Worksheet 11-Paper 2

Q1. Explain each of the following terms

a) Axiom
b) Theorem
c) Corollary
d) Incentre
e) Circumcentre
f) Centroid
g) Orthocentre

Q2. Prove that if three parallel lines cut off equal segments on some transversal line, then they will cut off equal segments on any other transversal line.

Q3. Let ΔABC be a triangle. Prove that if a line l is parallel to BC and cuts [AB] in the ratio s:t, where s, t ϵ ℕ, then it also cuts [AC] in the same ratio.

Q4. Prove that if two triangles ΔABC and ΔA' B' C' are similar, then their sides are proportional, in order.

Q5. Explain, with the aid of an example, what is meant by proof by contradiction.

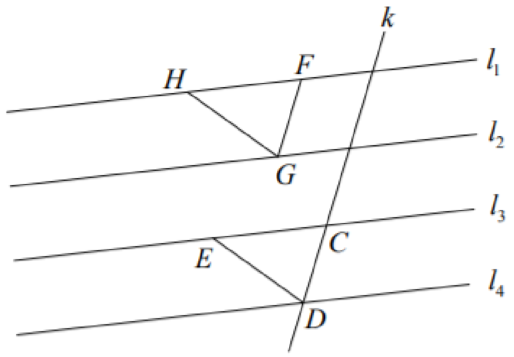
Q6.

(a) **(i)** Given the points B and C below, construct, without using a protractor or setsquare, a point A such that $|\angle ABC| = 60°$.

(ii) Hence construct, on the same diagram above, and using a compass and straight edge only, an angle of 15°.

(b) In the diagram, $l_1, l_2, l_3,$ and l_4 are parallel lines that make intercepts of equal length on the transversal k. FG is parallel to k, and HG is parallel to ED.

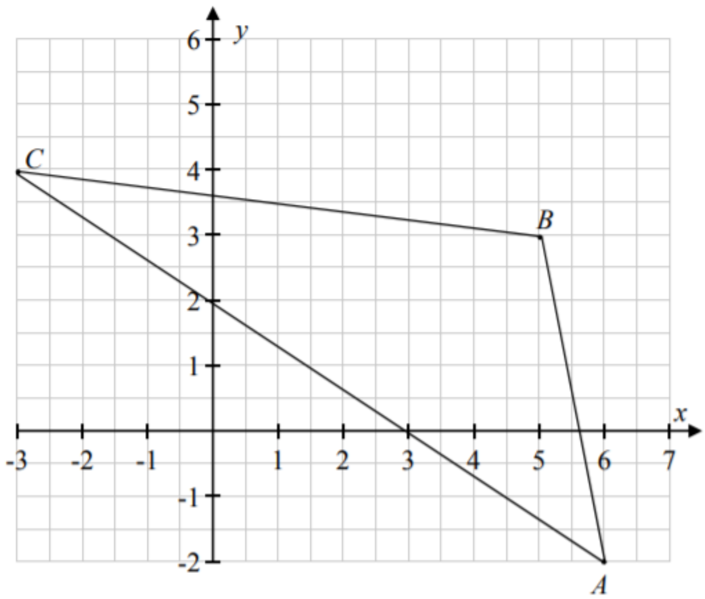
Prove that the triangles ΔCDE and ΔFGH are congruent.



Q7.

The points $A(6, -2)$, $B(5, 3)$ and $C(-3, 4)$ are shown on the diagram.

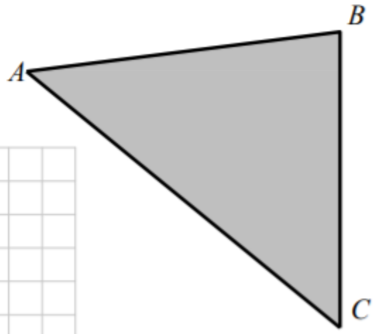
(a) Find the equation of the line through B which is perpendicular to AC.



(b) Use your answer to part **(a)** above to find the co-ordinates of the orthocentre of the triangle ABC.

Q8.

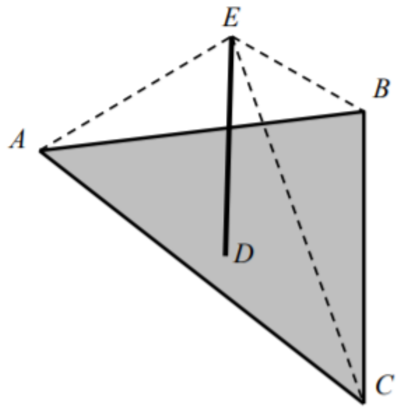
The lengths of the sides of a flat triangular field ACB are,
$|AB| = 120$ m, $|BC| = 134$ m and $|AC| = 150$ m.



(a) **(i)** Find $|\angle CBA|$. Give your answer, in degrees, correct to two decimal places.

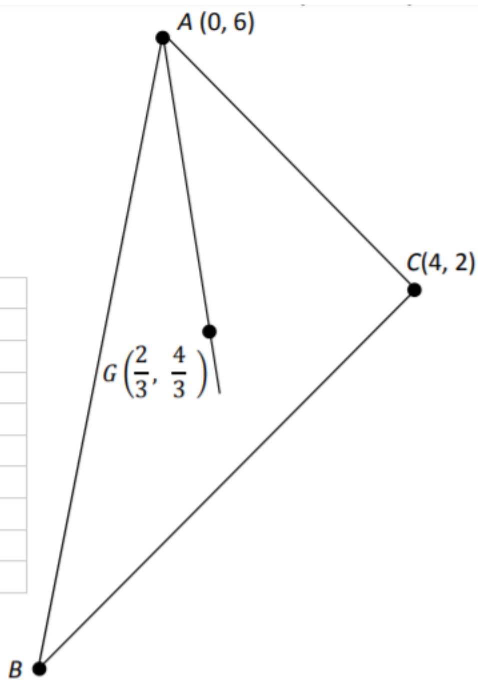
(ii) Find the area of the triangle ACB correct to the nearest whole number.

(b) A vertical mast, $[DE]$, is fixed at the circumcentre, D, of the triangle. The mast is held in place by three taut cables $[EA]$, $[EB]$ and $[EC]$. Explain why the three cables are equal in length.



Q9.

ABC is a triangle where the co-ordinates of A and C are $(0, 6)$ and $(4, 2)$ respectively.
$G\left(\frac{2}{3}, \frac{4}{3}\right)$ is the centroid of the triangle ABC.
AG intersects BC at the point P.
$|AG| : |GP| = 2 : 1$.



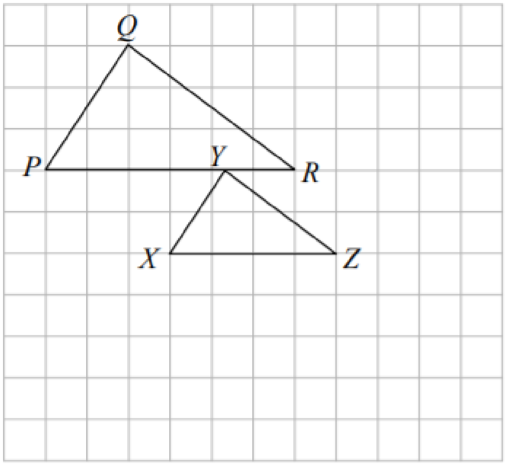
(a) Find the co-ordinates of P.

(b) Find the co-ordinates of B.

(c) Prove that C is the orthocentre of the triangle ABC.

Q10.

Two triangles are drawn on a square grid as shown. The points P, Q, R, X, and Z are on vertices of the grid, and the point Y lies on $[PR]$. The triangle PQR is an enlargement of the triangle XYZ.



(a) Calculate the scale factor of the enlargement, showing your work.

(b) By construction or otherwise, locate the centre of enlargement on the diagram above.

(c) Calculate $|YR|$ in grid units.