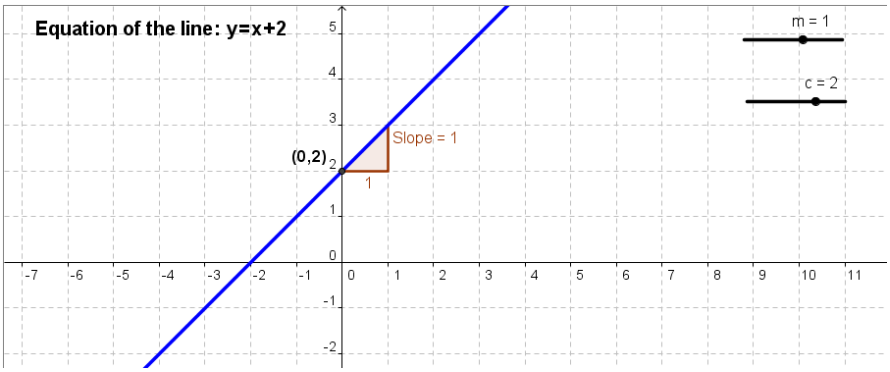
23. Write down the equation of the line that passes through (2,4) and (2,-7)._____

24. Write down the equation of the line that passes through (3,5) and (-2,5)._____

Student Activity on Equation of a Line

Use in connection with the interactive file "Equation of a Line" on the Student's CD.

To explore equations of a line in the form y=mx+c



1. Move the slider m. What happens the slope of the line as m increases?_____

_____

2. Move the slider m. What happens the slope of the line as m decreases?_____

_____

3. Move the slider m. When m is positive describe the line_____

_____

4. Move the slider m. When m is negative describe the line_____

_____

5. Move the slider m. When m=0 describe the line_____

_____

6. Which part of the equation of the line is related to the slider m?_____

_____

7. Move the slider c. What happens the line as c increases?_____

_____

8. Move the slider c. What happens the line as c decreases?_____

_____

9. Move the slider c. Compare the value of c to the point where the line crosses the y-axis.

   Describe the relationship between c and this point (the y-intercept)?

_____

_____

10. Which part of the equation of the line is related to the slider c?_____

_____

11. The equation of a line is y = 2x+3. Write down the slope of this line_____

12. Write down the point where the line y = 2x+3 crosses the y-axis_____

13. Keeping c = 0, move the slider m. Describe what is special about the lines that have

    c=0_____

14. The equation of a line is y = 5x. Write down the slope of this line_____

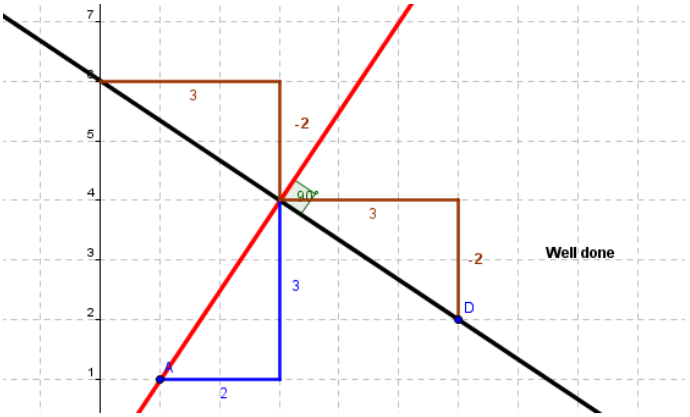
15. Write down the coordinates of the point where the line y =5x crosses the y-axis_____

16. **If you've completed "Student Activity on Slope" you should try the file "Constructing a Line Quiz 2" to test what you have just learned.**

Student Activity Perpendicular Lines

Use in connection with the interactive file "Perpendicular Lines" on the Student's CD.

To investigate if we can find the relationship between perpendicular lines.



The slider called "Step" is used to change the information on the screen.

To start set the slider to "Step = 1"

If the "rise" is really a "fall" (going down) then use a negative number for the fall

1. In terms of slope, write down the "run" of the line a._____
2. In terms of slope, write down the "rise" of the line a._____
3. **Write down the slope of a.**_____
4. Adjust the blue dot to make the line b perpendicular to a.

   In terms of slope, write down the "run" of the line b._____
5. In terms of slope, write down the "rise" of the line b._____
6. **Write down the slope of b.**_____

Move the "Step" slider to 2.

7. In terms of slope, write down the "run" of the line a._____

8. In terms of slope, write down the "rise" of the line a._____

9. **Write down the slope of a.**_____

10. Adjust the blue dot to make the line b perpendicular to a.

    In terms of slope, write down the "run" of the line b._____

11. In terms of slope, write down the "rise" of the line b._____

12. **Write down the slope of b.**_____

Move the "Step" slider to 3.

13. In terms of slope, write down the "run" of the line a._____

14. In terms of slope, write down the "rise" of the line a._____

15. **Write down the slope of a.**_____

16. Adjust the blue dot to make the line b perpendicular to a.

    In terms of slope, write down the "run" of the line b._____

17. In terms of slope, write down the "rise" of the line b._____

18. **Write down the slope of b.**_____

Move the "Step" slider to 4.

19. In terms of slope, write down the "run" of the line a._____

20. In terms of slope, write down the "rise" of the line a._____

21. **Write down the slope of a.**_____

22. Adjust the blue dot to make the line b perpendicular to a.

    In terms of slope, write down the "run" of the line b._____

23. In terms of slope, write down the "rise" of the line b._____

24. **Write down the slope of b.**_____

25. **What can you conclude from the answers above?**_____

    _____

    _____

    _____

    _____

26. **Move the "Step" slider to 5. Note:** Don't move the blue dot yet.

27. Write down the slope of a._____

28. Write down the slope of the line perpendicular to a._____

29. Adjust the blue dot to check your answer to the previous question.

30. Move the "Step" slider to 6, 7, 8, 9, 10 and 11 and check can you work out the slope perpendicular to a and then afterwards check your answers by moving the blue dot.

31. Move the "Step" slider to 12 and 13 see can you form a perpendicular slope at a point that isn't on the line. **Hint:** Look at the Rise and Run and your answer to Q.25