

Answers

Q1 Vertical transformations:

- | | | |
|--|------------------------------------|---|
| a) $(2, -3)$ and $(6, 5)$ | b) $(2, -6)$ and $(6, 2)$ | c) $(2, -15)$ and $(6, 9)$ |
| d) $(2, -\frac{5}{2})$ and $(6, \frac{3}{2})$ | e) $(2, 10)$ and $(6, -6)$ | f) $(2, \frac{10}{3})$ and $(6, -2)$ |
| g) $(2, -9)$ and $(6, 7)$ | h) $(2, 15)$ and $(6, -17)$ | i) $(2, 11)$ and $(6, 3)$ |

Q2 Horizontal transformations:

- | | | |
|-----------------------------------|---|---|
| a) $(1, -5)$ and $(3, 3)$ | b) $(-\frac{2}{3}, -5)$ and $(-2, 3)$ | c) $(0, -5)$ and $(4, 3)$ |
| d) $(3, -5)$ and $(7, 3)$ | e) $(\frac{1}{2}, -5)$ and $(\frac{5}{2}, 3)$ | f) $(8, -5)$ and $(16, 3)$ |
| g) $(2, -5)$ and $(-2, 3)$ | h) $(\frac{1}{2}, -5)$ and $(-\frac{3}{2}, 3)$ | i) $(-\frac{9}{4}, -5)$ and $(-\frac{21}{4}, 3)$ |

Q3 Two-dimensional transformations:

- | | | |
|--|------------------------------------|---|
| a) $(5, -10)$ and $(9, 6)$ | b) $(1, -1)$ and $(3, 7)$ | c) $(\frac{1}{2}, -15)$ and $(\frac{3}{2}, 9)$ |
| d) $(-1, \frac{5}{2})$ and $(-3, -\frac{3}{2})$ | e) $(-2, 7)$ and $(2, -1)$ | f) $(-9, -1)$ and $(3, 7)$ |
| g) $(1, -7)$ and $(5, -9)$ | h) $(4, -16)$ and $(12, 8)$ | i) $(5, -15)$ and $(1, 9)$ |
| j) $(2, -15)$ and $(10, 1)$ | k) $(3, -14)$ and $(5, 10)$ | l) $(0, 8)$ and $(-\frac{16}{3}, -8)$ |