Exercise 5.1

1. Find the distance between the points in each case below.
   (a) (2, 3) and (6, −4)
   (b) (−3, 4) and (3, −8)
   (c) (−5, −8) and (3, 5)
   (d) (−4, 2) and (5, −2)

2. Find the gradient of the straight line which passes through each of the following pairs of points.
   (a) (1, 2), (3, 5)
   (b) (−2, 5), (3, 7)
   (c) (5, −4), (−8, 6)
   (d) (−3, −4), (4, −1)

3. Determine, by comparing gradients, if the points are collinear (i.e. lie on a same straight line) in each of the following cases.
   (a) (0, 1), (2, 5), (−2, −3)
   (b) (1, 2), (0, −1), (−1, −4)
   (c) (−3, 4), (1, 2), (10, −3)
   (d) (−6, −4), (0, 2), (8, 10)

EXT I Ratio Formula

4. Find the coordinates of the point which divides AB in the ratio given in each of the following cases.
   (a) $A(2, 1)$ and $B(10, 7)$ in the ratio 1 : 2,
   (b) $A(−3, 2)$ and $B(6, −4)$ in the ratio 2 : 3,
   (c) $A(−5, −8)$ and $B(−1, 7)$ in the ratio 2 : 5,
   (d) $A(3, −2)$ and $B(−4, 2)$ in the ratio −2 : 3,
   (e) $A(−3, −4)$ and $B(2, 3)$ in the ratio 4 : −1.

5. Find the centroid of each of the following triangles ABC with vertices as follows.
   (a) $A(1, 1)$, $B(5, 3)$, $C(2, 8)$
   (b) $A(7, 4)$, $B(−3, 1)$, $C(11, −2)$
   (c) $A(−\frac{5}{2}, \frac{5}{2})$, $B(−6, −5)$, $C(4, −2)$

Exercise 5.1

1. (a) $\sqrt{65}$ (b) $6\sqrt{5}$
   (c) $\sqrt{233}$ (d) $\sqrt{97}$

2. (a) $\frac{3}{2}$ (b) $\frac{2}{5}$
   (c) $-\frac{10}{13}$ (d) $\frac{3}{7}$

3. (a) Yes
   (b) No
   (b) Yes
   (d) Yes

4. (a) $\left(\frac{14}{3}, 3\right)$ (b) $\left(\frac{3}{5}, -\frac{2}{5}\right)$
   (c) $\left(-\frac{27}{7}, -\frac{26}{7}\right)$ (d) $(17, -10)$
   (e) $\left(\frac{11}{3}, \frac{16}{3}\right)$

5. (a) $\left(\frac{8}{3}, 4\right)$ (b) $(5, 1)$
   (c) $\left(-\frac{3}{2}, -\frac{3}{2}\right)$