

### SOLUTIONS: Midpoint

1)  $A(-3, 4)$  and  $B(5, -2)$

$$x_m = \frac{x_1 + x_2}{2}$$
$$x_m = \frac{(-3) + (5)}{2}$$
$$x_m = \frac{2}{2}$$
$$x_m = 1$$

$$y_m = \frac{y_1 + y_2}{2}$$
$$y_m = \frac{(2) + (4)}{2}$$
$$y_m = \frac{6}{2}$$
$$y_m = 3$$

$M(1, 3)$

2)  $C(-7, -2)$  and  $D(-9, 18)$

$$x_m = \frac{x_1 + x_2}{2}$$
$$x_m = \frac{(-7) + (-9)}{2}$$
$$x_m = \frac{-16}{2}$$
$$x_m = -8$$

$$y_m = \frac{y_1 + y_2}{2}$$
$$y_m = \frac{(-2) + (18)}{2}$$
$$y_m = \frac{16}{2}$$
$$y_m = 8$$

$M(-8, 8)$

3)  $E(8, 25)$  and  $F(44, 77)$

$$x_m = \frac{x_1 + x_2}{2}$$
$$x_m = \frac{(8) + (44)}{2}$$
$$x_m = \frac{52}{2}$$
$$x_m = 26$$

$$y_m = \frac{y_1 + y_2}{2}$$
$$y_m = \frac{(25) + (77)}{2}$$
$$y_m = \frac{102}{2}$$
$$y_m = 51$$

$M(26, 51)$

4)  $G(13, 12)$  and  $H(-5, 56)$

$$x_m = \frac{x_1 + x_2}{2}$$
$$x_m = \frac{(13) + (-5)}{2}$$
$$x_m = \frac{8}{2}$$
$$x_m = 4$$

$$y_m = \frac{y_1 + y_2}{2}$$
$$y_m = \frac{(12) + (56)}{2}$$
$$y_m = \frac{68}{2}$$
$$y_m = 34$$

$M(4, 34)$

5)  $I(-15, 4)$  and  $J(32, -98)$

$$x_m = \frac{x_1 + x_2}{2}$$
$$x_m = \frac{(-15) + (32)}{2}$$
$$x_m = \frac{17}{2}$$
$$x_m = 8.5$$

$$y_m = \frac{y_1 + y_2}{2}$$
$$y_m = \frac{(4) + (-98)}{2}$$
$$y_m = \frac{-94}{2}$$
$$y_m = -47$$

$M(8.5, -47)$



6)  $K(9, 17)$   $M(36, 25)$

$$x_m = \frac{x_1 + x_2}{2}$$

$$36 = \frac{(9) + (x)}{2}$$

$$2(36) = \left( \frac{(9) + (x)}{2} \right) 2$$

$$72 = 9 + x$$

$$72 - 9 = x$$

$$63 = x$$

$$y_m = \frac{y_1 + y_2}{2}$$

$$25 = \frac{(17) + (y)}{2}$$

$$2(25) = \left( \frac{(17) + (x)}{2} \right) 2$$

$$50 = 17 + x$$

$$50 - 17 = x$$

$$33 = x$$

$L(63, 33)$

7)  $P(-23, 48)$   $M(54, -22)$

$$x_m = \frac{x_1 + x_2}{2}$$

$$54 = \frac{(-23) + (x)}{2}$$

$$2(54) = \left( \frac{(-23) + (x)}{2} \right) 2$$

$$108 = -23 + x$$

$$108 + 23 = x$$

$$131 = x$$

$$y_m = \frac{y_1 + y_2}{2}$$

$$-22 = \frac{(48) + (y)}{2}$$

$$2(-22) = \left( \frac{(48) + (x)}{2} \right) 2$$

$$-44 = 48 + x$$

$$-44 - 48 = x$$

$$-92 = x$$

$Q(131, -92)$

8)  $R(16, -3)$   $M(-4, 8)$

$$x_m = \frac{x_1 + x_2}{2}$$

$$-4 = \frac{(16) + (x)}{2}$$

$$2(-4) = \left( \frac{(16) + (x)}{2} \right) 2$$

$$-8 = 16 + x$$

$$-8 - 16 = x$$

$$-24 = x$$

$$y_m = \frac{y_1 + y_2}{2}$$

$$-3 = \frac{(-3) + (y)}{2}$$

$$2(8) = \left( \frac{(-3) + (x)}{2} \right) 2$$

$$16 = -3 + x$$

$$16 + 3 = x$$

$$19 = x$$

$S(-24, 19)$

9)  $T(-4, -5)$   $M(-9, 13)$

$$x_m = \frac{x_1 + x_2}{2}$$

$$-9 = \frac{(-4) + (x)}{2}$$

$$2(-9) = \left( \frac{(-4) + (x)}{2} \right) 2$$

$$-18 = -4 + x$$

$$-18 + 4 = x$$

$$-14 = x$$

$$y_m = \frac{y_1 + y_2}{2}$$

$$13 = \frac{(-5) + (y)}{2}$$

$$2(13) = \left( \frac{(-5) + (x)}{2} \right) 2$$

$$26 = -5 + x$$

$$26 + 5 = x$$

$$31 = x$$

$Q(-14, 31)$

10)  $V(8, 19)$   $M(-12, 41)$

$$x_m = \frac{x_1 + x_2}{2}$$

$$-12 = \frac{(8) + (x)}{2}$$

$$2(-12) = \left( \frac{(8) + (x)}{2} \right) 2$$

$$-24 = 8 + x$$

$$-24 - 8 = x$$

$$-32 = x$$

$$y_m = \frac{y_1 + y_2}{2}$$

$$41 = \frac{(19) + (y)}{2}$$

$$2(41) = \left( \frac{(19) + (x)}{2} \right) 2$$

$$82 = 19 + x$$

$$82 - 19 = x$$

$$63 = x$$

$W(-32, 63)$