

- 1 Draw a straight line AB divided into five equal parts by the points C, D, E and F. Write down the value of each of the following ratios:
- a) AD:DB b) AF:FB c) CD:DB d) AD:DF e) AC:CB

- 2 Find the midpoint of the line joining A $(-3, -4, 7)$ and B $(5, -6, -1)$.

- 3 Find the coordinates of P which divides the line AB where: $\triangle HPQ$

- a) A is $(3, 4, 5)$ and B is $(7, 12, 9)$ in the ratio 3:1
 b) A is $(2, 0, -5)$ and B is $(8, 12, 1)$ in the ratio 1:2
 c) A is $(9, 3, -8)$ and B is $(14, -7, 7)$ in the ratio 3:2
 d) A is $(-7, 1, 2)$ and B is $(-4, 10, -4)$ in the ratio 2:1
 e) A is $(1, 4, 7)$ and B is $(9, 4, -9)$ in the ratio 3:5
 f) A is $(-3, -1, -6)$ and B is $(4, 13, -13)$ in the ratio 4:3

- 5 Triangle ABC has vertices A $(6, 2)$, B $(8, -6)$ and C $(16, -2)$. D is the midpoint of BC and P divides AD in the ratio 2:1. E is the midpoint of AC and Q divides BE in the ratio 2:1. F is the midpoint of AB and R divides CF in the ratio 2:1.

- a) Find the coordinates of P, Q and R.
 b) Make two comments about the medians of this triangle.
 c) What name is given to the point of intersection of the medians of a triangle?

- 6 The points C $(4, -2, 0)$, D $(10, 4, -6)$ and E $(13, x, y)$ are collinear.

- a) State the ratio in which D divides CE.
 b) State the values of x and y.

- 7 The points C $(-3, 5, 6)$, D $(1, -3, 2)$ and E $(9, p, q)$ are collinear. State the values of p and q.

- 8 KLMN is a parallelogram with vertices K $(-1, -6, 2)$, L $(7, -2, -10)$, M $(5, 12, -10)$ and N $(-3, 8, 2)$. P is the midpoint of KL and Q divides NP in the ratio 2:1. Show that K, Q and M are collinear and find the ratio in which Q divides KM. ACE

- 1 a) 2:3 3 a) $(6, 10, 8)$ 5 a) Each of P, Q and R is $(10, -2)$.
 b) 4:1 b) $(4, 4, -3)$ b) The medians are concurrent. The point of intersection divides each median in the ratio 2:1.
 c) 1:3 c) $(12, -3, 1)$ c) The centroid
 d) 1:1 d) $(-5, 7, -2)$ 6 a) 2:1
 e) 1:4 e) $(4, 4, 1)$ b) $x = 7, y = -9$
 2 $(1, -5, 3)$ f) $(1, 7, -10)$ 7 $p = -19, q = -6$
 8 1:2