

Paper prepared by

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NAME:

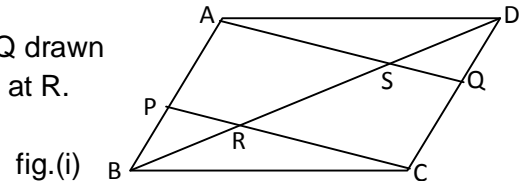
SECOND TERM

MATHEMATICS WORKSHEET III- AREAS OF PARALLELOGRAMS AND TRIANGLES.

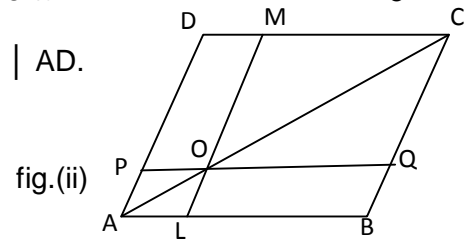
Don't forget:-

- Two congruent figures have equal area.
- Parallelograms on the same base and between the same parallels are equal in area. And its converse.
- If a triangle and a parallelogram are on the base and between same parallels, then the area of the triangle is equal to half the area of the parallelogram.
- Two triangles on the same base and between the same parallels are equal in area. And its converse.

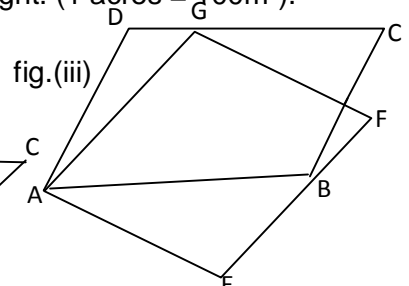
1. In a parallelogram ABCD, P is any point on the side AB. A line AQ drawn parallel to PC intersects DC at Q. BD intersects AQ at S and PC at R. Prove that $ar(\triangle PRB) = ar(\triangle QSD)$.



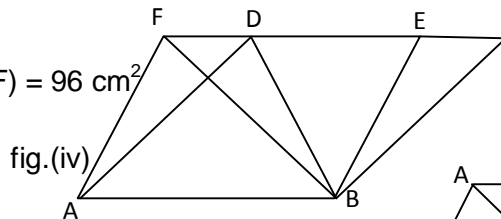
2. ABCD is a parallelogram. O is any point on AC. $PQ \parallel AB$ and $LM \parallel AD$. Prove that $ar(DPOM) = ar(BLOQ)$.



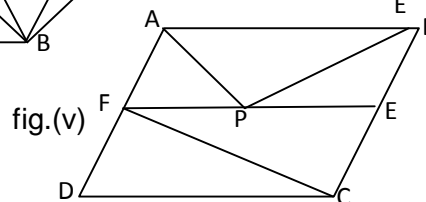
3. In a parallelogram ABCD $AB = 7.5$ cm, $BC = 5$ cm and perpendicular from A to DC = 3 cm. Find the length of the perpendicular drawn from B to AD.
4. The area of a parallelogram is $1\frac{1}{2}$ acres. Its base is 20m. Find its height. (1 acres = $100m^2$).
5. In the given figure(iii) ABCD and AEFB are two parallelograms. Prove that $ar(ABCD) = ar(AEFB)$. (hint: join BG).



6. In the given figure(iv) if $ar(ABEF) = 96$ cm² find (i) $ar(ABCD)$
(ii) $ar(\triangle BEF)$

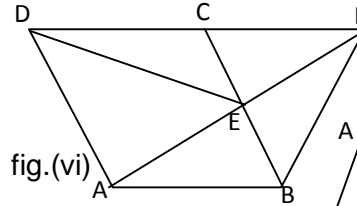


7. F, E are respectively mid-points of side AD, BC of parallelogram ABCD (fig v). P is any point on FE. Prove that $ar(\triangle APB) = ar(\triangle ECF)$.

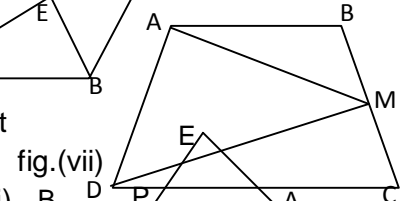


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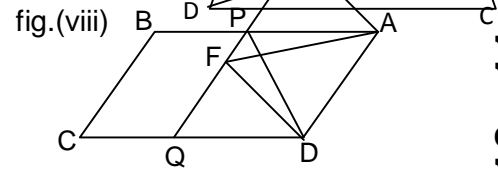
8. If ABCD is parallelogram, then prove that $ar(\triangle ABD) = ar(\triangle BCD)$ $ar(\triangle ABC) = ar(\triangle ACD) = \frac{1}{2} ar(ABCD)$.
9. Through the vertex A of parallelogram ABCD (fig vi), a line AEF is drawn to meet BC at E and DC produced at . Show that the triangles BEF and DCE are equal in area.



10. In the given figure(vii) ABCD is a trapezium with $AB \parallel DC$.M is the mid-point of BC. Prove that $ar(\triangle AMD) = \frac{1}{2} ar(\text{trapezium } ABCD)$.

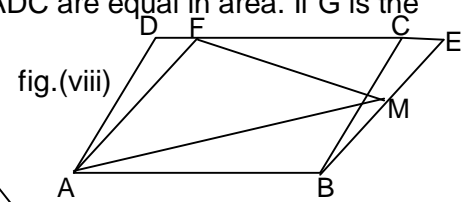


11. ABCD and AEFD are two parallelograms. Prove that
 (i). $ar(\triangle PEA) = ar(\triangle QFD)$
 (ii). $ar(\triangle PEA) : ar(\triangle PFA) = ar(\triangle QFD) : ar(\triangle PFD)$
 (iii). $PE = FQ$.

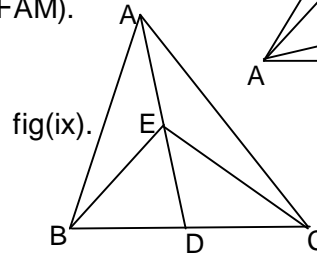


12. If AD is a median of $\triangle ABC$, then prove that the triangles ADB and ADC are equal in area. If G is the mid-point of median AD, prove that $ar(\triangle BGC) = 2ar(\triangle AGC)$.

13. ABCD and ABEF are parallelograms. M is any point of EB. If $ar(ABCD) = 28 \text{ cm}^2$, then find the $ar(\triangle FAM)$.



14. In the following figure(ix), E is the mid-point of median AD of a triangle ABC. Show that:
 $ar(\triangle BED) = \frac{1}{4} ar(\triangle ABC)$.



15. Prove that the parallelograms on the same base and between the same parallels are equal in area.

16. ABCD is a parallelogram and L and M are points on CD and AD respectively. Prove that $ar(\triangle ALB) = ar(\triangle BMC)$.

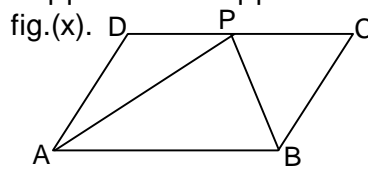
17. Prove that the three straight lines joining the mid-points of the sides of a triangle divide the triangle into four triangles of equal areas.

18. AD is a median of triangle ABC. X is any point on AD. Show that $ar(\triangle ABX) = ar(\triangle ACX)$.

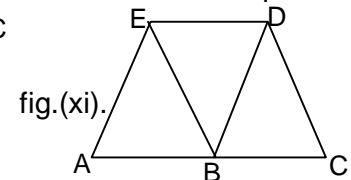
19. ABC is a triangle in which P and Q are the midpoints of AB and AC respectively. BQ and CP intersect each others at L. Prove that $ar(\triangle BLC) = ar(\text{quad } APLQ)$.

20. ABCD is a trapezium with $AB \parallel DC$. A line parallel to AC intersects AB at X and BC at Y. Prove that $ar(\triangle ADX) = ar(\triangle ACY)$.

21. XY is parallel to side BC of triangle ABC. If $BE \parallel AC$ and $CF \parallel AB$ meet XY at E and F respectively. Show that $ar(\triangle ABE) = ar(\triangle ACF)$.

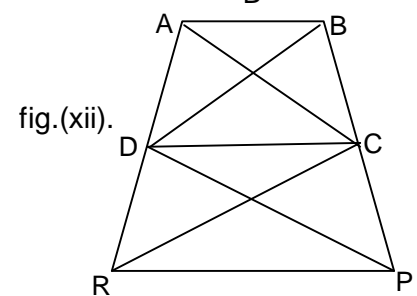


22. In figure(x), ABCD is a parallelogram and P is any point on the side CD. Prove that $ar(\triangle ADP) + ar(\triangle BCP) = \frac{1}{2} ar(ABCD)$.

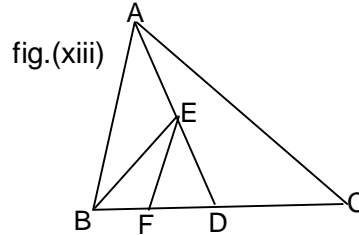


23. In figure(xi), ABDE and BCDE are two parallelograms, such that $AB = AC$. Show that $ar(\triangle BDE) = \frac{1}{3} ar(ACDE)$.

24. In figure (xii), $ar(\triangle DRC) = ar(\triangle DPC) = ar(\triangle BDP) = ar(\triangle ARC)$. Show that both the quadrilaterals ABCD and DPCR are trapeziums.



25. Prove that the median of a triangle divide the triangle in two triangles of equal area. Using this fact in the given figure (xiii), prove that $\text{ar}(\triangle BEF) = \frac{1}{8}\text{ar}(\triangle ABC)$, if EF is median of $\triangle BED$ and E is a mid-point of median AD.



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