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

- **Student Activities written to match the I.T. interactive modules on the Project Maths Leaving 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 Leaving 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 Leaving 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

Table of Contents

Instructions for use

This booklet contains student activities to accompany the majority of the interactive files on the Leaving 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.

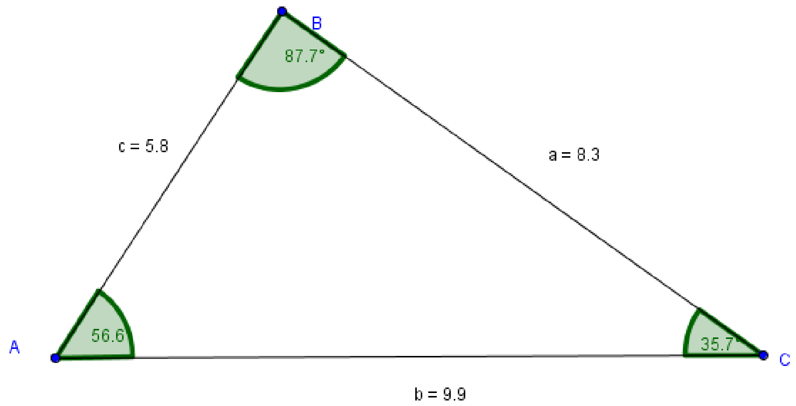
Student Activity Theorem 7

Use in connection with the interactive file "Theorem 7" on the Student's CD.

To investigate:

(iii) **The relationship between the angle opposite the greater of two sides and the angle opposite the lesser of two sides.**

(iv) **The side opposite the greater of two angles and the side opposite the lesser of two angles.**



1. While viewing the interactive file, compare the length of side a and side b. Which of these two lengths is the greater and is the angle opposite this side greater than or smaller than the angle opposite the other side?

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2. While viewing the interactive file, compare the length side a and side c. Which of these two lengths is the greater and is the angle opposite this side greater than or smaller than the angle opposite the other side?

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3. While viewing the interactive file, compare the length side b and side c. Which of these two lengths is the greater and is the angle opposite this side greater than or smaller than the angle opposite the other side?

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4. Move either of the points A, B or C in the interactive file. Now compare any two of the sides in the new triangle. Which side is the greater and is the angle opposite this side greater than or smaller than the angle opposite the other side? Repeat for different points.

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5. What pattern has emerged in questions 1-4 in connection with the greater of 2 sides and the angle opposite this side?

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6. Click the reset button on the right of the screen  , which angle is the biggest in the interactive file and is it opposite the biggest side? Now move the points A, B or C and check if this is always the case. Explain your answer.

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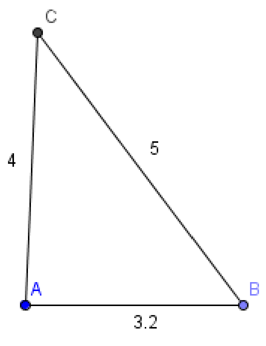
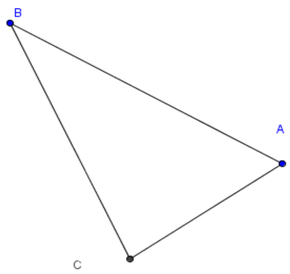
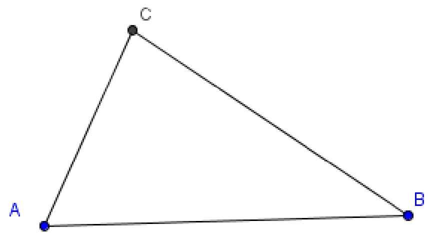
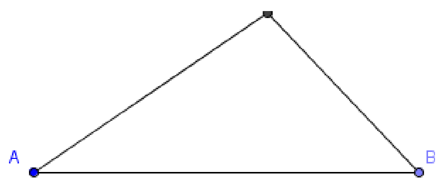
7. Measure and show the value of all the angles and the lengths of the sides (if not shown) in the following triangles and determine, if the greater angle is opposite the greater side in each case.



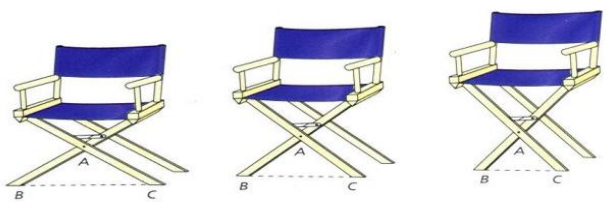






Challenge

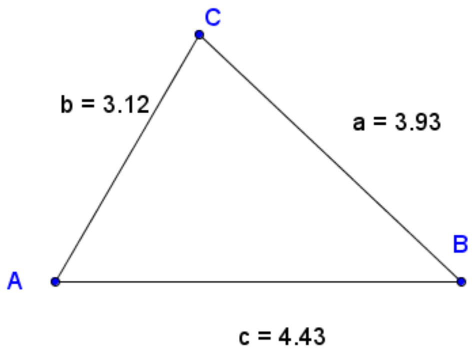
8. Which of these chairs is the most stable? Explain why you choose this chair.



Student Activity Theorem 8

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

To explore the relationship between any two sides of a triangle and the third side.



1. While viewing the interactive file, find the sum of the lengths of side a and side b and check if this sum is greater than the length of side c. Show calculations.

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2. While viewing the interactive file, find the sum of the lengths of side b and side c and check if this sum is greater than the length of side a. Show calculations.

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3. While viewing the interactive file, find the sum of the lengths of side a and side c and check if this sum is greater than the length of side b. Show calculations.

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4. Move the points A, B or C and find the sum of the lengths of any two sides in the triangle. Investigate if this sum is greater than the length of the third side. Show calculations.

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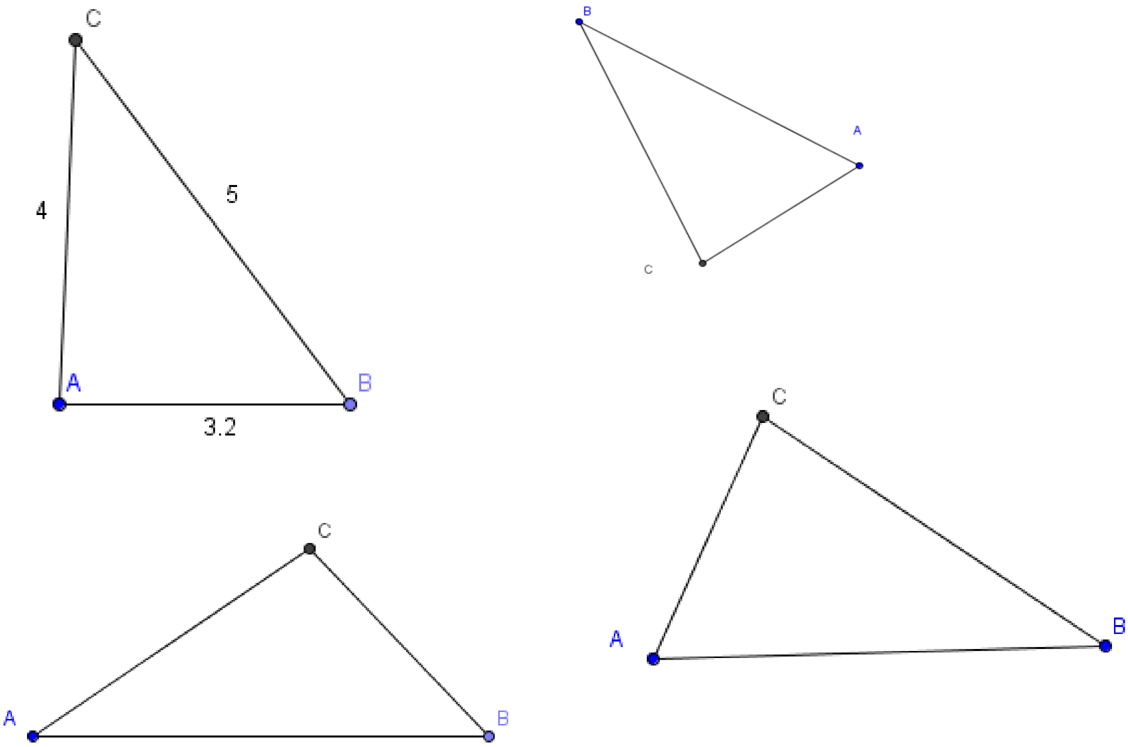
5. Repeat no 4 twice.

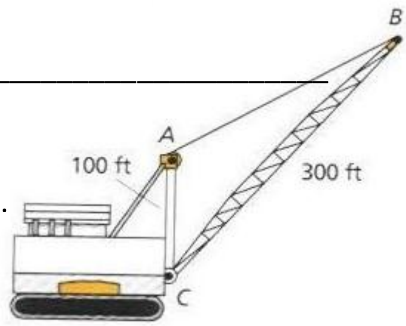
6. Measure the lengths of the sides (if not shown) in the following triangles and determine if the sum of the lengths of any two sides is in all cases greater than the length of the third side. Show calculations.



Challenge

7. Two sides of a triangle measure 12 cm and 8 cm respectively. What is the range of values for the third side of the triangle?

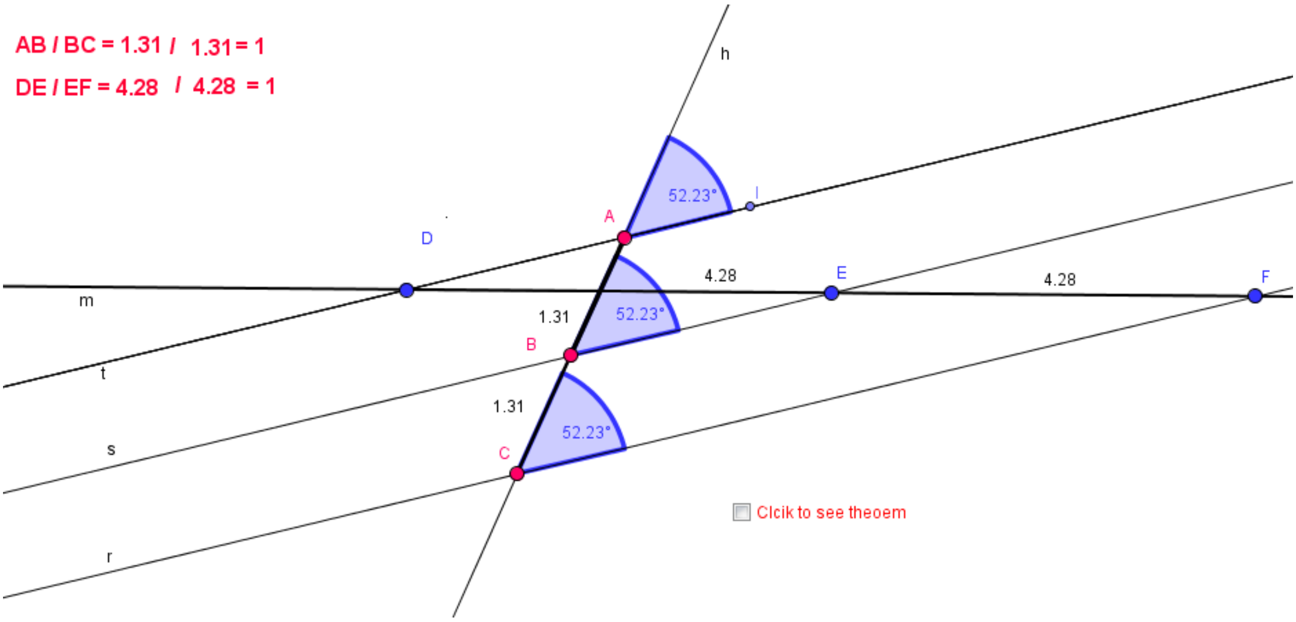
8. The mast of a crane (AC) is 100ft in height.
By adjusting the length of the cable, (from A to B) the operator of the crane can raise and lower the boom.
What is the minimum distance possible from A to B?



Student Activity Theorem 11

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

To investigate whether, if three parallel lines cut off equal segments on some transversal line, they cut off equal segments on any other transversal.



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

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2. How can you tell that the lines r, s and t are parallel in the interactive file?

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

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

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

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6. Move the point A in the interactive file and read the lengths of $|AB|$ and $|BC|$. What is the relationship between the lengths of $|AB|$ and $|BC|$? Now without moving any points find the lengths of $|DE|$ and $|EF|$ and find the relationship if any between them. Repeat for three different locations. Show calculations.

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

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8. By moving the points on the interactive file, can you find any situation where the statement “If three parallel lines cut off equal segments on some transversal line, then they will cut off equal segments on any other transversal” is not true. Explain.

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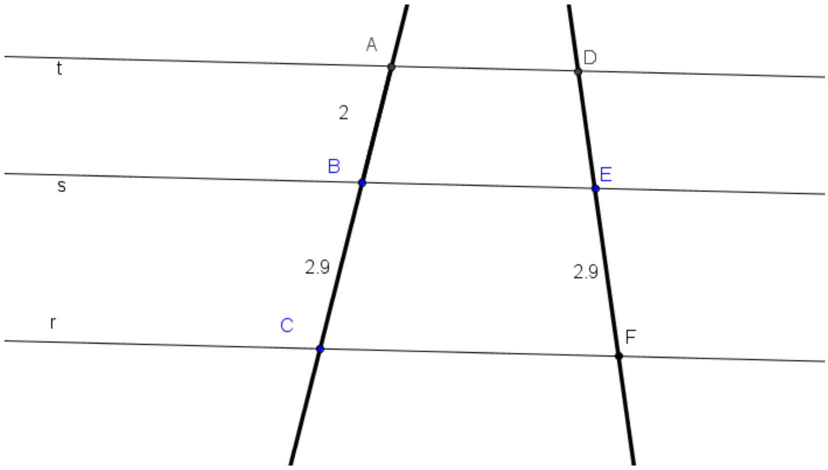
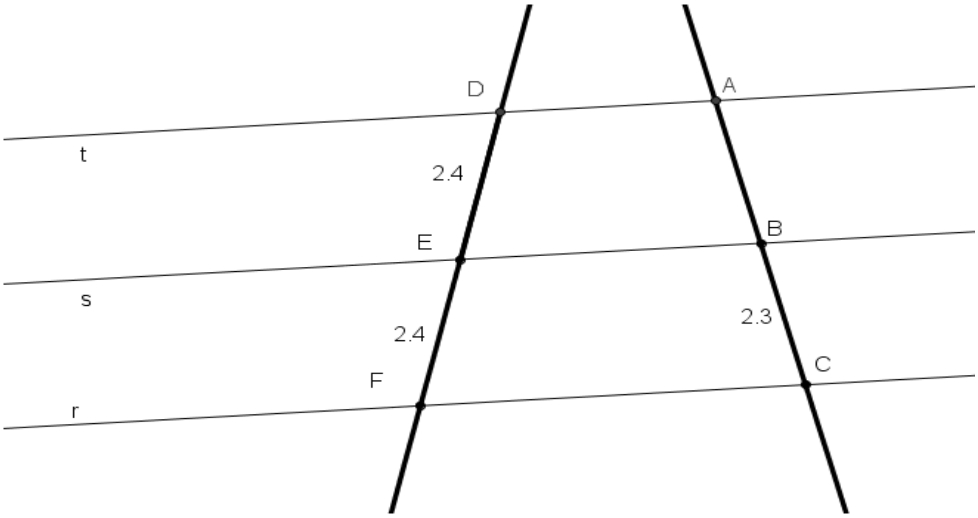
9. If you know lines t, s and r are parallel, find the length of $|DE|$. Explain your answer.



10. If you know lines t, s and r are parallel, find the length of $|AB|$. Explain your answer.



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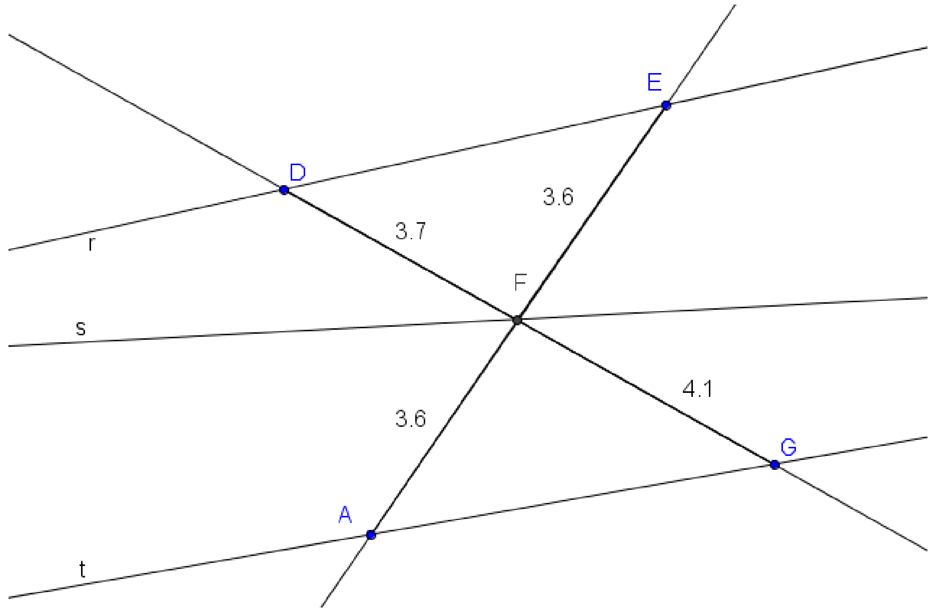
Challenge

11. Given that the distances $|AF|$ and $|FE|$ are equal, why are the distances $|DF|$ and $|FG|$ not equal?



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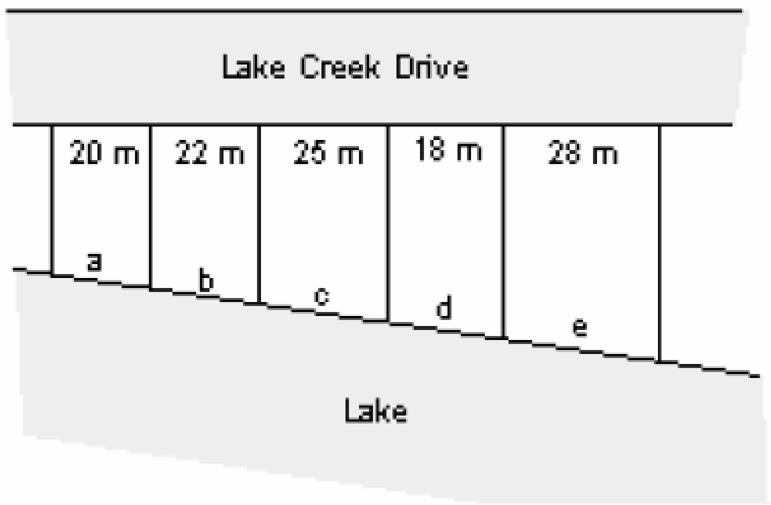
12.

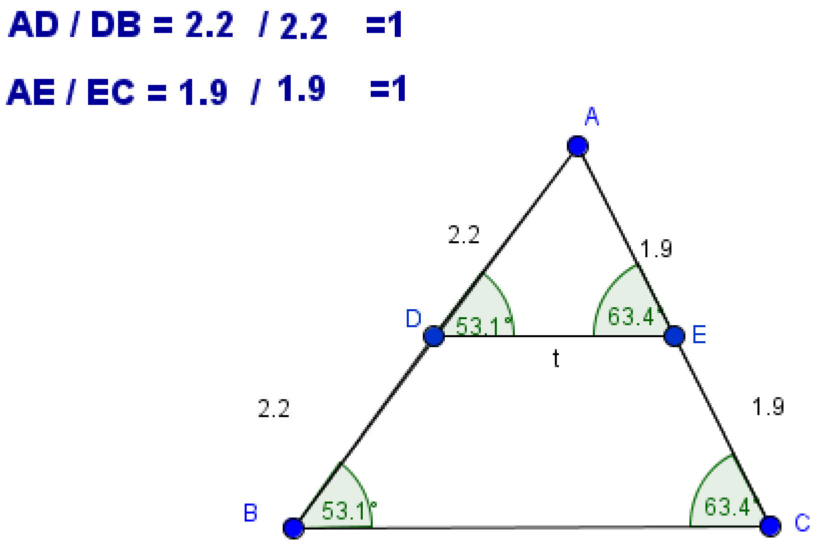
In Lake Creek, the lots on which houses are to be built are laid out as shown. What is the lake frontage for each of the five lots if the total frontage is 135.6 meters?



Student Activity Theorem 12

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

To realize that given the triangle ABC and a line *t* which is parallel to BC and cuts [AB] in the ratio m: n, then it also cuts [AC] in the same ratio.



1. How can you tell, if the line t is parallel to the $|BC|$?

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2. What are the lengths of $|AD|$ and $|DB|$ in the interactive file and do you notice anything about these lengths?

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3. What are the lengths of $|AE|$ and $|EC|$ in the interactive file and do you notice anything about these lengths?

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4. Has $\frac{|AD|}{|DB|}$ the same value as $\frac{|AE|}{|EC|}$?

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5. Move some of the points. What happens to the angles in the triangle ABC and the triangle ADE? Is there any relationship between them and what does this imply?

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6. As you move the points, what happens to the relationship between the ratios $\frac{|AD|}{|DB|}$ and $\frac{|AE|}{|EC|}$?

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7. Do you agree with the statement "Given a triangle ABC, if the line t is parallel to $|BC|$ and cuts [AB] in the ratio m: n, then it also cuts [AC] in the same ratio."? Explain your answer.

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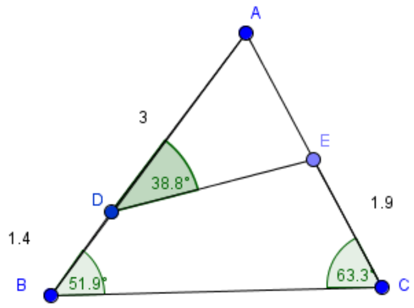
Challenges

8. Can the above theorem be applied to the following diagram, explain your answer.



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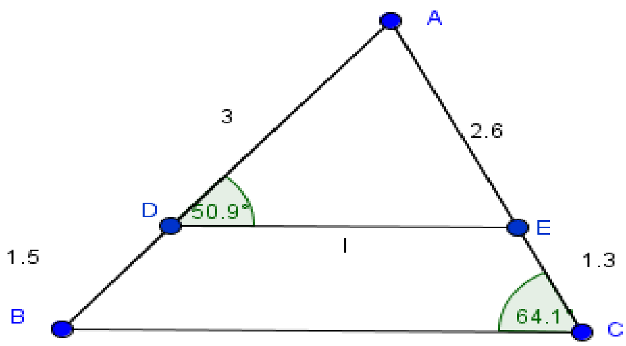
9. What are the values of the angles ABC and AED given $|BC|$ is parallel to $|DE|$?



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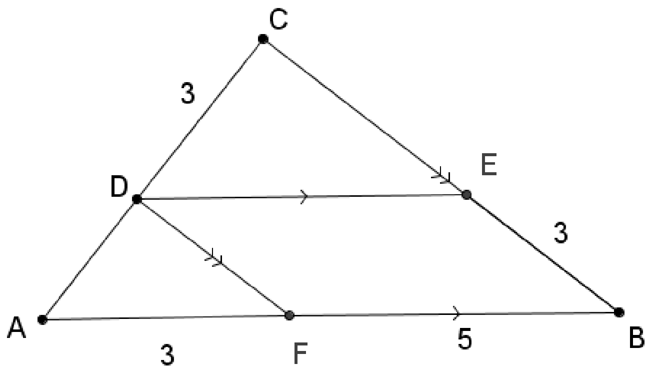
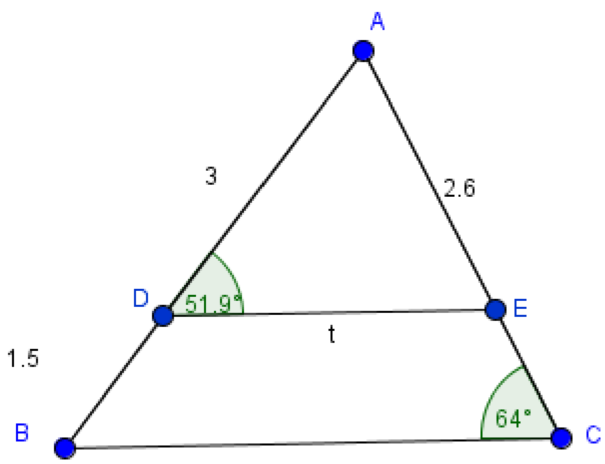
10. Given that $|DF|$ is parallel to $|CB|$ and $|DE|$ is parallel to $|AB|$, find the length of $|CE|$.



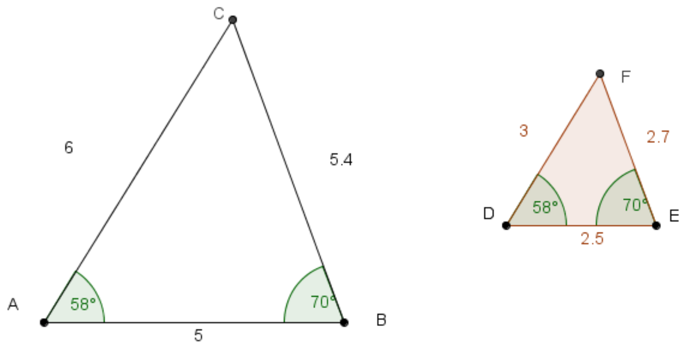
11. What is the value of the angle BAC, given $|DE|$ is parallel to $|BC|$?



Student Activity Theorem 13

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

To explore the relationship between the corresponding sides of similar triangles.



1. What do you notice about the angles in the triangles ABC and DEF?

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2. Move the sliders angleA and angleB and state how the angles of the two triangles now relate?

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   ____

3. Are the sides of the triangles equal?

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4. What is the name for two triangles that have same angles, but not necessarily the same sides?

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5. When you click the translation box, what do you notice?

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6. When the translation box is clicked, what do you notice about the line segments AB and D1E1?

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7. What is the ratio of $\frac{|AC|}{|DF|}$? Show calculations. (Note the lengths in the interactive file are given correct to 1 decimal place, this may affect some calculations.)

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8. What is the ratio of $\frac{|BC|}{|EF|}$? Show calculations. (Note the lengths in the interactive file are given correct to 1 decimal place, this may affect some calculations.)

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9. What is the ratio of $\frac{|AB|}{|DE|}$? Show calculations.

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10. Move the sliders for the bases and watch the lengths change. Are the ratios still the same?

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11. From viewing the interactive file do you agree with the theorem "If two triangles are similar, then their sides are proportional, in order." Explain this statement in your own words.

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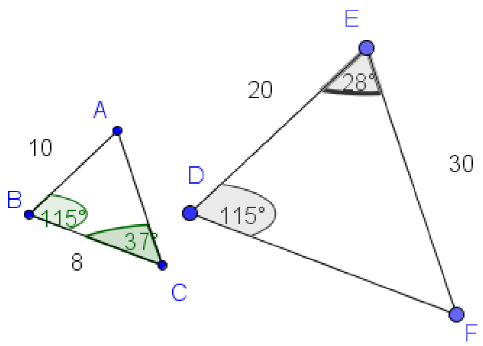
Challenge

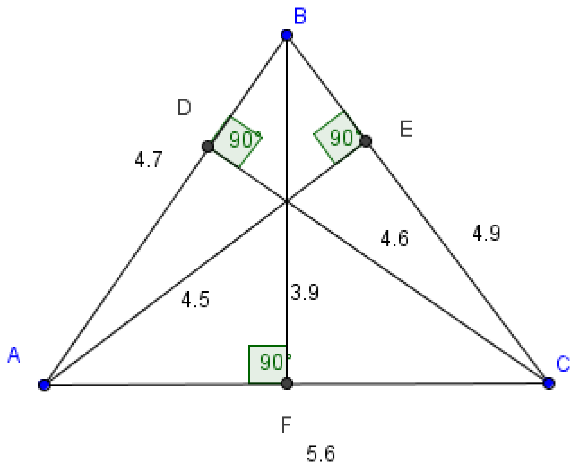
12. Find the value of the length of all the sides of the following triangles.



Student Activity Theorem 16

Use in connection with interactive file "Theorem 16" on the Student's CD.

Taking different sides of a triangle as the base explore the value of half that base times the corresponding perpendicular height.



(Please note the figures in the interactive file are corrected to 1 decimal place, which may lead to slight inaccuracies. For example, using the figures, ½ (5.8)(4.4) yields 12.76, not 12.8 as stated.)

1. If AC is the base, which line is the perpendicular height? Give a reason for your answer.

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2. Without moving any of the points, what is the length of AC and the corresponding perpendicular height? If the area of a triangle is half the base multiplied by the perpendicular height, what is the area of the triangle ABC using AC as base?

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3. Without moving any of the points, find the length of BC and the corresponding perpendicular height and using BC as the base find the area of the triangle ABC.

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4. Without moving any of the points, find the length of AB and the corresponding perpendicular height and using AB as the base find the area of the triangle.

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5. What do you notice about the values you got for the areas of the triangles in the above three questions?

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6. If the perpendicular height is 4 and the area of the triangle is 12.8, find the length of the base correct to 1 decimal place. Do your figures agree with the interactive file?

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7. Move some or all of the points A, B or C and record a new set of bases and corresponding perpendicular heights and find the corresponding areas. Are the areas the same?

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8. Repeat question 7 for a different set of values. What was the relationship between the areas this time?

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9. From the calculations performed in the last set of questions, what conclusion do you come to regarding the choice of a line as the base of a triangle to find the area of a triangle?

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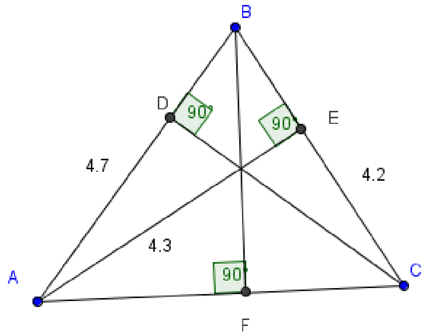
Challenge

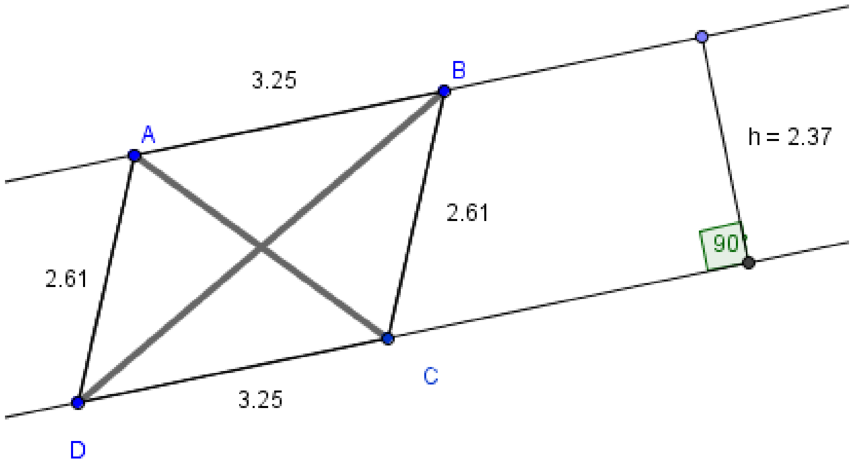
10. Find the lengths of the line segments CD, BF in the diagram below



Student Activity Theorem 17

Use in connection with interactive file "Theorem 17" on the Student's CD.

To examine how a diagonal of a parallelogram divides a parallelogram.



1. Name 2 diagonals of the parallelogram in the interactive file.

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2. Which Line represents the perpendicular height between the parallel lines? Explain your answer.

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3. The parallelogram is divided into two triangles by the diagonal AC, name these triangles.

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4. Find the area of each of the triangles mentioned in question 3. Explain your calculations.

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5. Can you conclude that the diagonal AC bisected the area of the parallelogram? Explain your answer.

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6. The parallelogram is divided into two triangles by the diagonal BD, name these triangles.

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7. Find the area of each of the triangles mentioned in question 6. Explain your calculations.

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8. Can you conclude that the diagonal BD bisected the area of the parallelogram? Explain your answer.

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9. By moving the points on the interactive file, can you conclude that each diagonal of any parallelogram bisects the area of the parallelogram? Explain.

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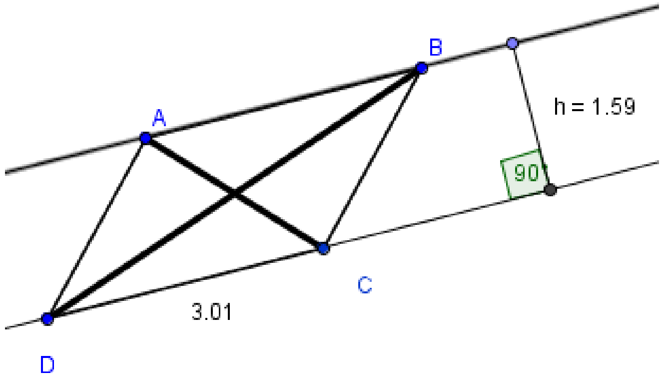
Challenges

10. Find the area of the triangle ADC and hence find the area of the parallelogram ABCD. Show calculations.



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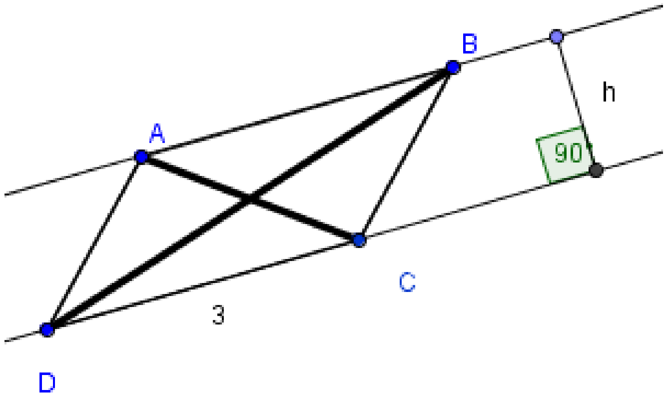
11. If the area of the parallelogram below is 45 cm^2. Find the shortest distance between the parallel lines AB and DC. Show calculations.



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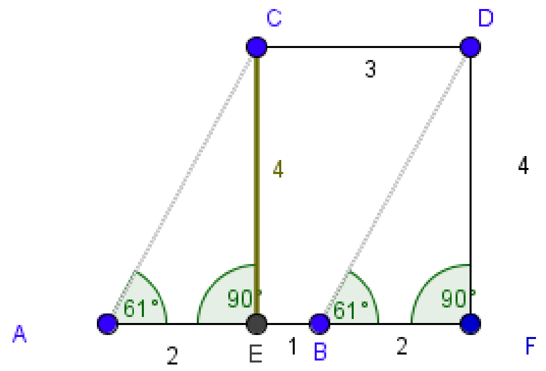
Student Activity Theorem 18

Use in connection with interactive file "Theorem 18" on the Student's CD.

To establish a formula for the area of a parallelogram.



1. What is the area of the rectangle EFDC?

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2. What are the differences in the rectangle EFDC and the parallelogram ABDC?

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3. What are the similarities between the triangle AEC and the triangle BFD and how does the area of these triangles compare?

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4. If you take triangle AEC away from the parallelogram ABDC and add the triangle BFD to it, what shape do you get and what is its area? What does that inform you about the relationship between the area of the parallelogram ABDC and the area of the rectangle EFDC?

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5. Making sure that the line segment CE in the interactive file stays the same as it was originally, move the point A so that it overlaps with point E. What do you now notice about the shape of the parallelogram in comparison with the rectangle EFDC?

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6. What is meant by the perpendicular height of a parallelogram and what line segment is the perpendicular height of the parallelogram ABDC?

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7. Does the line segment that represents the perpendicular height always have to be at right angles to the base?

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Do you conclude that "The area of a parallelogram is the base times height."? Explain.

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8. Move the base slider and / or the points and check if you still agree with the statement, "The area of any parallelogram is the base times height."

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Challenges

9. Find the area of a parallelogram with base equal to 6 cm and height equal to 8 cm? Show calculations.

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10. If a parallelogram has area equal to 96 cm^2 and its height is 12 cm, what is its base? Show calculations.

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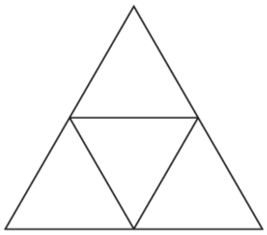
11.

An equilateral triangle can be divided into equal-sized triangles using lines parallel to the opposite sides. The lines connect two midpoints. How many parallelograms can you find in the figure?



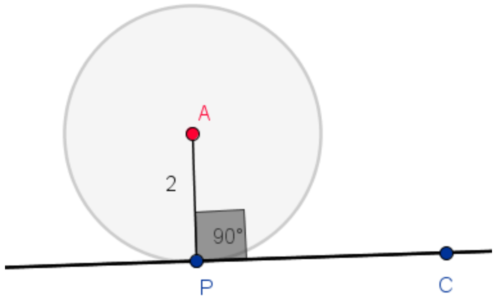
Suppose the area of the large triangle is 16 square units. What is the area of each of the parallelograms?

©http://teacherweb.puyallup.k12.wa.us/wildwood/sanderson/documents/covering_and_surrounding_homework_problems_-_investigation_4.pdf. See this link for other examples of applications of the area of a parallelogram.

Student Activity Theorem 20

Use in connection with the interactive file called "Theorem 20" on the Student's CD.

To investigate the angle the tangent of a circle, makes with the radius that goes through its point of contact.



1. Which line segment is the radius of the circle and what is its length?

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2. What is the name of the line that contains the points P and C?

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3. In the interactive file, what is the value of the angle between the tangent and the radius?

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4. What happens to the angle between the tangent and the radius when you move the point P around the circle?

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5. What happens to the circle when you move the slider?

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6. What happens to the angle between the tangent and the radius when you move the slider?

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7. Do you agree that the angle between the tangent and the radius at the point of contact is always 90^0?

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Challenges

8. What is the value of the angle MKC in the diagram opposite?

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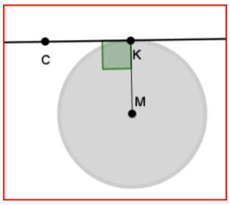

9. How would one tell, if t is a tangent to the circle opposite?

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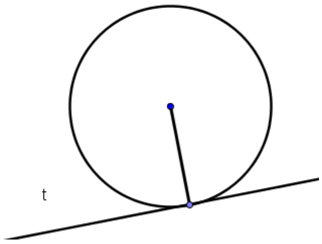
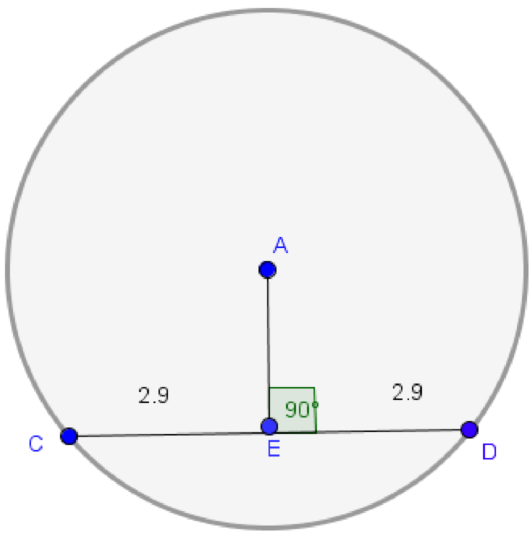


Student Activity Theorem 21

Use in connection with interactive file "Theorem 21" on the Student's CD.

To explore the perpendicular from the centre of a circle to a chord.



1. Which line is a chord of the circle?

____

____

2. What is the measure of the angle between the chord and the line segment $|AE|$?

____

____

3. As you move the point C, what happens to this angle?

____

____

____

4. Move the points on the interactive file and decide if you agree that the line segment $|AE|$ is always perpendicular to the line segment $|CD|$.

____

____

5. What is the length of the line segments $|CE|$ and $|ED|$? Are they equal?

____

____

6. Move the point C around the circle. Do you notice any relationship between the lengths of the line segments CE and ED? What is this relationship?

____

____

____

____

7. Move the point C above point A. Are the lengths of the line segments $|CE|$ and $|ED|$ still the same?

____

____

____

8. Move the point D above point A. Are the lengths of the line segments $|CE|$ and $|ED|$ still the same?

____

____

____

9. What happens when one moves point A?

____

____

____

10. What is significant about the point A?

____

____

____

11. With point A moved from its original position, what happens to the angle AED?

____

____

____

12. With point A moved from its original position, what happens to the lengths of CE and ED?

____

____

____

13. If angle AED was not equal to 90^o, would CE and ED still be the same? Explain your answer.

____

____

____

____

14. What is meant by the bisector of a chord?

____

____

____

15. Do you agree that AE is perpendicular to CD and does it bisect CD, regardless of the position of CD?

____

____

____

16. Is it true that the perpendicular from the centre to any chord bisects that chord? *(Hint you were able to move C to enable CD to become any chord of a circle.)*

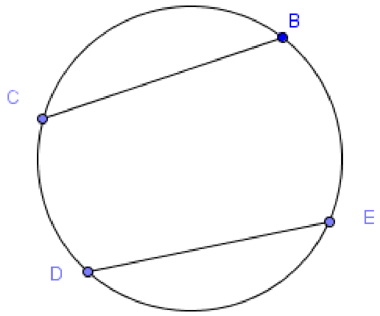
____

____

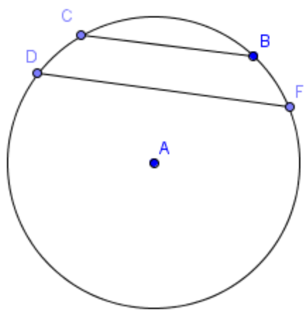
____

Challenges

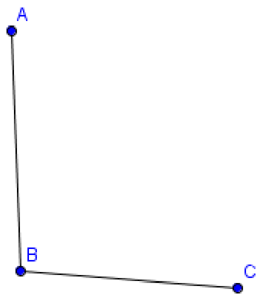
17. Find the centre of this circle.



18. CB and DF are two parallel chords and the perpendicular distance between the parallel lines is 1 cm. Find the length of the chord CB, if the radius of the circle is 5 cm and chord DF measures 8 cm.



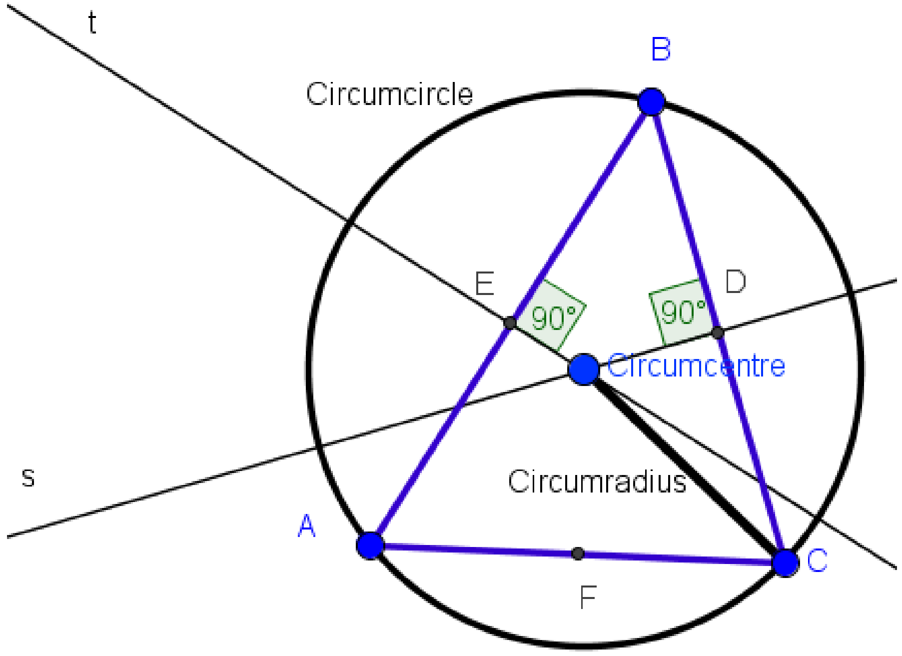
19. If AB and BC are the chords of a circle, draw the circle that touches the points A, B and C.



Student Activity Construction 16

Use in connection with interactive file "Constr 16" on the Student's CD.

Construction 16: To construct a circumcentre and circumcircle of a given triangle, using only straight edge and compass.



1. Name the mid points of the line segments AB, BC and AC.

____

____

2. What is the relationship between side AB and line t?

____

____

3. What is the relationship between side BC and line s?

____

____

4. Name the perpendicular bisectors of AB and BC.

____

____

5. What is the name of the point where the two perpendicular bisectors meet?

____

6. Name the circle whose radius is the same distance from all of the vertices of the triangle to the circumcentre?

____

7. Name 3 line segments (not all shown in the interactive file) that can be known as a circumradius of the circumcircle in the interactive file.

____

8. Move the points A, B or C and describe what happens.

____

____

9. Describe how to find the circumcentre of a triangle and draw the circumcircle of a triangle.

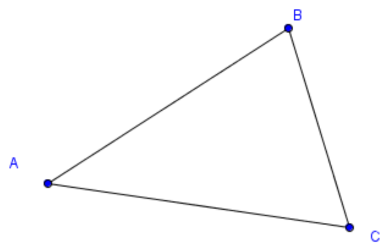
____

____

____

____

10. Find the circumcircle of the following triangle. List construction steps.



____

____

____

____

11. The organisers of a race, where the track is circular, want to locate a position for their first aid station, so that the station is equidistant from each point on the track. Advise them how to do this.

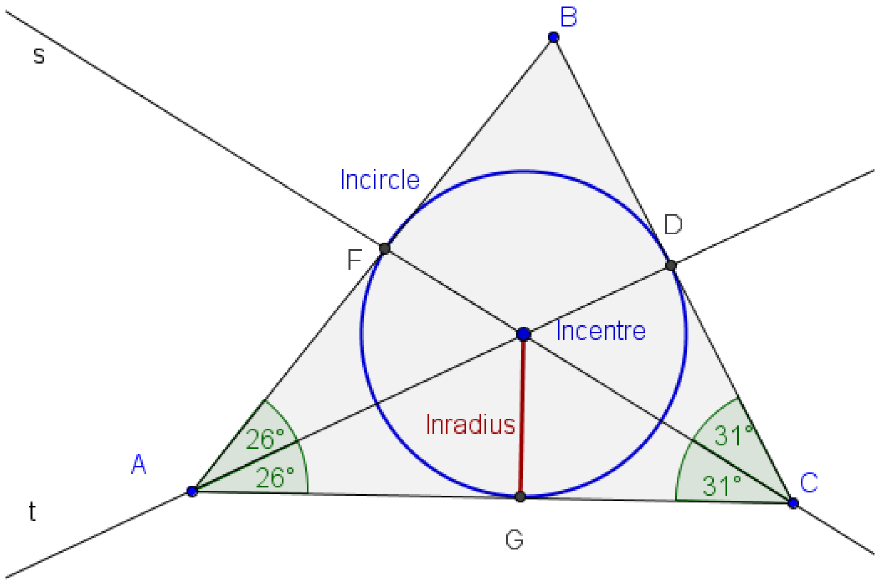
____

____

Student Activity Construction 17

Use in connection with interactive file "Constr 17" on the Student's CD.

Construction 17: To construct an Incentre and incircle of a given triangle, using only straight edge and compass.



1. What is the value of the angle CAD?

____

____

2. What is the value of the angle DAB?

____

____

3. What is the relationship between the line d and the angle CAB?

____

____

4. What is the value of the angle ABE?

____

____

5. What is the value of the angle EBC?

____

____

6. What is the relationship between the line b and the angle ABC?

____

____

7. What is the value of the angle BCF?

____

____

8. What is the value of the angle FCA?

____

____

9. What is the relationship between the line h and the angle BCA?

____

____

10. At what point do the three angle bisectors of the angles meet?

____

____

11. What is the relationship between the line segment called the inradius and the line segment AC?

____

____

12. What do you notice about the incircle, no matter where we move the points A, B or C on the interactive file?

____

____

13. Describe how to draw the incentre of a triangle.

____

____

____

____

____

____

____

14. A gardener wants to install a circular pond in their triangular garden. Using geometry how could they find the centre of the pond?

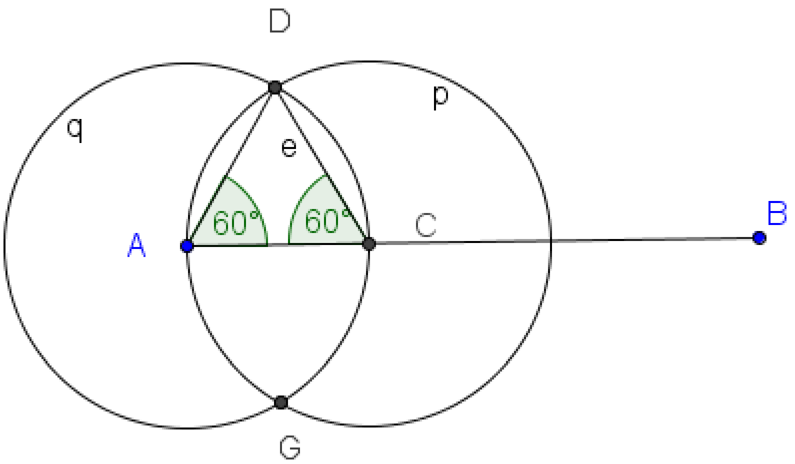
____

15. Draw 2 triangles on a sheet of paper and find their incentre, incircle and inradius.

Student Activity Construction 18

Use in conjunction with the interactive file "Constr 18" on the Student's CD.

Construction 18: To construct an angle of 60 degrees without using a protector or set square.



Note all the angles in an equilateral triangle are equal to 60° and an equilateral triangle can be constructed using only a compass and straight edge using a given line segment (i.e. construct intersecting arcs (or circles) of radius equal to length of line segment).

1. In the interactive file, what was given before any of the boxes were clicked?

 ____

 ____

2. With the help of the interactive file, list the construction protocol to make an angle of 60^0.

 ____

 ____

 ____

 ____

 ____

 ____

3. As you move the point A, what do you notice about the angle ACD?

 ____

 ____

 ____

4. As you move the radius slider, what do you notice about the angle ACD?

____

____

5. Why is angle ACD always 60^0?

____

6. Does the length of the line AB have any impact on the construction? Explain.

____

____

____

7. Does the length of the radius of the circle have any impact on the construction? Explain.

____

____

8. Explain why this construction method always gives 60^0.

____

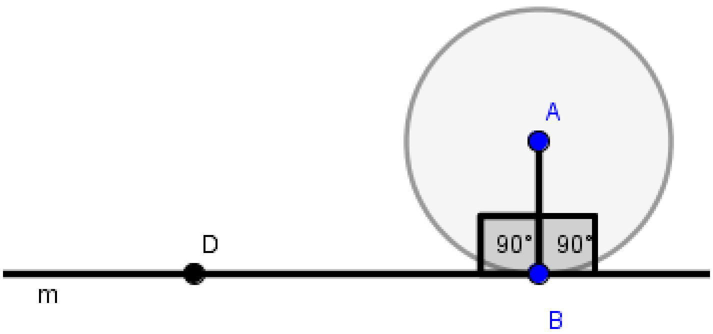
____

____

Student Activity Construction 19

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

Construction 19: To construct a tangent to a given circle at a given point on it.



1. What is meant by the radius of a circle?

____

____

____

2. How many times does a tangent to a circle cut the circle?

____

____

3. Using the interactive file, describe the protocol of how to draw a tangent to a given circle at a given point on it.

____

____

____

____

4. What is the measure of the angle formed by the tangent and the radius?

____

____

5. What happens when you move the point B in the interactive file around the circle?

____

____

6. What happens when you move the centre of the circle Ain the interactive file?

____

____

____

7. Does the location of point B on the circle affect the tangent of the circle? Explain.

____

____

____

____

8. How many tangents can be drawn to a given circle at a given point on it? Explain.

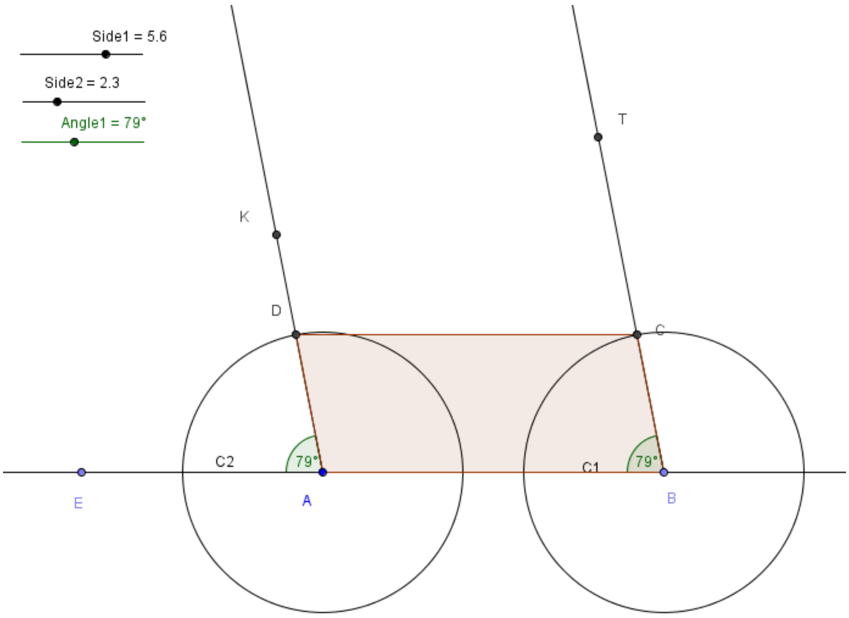
____

____

Student Activity Construction 20

Use in connection with the interactive file "construction 20" on the Student's CD.

Construction 20: To construct a parallelogram, given the length of the sides and the measure of the angles.



1. What is meant by a parallel line?

____

____

2. What is meant by a parallelogram?

____

____

____

____

3. By viewing the interactive file construction 20, what are the steps for drawing a parallelogram given the length of the sides and the measure of the angles?

____

____

____

____

____

____

4. What 3 pieces of information is required in order to be able to draw a particular parallelogram?

____

____

5. What determines the location of the parallelogram?

____

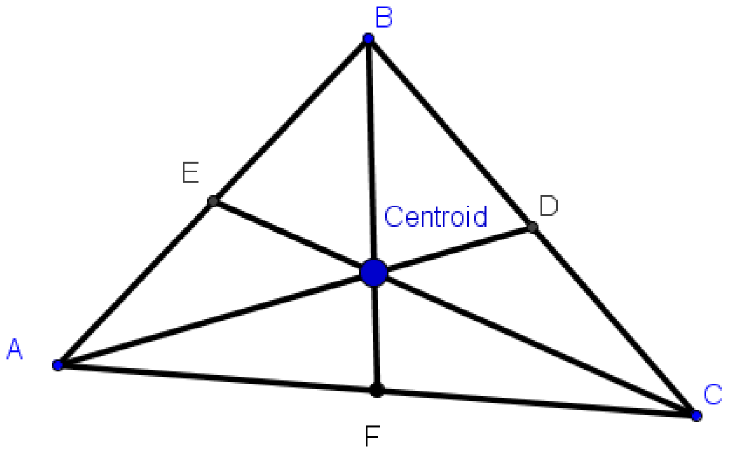
____

6. Construct a parallelogram ABCD using the steps described in the interactive file construction 20, where AB equals 4cm and BC equals 5 cm and angle ABC equals 60^0?

Student Activity Construction 21

Use in connection with the interactive file "Constr 21" on the Student's CD.

Construction 21: To construct a centroid of a triangle.



1. Name the vertices of the triangle?

____

2. Name the three mid points of the sides of the triangle.

____

3. What is meant by a median of a triangle and name the medians of this triangle?

____

____

4. Name the point where the medians of a triangle meet.

____

____

5. Using the interactive file describe how to find the centroid of a triangle.

____

____

____

____

____

____

6. Move the points A, B, C of the triangle and as the triangle changes shape determine if the medians are still concurrent (meet at the same point). Explain your answer.

____

____

____

7. How would you describe to a non mathematician, what the centroid of a triangle is?

____

____

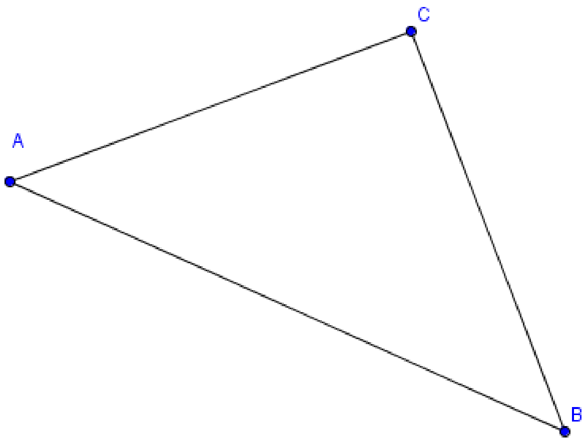
____

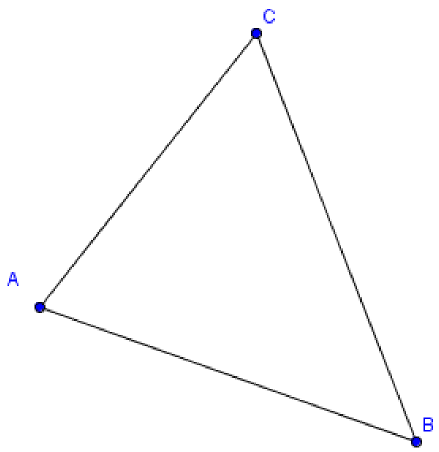
____

8. What point is the centre of gravity of a triangle?

____

9. Find the centroid of the following triangles:



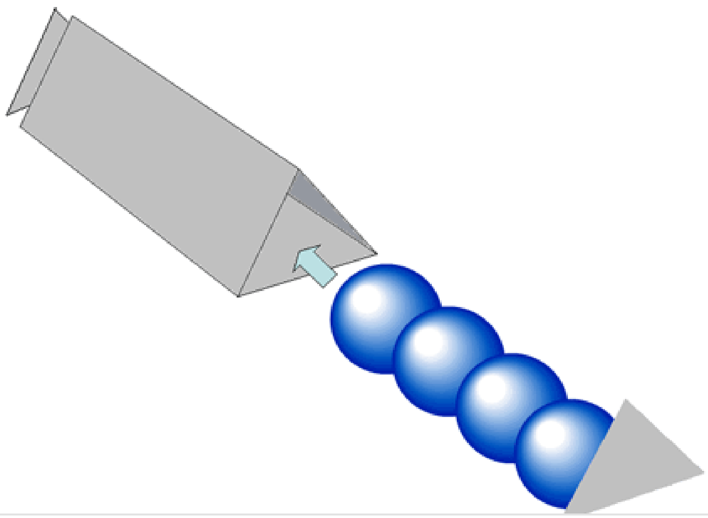


Challenge

The "Ball Box" problem

The Acme Tennis Ball Company is designing a new box to ship its products. The marketing department wants a triangular box that can hold 4 balls, as in the illustration below. The balls fit exactly inside the box, just touching all three walls and the end caps of the container. All 3 walls of the box are the same size.

Assume a tennis ball is 6 cm in diameter, and ignore the thickness of the box material.



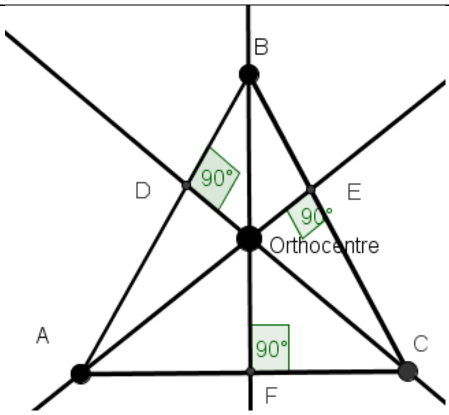
Problem 1

The end of the box is in the shape of a triangle.
What is the type and dimensions of the triangle to 2 decimal places?

Student Activity Construction 22 (Higher Level only)

Use in connection with the interactive file "Constr 22" on the Student's CD.

Construction 22: To construct an orthocentre of a triangle.



1. What is meant by saying one line is perpendicular to another line?

____

____

2. How were points D, E and F formed?

____

____

____

____

3. List the protocol to find the orthocentre of a triangle.

____

____

____

____

____

____

____

4. Move the points in the triangle and as the triangle changes are the perpendiculars from the vertices to the opposite sides still concurrent and what is the name of the point where they meet?

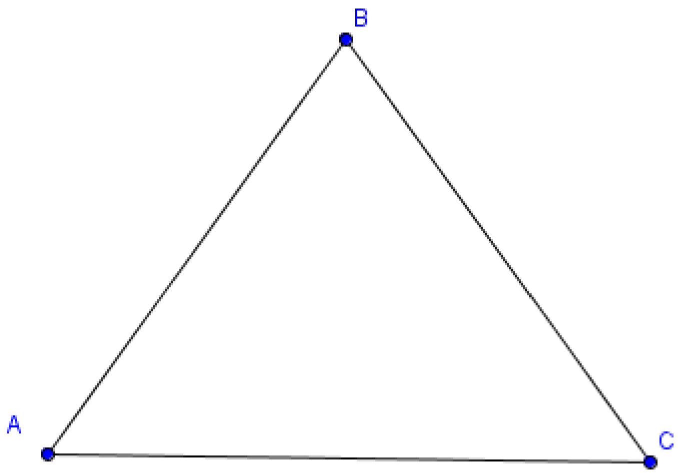
5. What is meant by the point known as the Orthocentre of any triangle?

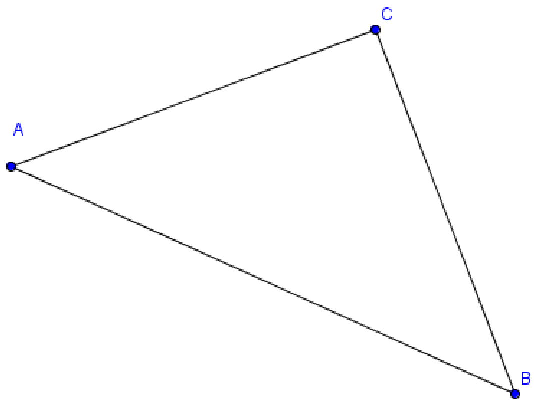
____
____
____

6. By moving the points A, B and / or C, determine if the orthocentre of a triangle can be outside the triangle.

____

7. Find the orthocentres of the following triangles.





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

3. Name the point of reflection for the cat.

4. 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'?

5. 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'.

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

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

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

____

____

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

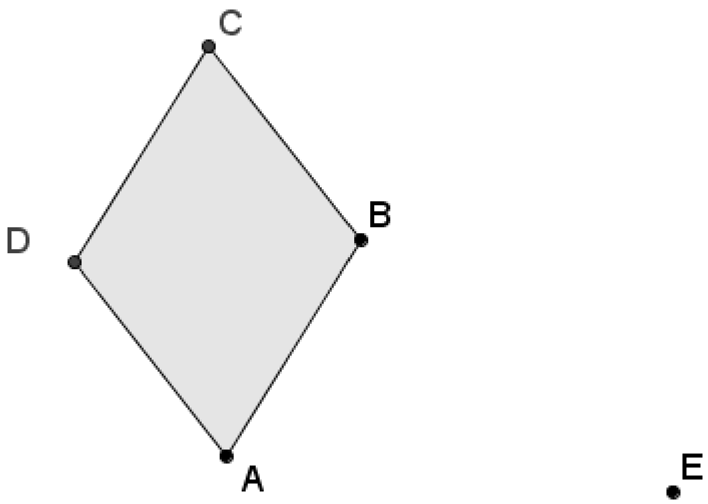
____

____

____

____

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



Student Activity 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?

8. 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?

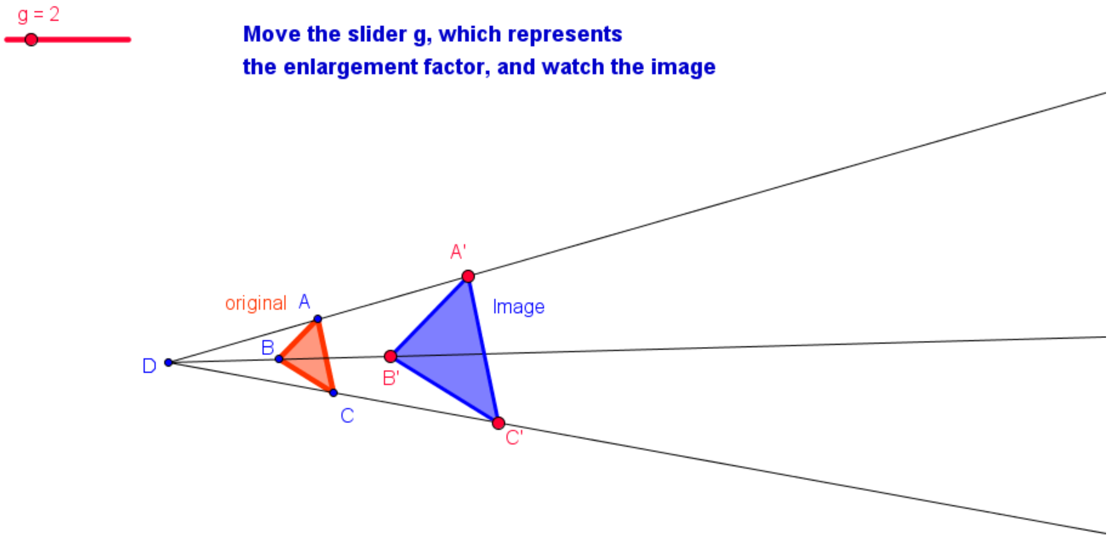
4. What is the effect of moving point A or point B on the interactive file?

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.

Student Activity Enlargements 1

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



1. What point is the centre of enlargement in the interactive file?

   ____

2. When g=3 complete the table by measuring the lengths on the screen with a ruler.

AB		AC		BC	
A'B'		A'C'		B'C'	

3. Do you notice any relationship between the corresponding sides in Question 2 and if so what is the relationship?

   ____

   ____

4. Now move the slider in the interactive file to g=4 and complete the table.

AB		AC		BC	
A'B'		A'C'		B'C'	

   What relationship did you notice between the corresponding sides?

   ____

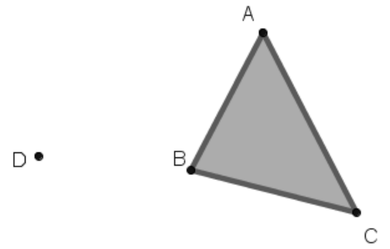
   ____

5. When g the enlargement factor is 1, what happens to the image?

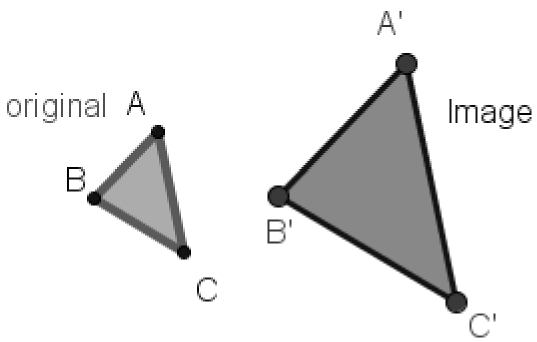
____

Note questions 6, 7 and 8 do not need the interactive file.

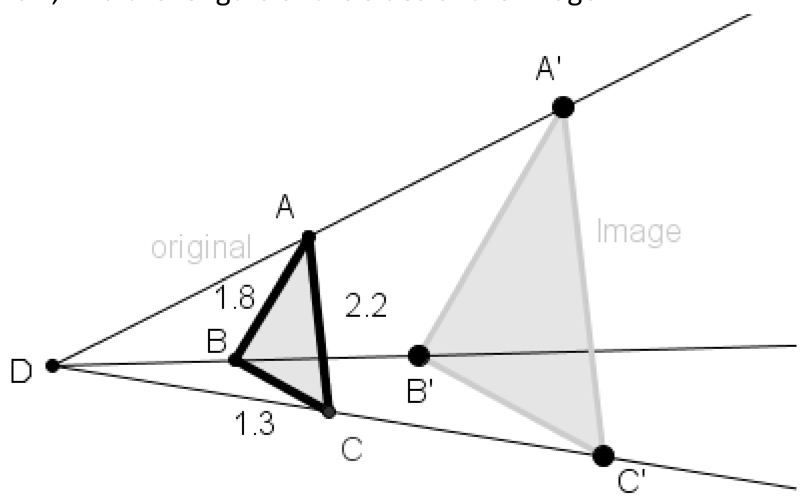
6. Find the image of the triangle ABC under an enlargement with D as centre and a scale factor of 2.



7. Find the centre of enlargement, if A'B'C' is the image of ABC under an enlargement.



8. If the scale factor is 2, find the lengths of the sides of the image:

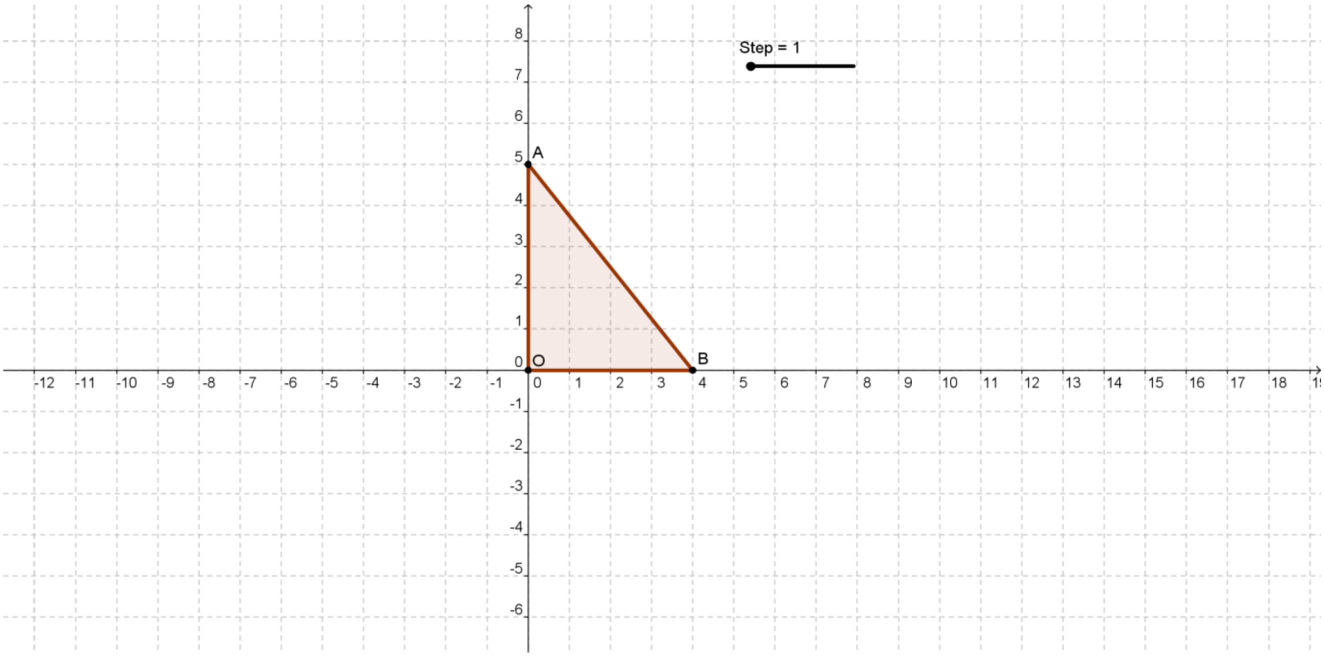


AB	1.8	A'B'	
BC	1.3	B'C'	
AC	2.2	A'C'	

Student Activity on Area of a Triangle

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

To investigate situations where we can use the formula ½ base × perpendicular height.



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

To start set the slider to "Step = 1"

1. What is the length of [OB]?____
2. What is the length of [OA]?____
3. Work out the area of the triangle AOB____

   ____
4. Move the "Step" slider to 2. What is the length of [OD]?_________________________
5. What is the length of [OC]?____
6. Work out the area of the triangle COD____

   ____
7. Move the "Step" slider to 3. What is the length of [OF]?_________________________

8. What is the length of [OE]?____

9. Work out the area of the triangle EOF____________________________________

____

10. Move the “Step” slider to 4. We’re going to use [PR] as the base of this triangle.

    What is the length of [PR]?____

11. What is the perpendicular height of the triangle?____________________________

12. Work out the area of the triangle PQR____________________________________

____

____

13. Move the “Step” slider to 5. We’re going to use [SU] as the base of this triangle.

    What is the length of [SU]?____

14. What is the perpendicular height of the triangle?____________________________

15. Work out the area of the triangle SUT____________________________________

____

____

16. Move the “Step” slider to 6. We’re going to use [PR] as the base of this triangle.

    What is the length of [PR]?____

17. What is the perpendicular height of the triangle?____________________________

18. Work out the area of the triangle PQR.

____

____

____

19. Move the “Step” slider to 7. We’re going to use [SU] as the base of this triangle.

    What is the length of [SU]?____

20. What is the perpendicular height of the triangle?______________________________

21. Work out the area of the triangle SUT____

    ____

    ____

22. Move the “Step” slider to 8. We’re going to use [AC] as the base of this triangle.

    What is the length of [AC]?____

23. What is the perpendicular height of the triangle?______________________________

24. Work out the area of the triangle ABC____

    ____

    ____

25. Move the “Step” slider to 9. We’re going to use [DF] as the base of this triangle.

    What is the length of [DF]?____

26. What is the perpendicular height of the triangle?______________________________

27. Work out the area of the triangle DEF____

    ____

    ____

28. Move the “Step” slider to 10. We’re going to use [AB] as the base of this triangle.

    What is the length of [AB]?____

29. What is the perpendicular height of the triangle?______________________________

30. Work out the area of the triangle ABC____

    ____

    ____

31. Move the "Step" slider to 11. The points P and R have coordinates (2,1) and (10,1). They are both on the line y=1. The point Q is on the line y=4. We don't know the x-coordinate of the point Q. How far is Q from the line y=1?______________________

32. Work out the area of the triangle PQR______________________________________

____

____

33. Move the "Step" slider to 12. The points A and C have coordinates (3,7) and (3,2). They are both on the line x=3. The point B is on the line x=7. We don't know the y-coordinate of the point B. How far is B from the line x=3?______________________

34. Work out the area of the triangle ABC______________________________________

____

____

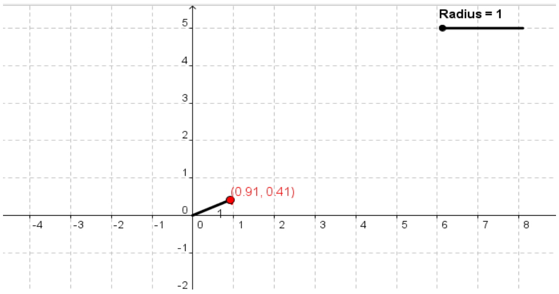
35. Move the "Step" slider to 13. This is an example of where you can still use the formula **½ base × perpendicular height** (but this time the base is not parallel to one of the axes).

Try the "Area of a Triangle Quiz" that is also on this CD/Website

Student Activity on Circles with Centre (0,0) 1

Use in connection with the interactive file "Circles with Centre (0,0) 1" on the Student's CD.

To explore the relationship between the equation of a circle, the circle's radius, and points on the circle. Then draw (some) circles of the form $x^2+y^2=r^2$



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

To start set the slider to "Step = 1"

1. The red dot is at a fixed distance of 1 unit from the point (0,0). Drag the red dot.

   What shape is

   formed?____

2. Change the radius of the circle to 2 by using the Radius slider. Drag the red dot again. Write down four points on the circle (with whole number coordinates).___________

____

3. Change the radius of the circle to 4 by using the Radius slider. Drag the red dot again. Write down four points on the circle (with whole number coordinates).______

____

4. Move the "Step" slider to 2. Adjust the Radius slider. What do you notice about the equation of the circle as the radius gets bigger?_________________________________

____

5. What do you notice about the equation of the circle as the radius gets smaller?_____

____

6. $(1)^2=1$, $(2)^2=4$, $(3)^2=9$. The numbers 1, 4 and 9 are all square numbers. Write down the first 10 square numbers.____

____

7. When the radius is 3, what is the equation of the circle?________________________

8. When the radius is 4, what is the equation of the circle?________________________

9. When the radius is 5, what is the equation of the circle?________________________

10. Write down the relationship between the radius of a circle and its equation._______

____

____

11. A circle with centre (0,0) has a radius of 7. What is its equation?_________________

12. A circle has centre (0,0) and a radius of 7. Write down 4 points on the circle_______

____

13. Sketch the circle that has centre (0,0) and a radius of 7. Clearly label the points where it crosses the x-axis and y-axis

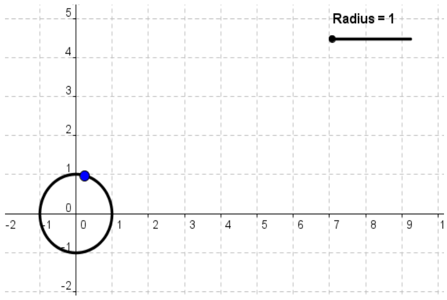
Move the "Step" slider along and complete the questions that are asked.

You could now try "Drawing Circles Quiz 1" which is also on this CD/Website

Student Activity on Circles with Centre (0,0) 2

Use in connection with the interactive file "Circles with Centre (0,0) 2" on the Student's CD.

To explore the relationship between the equation of a circle and the circle's radius, and also to look at the relationship between the points on the circle and the equation of circles of the form $x^2+y^2=r^2$



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

To start set the slider to "Step = 1"

1. Change the radius using the Radius slider and drag the blue dot around the circle.

   When the radius of a circle is a whole number there are always (at least) how many points on the circle with whole number coordinates?____

2. $(0)^2$ = _______ $(4)^2$ = ________ $(-4)^2$ = __________

3. Except for zero, every time you square a (real) number it is always______________

4. Move the "Step" slider to 2. The circle $x^2+y^2=16$ is shown. There are 4 points marked in on the diagram.

   Fill in the coordinates into the spaces and see do they satisfy the equation $x^2+y^2=16$?

$x^2 + y^2 = 16$	$x^2 + y^2 = 16$	$x^2 + y^2 = 16$	$x^2 + y^2 = 16$
$(\ \ )^2+(\ \ )^2= 16$	$(\ \ )^2+(\ \ )^2= 16$	$(\ \ )^2+(\ \ )^2= 16$	$(\ \ )^2+(\ \ )^2= 16$
+ = 16	+ = 16	+ = 16	+ = 16

5. Move the “Step” slider to 3. Let’s see if other points on the circle satisfy the equation $x^2+y^2=16$. Move the blue dot to any point on the circle (but not (4,0), (0,4), (–4,0) or (0,–4)).

   Fill in the coordinates into the spaces and see do they satisfy the following equations

   $x^2 + y^2 = 16$

   $(\quad)^2+(\quad)^2= 16$

   $+ \qquad = 16$

   Note: Both sides might not be equal here because the diagram has rounded the coordinates of the point to two decimal places.

6. Drag the slider called “Animation”. What type of triangle can you see?___________

   ____

7. What is the length of the base of the triangle?_______________________________

8. What is the height of the triangle?____

9. What theorem can we use when we have the lengths of two sides of a right angled triangle and need to work out the third side?_____________________________________

10. Work out the length of the radius____

    ____

    ____

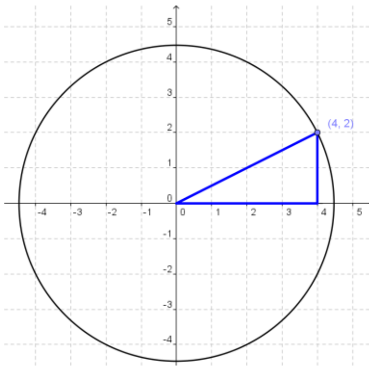
11. Write down the relationship between points on a circle and the circle’s radius______

    ____

Student Activity on Circles with Centre (0,0) 3

Use in connection with the interactive file "Circles with Centre (0,0) 3" on the Student's CD.

To explore the relationship between the equation of a circle, the circle's radius, and points on the circle. Then draw (some) circles of the form $x^2+y^2=r^2$



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

To start set the slider to "Step = 1"

1. Change the radius using the Radius slider and drag the red dot around the circle.

   When the radius of a circle is a whole number there are always (at least) how many points on the circle with whole number coordinates?____

2. Move the "Step" slider to 2. Drag the blue dot. Write down the <u>twelve points</u> on the circle (that all have whole number coordinates)________________________________

   ____

3. __________of the points are on the axes

4. __________of the points are on not on the axes

Let's look more closely at how we could have got the points that have whole number coordinates but are not on the axes.

5. Move the "Step" slider to 3. This is the circle that has centre (0,0) that passes through the point (4,2). By looking at where the circle crosses the axes can you write down an approximate answer for the radius?____
6. Drag the slider called "Animation". What type of triangle can you see?___________

   ____
7. What is the length of the base of the triangle?______________________________
8. What is the height of the triangle?____
9. What theorem can we use when we have the lengths of two sides of a right angled triangle and need to work out the third side?______________________________________
10. Work out the length of the radius____

    ____

    ____

    ____
11. Compare this to your approximation from earlier. Are they similar?______________
12. <u>On paper.</u> $(1)^2=1$, $(2)^2=4$, $(3)^2=9$. The numbers 1, 4 and 9 are all square numbers. Can you write down the first 10 square numbers?____

    ____

13. Can you think of two numbers which, when squared, and then added together add up to 13 i.e. $(\ \ )^2+(\ \ )^2=$ 13?____

14. Move the "Step" slider to 4. Move the radius slider so that the radius is $\sqrt{13}$.

    Move the point on the circle and find <u>all eight points</u> on the circle that have whole number coordinates.____

15. Choose any three points from the previous question and fill the coordinates into the following spaces and see if they satisfy the following equations.

$x^2 + y^2 = r^2$	$x^2 + y^2 = r^2$	$x^2 + y^2 = r^2$
$(\ \ )^2+(\ \ )^2=\left(\sqrt{13}\right)^2$	$(\ \ )^2+(\ \ )^2=\left(\sqrt{13}\right)^2$	$(\ \ )^2+(\ \ )^2=\left(\sqrt{13}\right)^2$
$+ \quad = 13$	$+ \quad = 13$	$+ \quad = 13$

16. Write down the relationship between points on a circle and the circle's radius.____

    ____

    ____

17. Can you think of two numbers that when squared and then added together sum to 29 i.e. $(\ \ )^2+(\ \ )^2= 29$?

18. Move the radius slider so that the radius is $\sqrt{29}$ and check to see if you were correct.

    Write down 8 points on the circle with radius $\sqrt{29}$.________________________

    ____

19. Move the "Step" slider to 5. Change the radius of the circle and compare this to the equation of the circle. What is the relationship between the radius of the circle and the equation of the circle?____

____

____

Answer the following by adjusting the radius slider:

20. If a circle with centre (0,0) has a radius of $\sqrt{17}$, what is its equation?__________

21. If a circle with centre (0,0) has a radius of $\sqrt{34}$, what is its equation?__________

22. If a circle with centre (0,0) has a radius of 4, what is its equation?____________

23. If the equation of a circle is $x^2+y^2=13$, what is the radius of the circle?_________

24. If the equation of a circle is $x^2+y^2=20$, what is the radius of the circle?_________

25. If the equation of a circle is $x^2+y^2=34$, what is the radius of the circle?_________

Move the “Step” slider along and complete the questions that are asked.

$x^2+y^2 = 1$, $x^2+y^2=4$, $x^2+y^2=9$, etc. are easy to draw because they have a whole number radius.

$x^2+y^2 = 2$, $x^2+y^2 = 5$, $x^2+y^2 = 8$, $x^2+y^2 = 10$, $x^2+y^2 = 13$, $x^2+y^2 = 17$, $x^2+y^2 = 18$, $x^2+y^2 = 20$ etc. are okay to draw because r^2 is the sum of two whole numbers squared.

26. $x^2+y^2 = 50$ is an interesting one because it’s the first one that has two different pairs of square numbers that add together to get 50.

27. What square numbers add together to get 50? + = 50 + = 50

28. Fill in the brackets $(\quad)^2+(\quad)^2= 50$ and $(\quad)^2+(\quad)^2= 50$

29. $x^2+y^2 = 65$ is the next one of these.

30. What square numbers add together to get 65? + = 65 + = 65

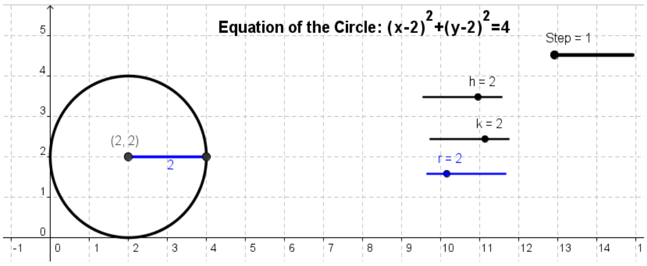
31. Fill in the brackets $(\quad)^2+(\quad)^2= 65$ and $(\quad)^2+(\quad)^2= 65$

You could now try “Drawing Circles Quiz 2” which is also on this CD/Website

Student Activity on Circles with Centre (h,k)

Use in connection with the interactive file “Circles with Centre (h,k)” on the Student’s CD.

To explore the properties of circles with centre (h,k)



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

To start set the slider to “Step = 1”

1. Adjust the sliders and watch the size, equation and location of the circle change.

2. As h increases i.e. moves from -5 to 5 what happens the circle?___________________

3. As h decreases i.e. moves from 5 to -5 what happens the circle?__________________

4. As k increases i.e. moves from -5 to 5 what happens the circle?___________________

5. As k decreases i.e. moves from 5 to -5 what happens the circle?__________________

6. Describe how you would work out the centre of the circle $(x-3)^2+(y+4)^2=25$.________

   ____

   ____

7. Adjust h or k so that the centre of the circle is on the x-axis. What do you notice about the

   equation?____

8. Adjust h or k so that the centre of the circle is on the y-axis. What do you notice about the equation?____

9. In what circumstances would a circle have an equation of $x^2+(y-4)^2=36$?__________

____

10. In what circumstances would a circle have an equation of $x^2+y^2=36$?______________

____

11. Describe how to find the equation of the circle with centre (2, 4) and radius 3.______

____

____

12. As its radius increases what happens to a circle?______________________________

13. Make h = 2, k = 2 and **r = 3**. Write down the equation you see. __________________

14. Make h = 2, k = 2 and **r = 4**. Write down the equation you see. __________________

15. Make h = 2, k = 2 and **r = 5**. Write down the equation you see. __________________

16. Looking at the last three answers can you write down what happens the right hand side of the equation as the radius increases?_______________________________________

____

17. Can you describe how we get the number on the right hand side of the equation?___

____

____

18. If you were given an equation like this one: $(x–2)^2+(y+3)^2=25$ what shape would you expect it to be?____

19. If you were given an equation like this one: $x^2+y^2=20$ what shape would you expect it to be?____

If you have completed Student Activity on Circles with Centre (0,0) 3 then you should try the following questions:

20. Move the “Step” slider to 2. You are given the equation $(x–2)^2+(y+3)^2=16$. The centre of this circle is (2, –3). The radius of this circle is 4. This is a whole number so you could count 4 units in any direction to get different points on the circle. Move the blue dot to a point on the circle.

21. Move the “Step” slider to 3. You are given the equation $(x–2)^2+(y+3)^2=29$. The centre of this circle is (2, –3) and the radius is $\sqrt{29}$. This isn’t a whole number so it’s harder to find points (with whole number coordinates) on the circle. Can you think of two numbers that when squared and are then added together add up to 29 i.e.

$(\quad)^2+(\quad)^2= 29$.

22. The numbers you put in the brackets in the last question are the number of units you could take from the centre across and up to get a point on the circle. If you have five units to the right of the centre and two units up you should have a point that is $\sqrt{29}$ from the centre.

23. If two people moved from the same start point and one moved five steps to the right and two steps forward and the other moved two steps to the right and five steps up what can you say about their distances from the start point?______________________________

24. Use this answer to move the blue dot to another point on the circle.

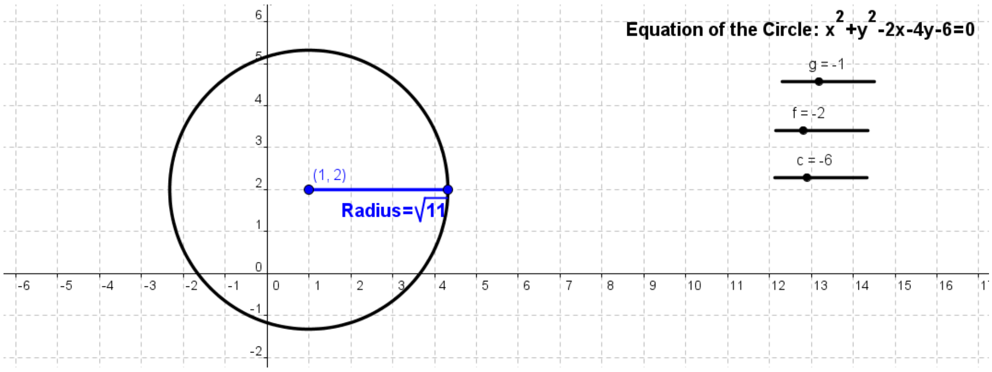
25. Move the blue dot to another (different) point on the circle?

26. You could now try "Drawing Circles Quiz 3" and "Drawing Circles Quiz 4" which are also on this CD/Website

Student Activity on Circles with Centre (-g,-f)

Use in connection with the interactive file "Circles with Centre (-g,-f)" on the Student's CD.

To explore the properties of circles with centre (-g,-f)



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

To start set the slider to "Step = 1"

1. Adjust the sliders and watch the size, equation and location of the circle change.

2. As g increases, i.e. moves from -5 to 5, what happens the circle?_________________

3. As g decreases, i.e. moves from 5 to -5, what happens the circle?________________

4. As f increases, i.e. moves from -5 to 5, what happens the circle?_________________

5. As f decreases, i.e. moves from 5 to -5, what happens the circle?_________________

6. Adjust the sliders and see if you can come up with a relationship between the x-coordinate of the centre and any part of the equation of the circle._____________________

   ____

   ____

7. Adjust the sliders and see if you can come up with a relationship between the y-coordinate of the centre and any part of the equation of the circle.____

   ____

8. Describe how you would work out the centre of the circle $x^2+y^2-6x+4y-5=0$.

   ____

   ____

   ____

9. Adjust g or f so that the centre of the circle is on the x-axis. What do you notice about the equation?______________________________

10. Adjust g or f so that the centre of the circle is on the y-axis. What do you notice about the equation?__________________________________

11. When the centre of the circle is on the x-axis what happens the equation of the circle?____

12. When the centre of the circle is on the y-axis what happens the equation of the circle?____

13. Under what circumstances would a circle have an equation of $x^2+y^2-9=0$?____

    ____

14. Under what circumstances would a circle have an equation with no “x” term and a “y” term of 4y?

____

____

15. Make c=0. Which piece of the equation is influenced?_________________________

16. Keeping c=0, adjust the sliders g and f and see if you can see any relationship between g, f and the radius of the circle? Finish off the following sentence: When c=0 the radius of the circle is

____

____

17. Make c=0, g=2, and f=3. What is the radius?_________________________________

18. Make c=1, g=2 and f=3. What is the radius?_________________________________

19. Make c=2, g=2 and f=3. What is the radius?_________________________________

20. Make c=–1 , g=2 and f=3. What is the radius?________________________________

21. Can you work out the formula for the radius in terms of g, f and c?_______________

22. Can you find a set of circumstances when you adjust g, f and c that the circle is no longer there i.e. no circle is drawn?____

____

23. Substitute the numbers you found in the previous answer into your formula for finding the radius from question 21. What do you get for the radius?________

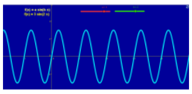
____

24. Would it be possible to have a radius equal to this?___________________________

25. Describe how to find the equation of the circle with centre (2, 4) and radius 3______

____

____

Student activity on graphs of $y = a \sin bx$ 

Use in connection with the following file** f(x) = a* sin *bx* ***(angle measure in radians) on the Student's CD.

1. Drag the sliders so that a=1 and b=1.

   Write down the period and range of $f(x) = \sin x$

   (i) Period =

   (ii) Range =

2. Drag **slider a** to vary the value of a. What is the effect of changing variable a on the function $f(x) = a \sin bx$?

3. Drag the **slider a** to vary the value of a, keeping b =1 and fill in the following table.

a	1	2	3	4
Range of f(x)				

4. Drag the **slider a** to vary the value of a, keeping b =1 and fill in the following table.

a	-1	-2	-3	-4
Range of f(x)				

You may wish to check your answer to Q2 having answered Q3 and Q4.

5. Drag the **slider b** to vary the value of b, keeping a constant. What is the effect of varying b on the function $f(x) = a \sin bx$?

6. Drag the **slider b** to vary the value of b, keeping a constant at e.g. a =2 and fill in the following table.

b	1	2	3	4
Period of f(x)				

7. Drag the **slider b** to vary the value of b, keeping a constant at e.g. a =2 and fill in the following table.

b	-1	-2	-3	-4
Period of f(x)				

8. Fill in the table below:

Function	**Range**	**Period**
$y = 3 \sin x$		
$y = \sin 4x$		
$y = 5 \sin 3x$		
$y = 2 \sin 2x$		

9. Given that $y = a \sin bx$, write down the range and period of this function in terms of a and b.

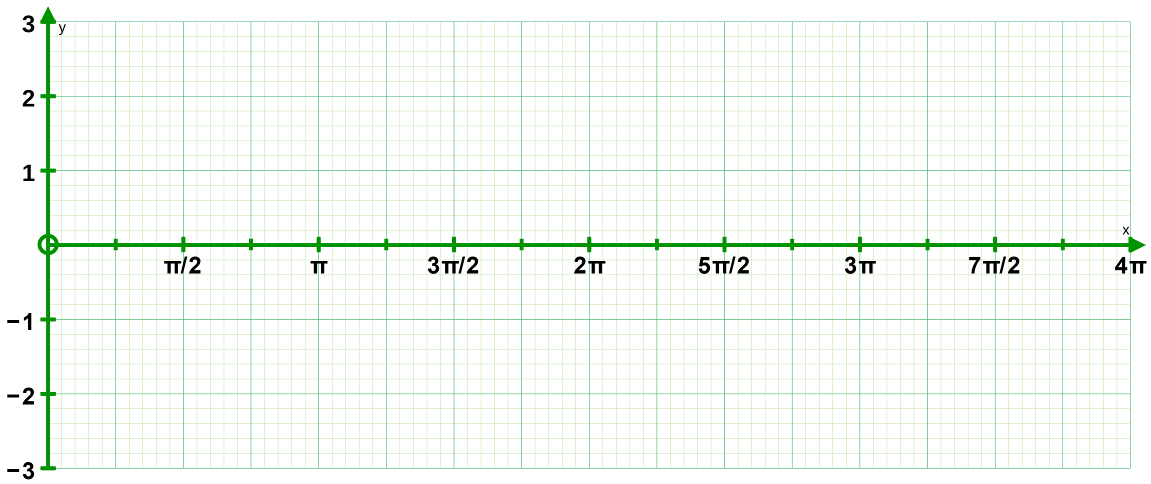
Range =

Period =

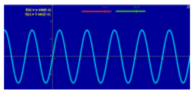
10. Fill in the last column in the table below, in the form $y = a \sin bx$, for a and b ,given the range and period of each function

Range	**Period**	$y = a \sin bx$
$[-1,1]$	π	
$[-3,3]$	$\frac{2\pi}{3}$	
$[-5,5]$	$\frac{\pi}{2}$	
$[-4,4]$	$\frac{\pi}{4}$	

11. Given that the period of $f(x) = a \sin bx$ is π radians and the range is $[-2,2]$ sketch a graph of the function on the graph paper provided below for the domain 0 to 4π.



Student activity on graphs of y = *acosbx*



Use in connection with the following file f(x) = a cos bx (angle measure in radians) on the Student's CD.

1. Drag the sliders so that a=1 and *b*=1.
   Write down the period and range of *f(x)* = cos *x*
   (i) Period =
   (ii) Range =

2. Drag **slider a** to vary the value of *a.* What is the effect of changing variable *a* on the function *f(x) = a* cos *bx*?

3. Drag the **slider a** to vary the value of *a*, keeping *b* =1 and fill in the following table.

a	1	2	3	4
Range of f(x)				

4. Drag the **slider a** to vary the value of *a*, keeping *b* =1 and fill in the following table.

a	-1	-2	-3	-4
Range of f(x)				

You may wish to check your answer to Q2 having answered Q3 and Q4.

5. Drag the **slider b** to vary the value of *b*, keeping *a* constant. What is the effect of varying *b* on the function *f(x) = a* cos *bx*?

6. Drag the **slider b** to vary the value of *b*, keeping *a* constant at e.g. *a* =2 and fill in the following table.

b	1	2	3	4
Period of f(x)				

7. Drag the **slider b** to vary the value of *b*, keeping *a* constant at e.g. *a* =2 and fill in the following table.

b	-1	-2	-3	-4
Period of f(x)				

8. Fill in the table below:

Function	**Range**	**Period**
$y = 3 \cos x$		
$y = \cos 4x$		
$y = 5 \cos 3x$		
$y = 2 \cos 2x$		

9. Given $y = a \cos bx$, write down the range and period of this function in terms of a and b.

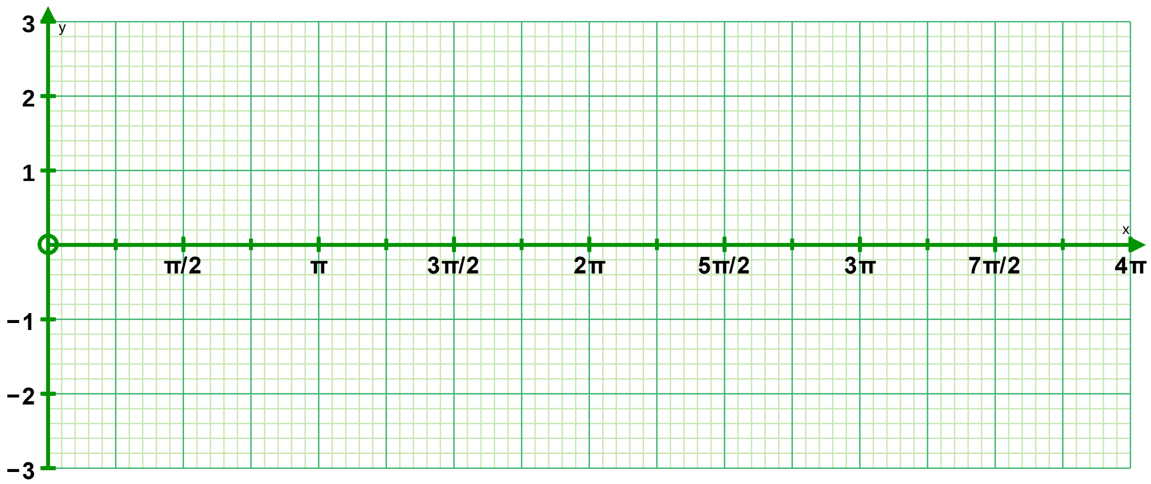
Range =

Period =

10. Fill in the last column in the table below, in the form $y = a \cos bx$, for a and b, given the range and period of each function

Range	**Period**	$y = a \cos bx$
$[-1,1]$	π	
$[-3,3]$	$\frac{2\pi}{3}$	
$[-5,5]$	π	
$[-4,4]$	$\frac{\pi}{4}$	

12. Given that the period of $f(x) = a \cos bx$ is π radians and the range is $[-2,2]$ sketch a graph of the function on the graph paper provided below for the domain 0 to 4π



Quiz 1

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

By completing Table A match the items on the right to the items on the left.

1. Circumcircle	A. The point of intersection of the bisectors of the angles of a triangle is known as the.
2. Circumcentre	B. The circle that passes through the vertices of a triangle is known as the.
3. Circumradius	C. The point where the three medians of a triangle meet is known as the.
4. Incircle	D. A circle that lies inside a triangle and is tangent to each of its sides is known as the.
5. Incentre	E. The radius of a circumcircle is known as the.
6. Centroid	F. The point where the perpendicular bisectors of the each side of a triangle meet is known as the.
7. Median	G. The radius of an incircle is known as the.
8. Inradius	H. The line joining the vertex of a triangle to the midpoint of the opposite side is known as the.

Table A

1.	2.	3.	4.	5.	6.	7.	8.