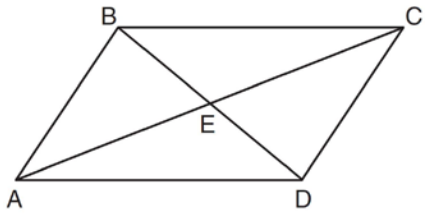
Name: _____

G.CO.A.1: Midpoint 1a

1 In the diagram below, parallelogram $ABCD$ has vertices $A(1,3)$, $B(5,7)$, $C(10,7)$, and $D(6,3)$. Diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E.

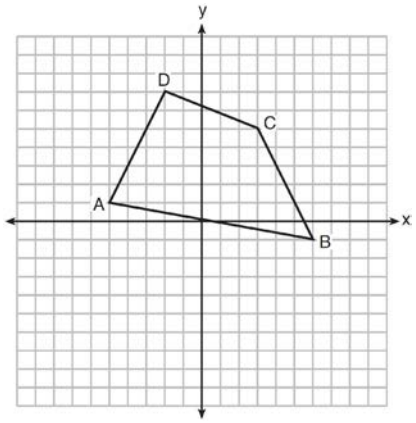


(Not drawn to scale)

What are the coordinates of point E?

1) $(0.5,2)$
2) $(4.5,2)$
3) $(5.5,5)$
4) $(7.5,7)$

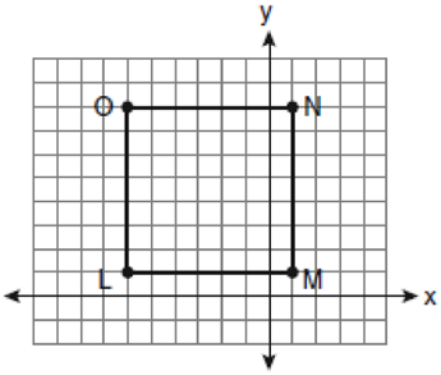
2 In the diagram below, quadrilateral $ABCD$ has vertices $A(-5,1)$, $B(6,-1)$, $C(3,5)$, and $D(-2,7)$.



What are the coordinates of the midpoint of diagonal $\overline{AC}$?

1) $(-1,3)$
2) $(1,3)$
3) $(1,4)$
4) $(2,3)$

3 Square $LMNO$ is shown in the diagram below.



What are the coordinates of the midpoint of diagonal $\overline{LN}$?

1) $\left(4\frac{1}{2},-2\frac{1}{2}\right)$
2) $\left(-3\frac{1}{2},3\frac{1}{2}\right)$
3) $\left(-2\frac{1}{2},3\frac{1}{2}\right)$
4) $\left(-2\frac{1}{2},4\frac{1}{2}\right)$

4 What are the coordinates of the midpoint of the line segment with endpoints $(2,-5)$ and $(8,3)$?

1) $(3,-4)$
2) $(3,-1)$
3) $(5,-4)$
4) $(5,-1)$

5 The endpoints of $\overline{CD}$ are $C(-2,-4)$ and $D(6,2)$. What are the coordinates of the midpoint of $\overline{CD}$?

1) $(2,3)$
2) $(2,-1)$
3) $(4,-2)$
4) $(4,3)$

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6 A line segment has endpoints $A(7,-1)$ and $B(-3,3)$. What are the coordinates of the midpoint of $\overline{AB}$?
1) $(1,2)$
2) $(2,1)$
3) $(-5,2)$
4) $(5,-2)$

7 The coordinates of A are $(-9,2)$ and the coordinates of G are $(3,14)$. What are the coordinates of the midpoint of $\overline{AG}$?
1) $(-3,8)$
2) $(-6,6)$
3) $(-6,16)$
4) $(-21,-10)$

8 Line segment AB has endpoints $A(2,-3)$ and $B(-4,6)$. What are the coordinates of the midpoint of $\overline{AB}$?
1) $(-2,3)$
2) $\left(-1,1\frac{1}{2}\right)$
3) $(-1,3)$
4) $\left(3,4\frac{1}{2}\right)$

9 What is the midpoint of the line segment that joins points $(4,-2)$ and $(-2,5)$?
1) $\left(1,\frac{3}{2}\right)$
2) $\left(\frac{3}{2},3\right)$
3) $\left(1,\frac{7}{2}\right)$
4) $\left(2,\frac{3}{2}\right)$

10 What are the coordinates of the center of a circle if the endpoints of its diameter are $A(8,-4)$ and $B(-3,2)$?
1) $(2.5,1)$
2) $(2.5,-1)$
3) $(5.5,-3)$
4) $(5.5,3)$

11 If a line segment has endpoints $A(3x+5,3y)$ and $B(x-1,-y)$, what are the coordinates of the midpoint of $\overline{AB}$?
1) $(x+3,2y)$
2) $(2x+2,y)$
3) $(2x+3,y)$
4) $(4x+4,2y)$

12 Point M is the midpoint of $\overline{AB}$. If the coordinates of A are $(-3,6)$ and the coordinates of M are $(-5,2)$, what are the coordinates of B?
1) $(1,2)$
2) $(7,10)$
3) $(-4,4)$
4) $(-7,-2)$

13 The midpoint of $\overline{AB}$ is $M(4,2)$. If the coordinates of A are $(6,-4)$, what are the coordinates of B?
1) $(1,-3)$
2) $(2,8)$
3) $(5,-1)$
4) $(14,0)$

14 Point M is the midpoint of $\overline{AB}$. If the coordinates of M are $(2,8)$ and the coordinates of A are $(10,12)$, what are the coordinates of B?
1) $(6,10)$
2) $(-6,4)$
3) $(-8,-4)$
4) $(18,16)$

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15 M is the midpoint of $\overline{AB}$. If the coordinates of A are $(-1,5)$ and the coordinates of M are $(3,3)$, what are the coordinates of B?
1) $(1,4)$
2) $(2,8)$
3) $(7,1)$
4) $(-5,7)$

16 The midpoint of $\overline{AB}$ has coordinates of $(5,-1)$. If the coordinates of A are $(2,-3)$, what are the coordinates of B?
1) $(8,1)$
2) $(8,-5)$
3) $(7,0)$
4) $(3.5,-2)$

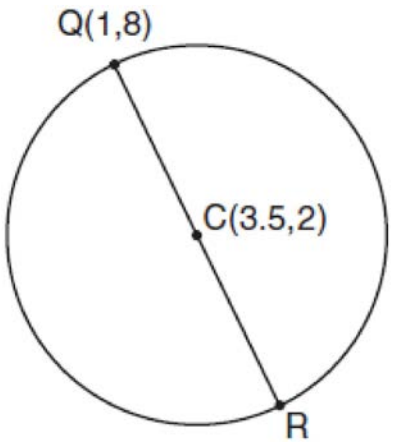
17 The midpoint of $\overline{AB}$ is $(-1,5)$ and the coordinates of point A are $(-3,2)$. What are the coordinates of point B?
1) $(1,8)$
2) $(1,10)$
3) $(0,7)$
4) $(-5,8)$

18 A line segment on the coordinate plane has endpoints $(2,4)$ and $(4,y)$. The midpoint of the segment is point $(3,7)$. What is the value of y?
1) 11
2) 10
3) 5
4) -2

19 Segment AB is the diameter of circle M. The coordinates of A are $(-4,3)$. The coordinates of M are $(1,5)$. What are the coordinates of B?
1) $(6,7)$
2) $(5,8)$
3) $(-3,8)$
4) $(-5,2)$

20 Line segment AB is a diameter of circle O whose center has coordinates $(6,8)$. What are the coordinates of point B if the coordinates of point A are $(4,2)$?
1) $(1,3)$
2) $(5,5)$
3) $(8,14)$
4) $(10,10)$

21 In the diagram below of circle C, $\overline{QR}$ is a diameter, and $Q(1,8)$ and $C(3.5,2)$ are points on a coordinate plane. Find and state the coordinates of point R.



22 In circle O, diameter $\overline{RS}$ has endpoints $R(3a,2b-1)$ and $S(a-6,4b+5)$. Find the coordinates of point O, in terms of a and b. Express your answer in simplest form.

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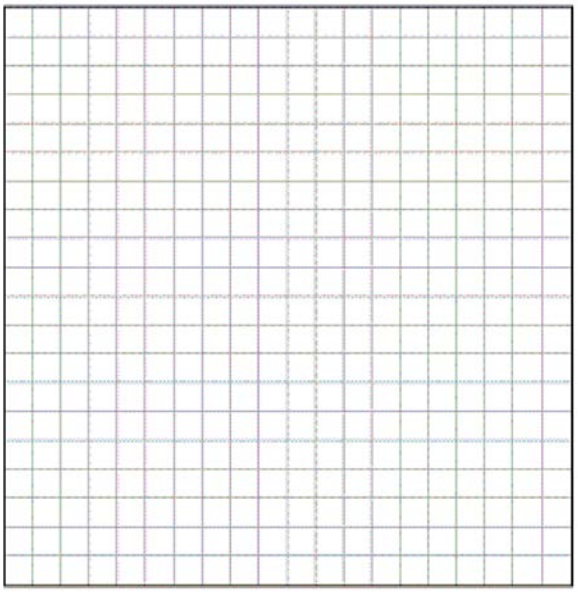
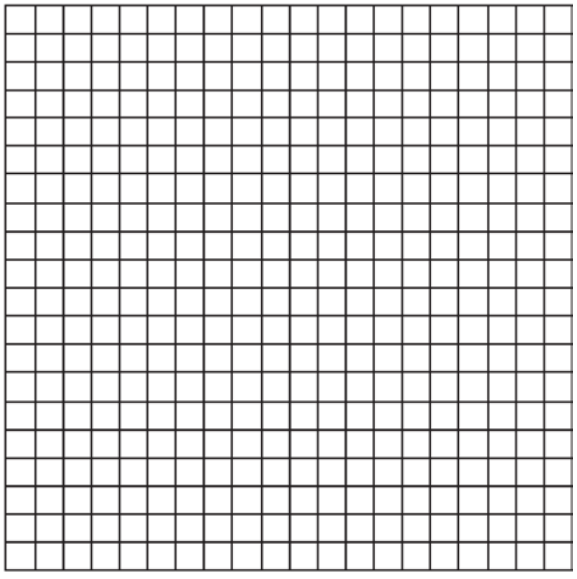
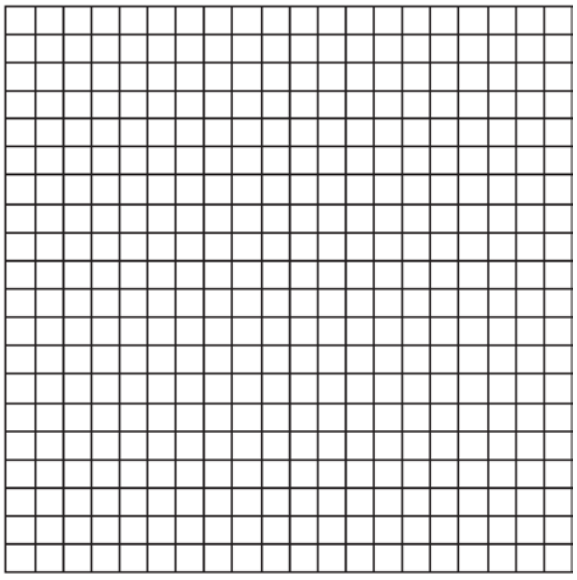
23 The midpoint M of line segment AB has coordinates $(-3,4)$. If point A is the origin, $(0,0)$, what are the coordinates of point B? [The use of the accompanying grid is optional.]



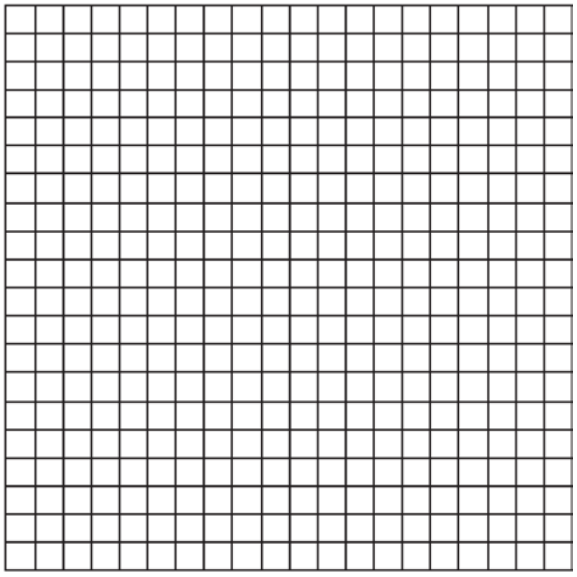
24 The coordinates of the midpoint of $\overline{AB}$ are $(2,4)$, and the coordinates of point B are $(3,7)$. What are the coordinates of point A? [The use of the accompanying grid is optional.]



25 In a circle whose center is $(2,3)$, one endpoint of a diameter is $(-1,5)$. Find the coordinates of the other endpoint of that diameter. [The use of the accompanying grid is optional.]



26 One endpoint of a line segment is $(6,2)$. The midpoint of the segment is $(2,0)$. Find the coordinates of the other endpoint. [The use of the grid is optional.]



G.CO.A.1: Midpoint 1a
Answer Section

1 ANS: 3

$M_x = \frac{1+10}{2} = \frac{11}{2} = 5.5 \;\; M_y = \frac{3+7}{2} = \frac{10}{2} = 5.$

REF: 081407ge

2 ANS: 1

$M_x = \frac{-5+3}{2} = \frac{-2}{2} = -1. \;\; M_y = \frac{1+5}{2} = \frac{6}{2} = 3.$

REF: 061402ge

3 ANS: 4

$M_x = \frac{-6+1}{2} = -\frac{5}{2}. \;\; M_y = \frac{1+8}{2} = \frac{9}{2}.$

REF: 060919ge

4 ANS: 4

$M_x = \frac{2+8}{2} = 5. \;\; M_Y = \frac{-5+3}{2} = -1.$

REF: 011502ge

5 ANS: 2

$M_x = \frac{-2+6}{2} = 2. \;\; M_y = \frac{-4+2}{2} = -1$

REF: 080910ge

6 ANS: 2

$M_x = \frac{7+(-3)}{2} = 2. \;\; M_Y = \frac{-1+3}{2} = 1.$

REF: 011106ge

7 ANS: 1

$M_x = \frac{-9+3}{2} = -3. \;\; M_y = \frac{2+14}{2} = 8.$

REF: 080624a

8 ANS: 2

$M_x = \frac{2+(-4)}{2} = -1. \;\; M_Y = \frac{-3+6}{2} = \frac{3}{2}.$

REF: fall0813ge

9 ANS: 1

$M_x = \frac{4+(-2)}{2} = 1.\ M_y = \frac{-2+5}{2} = \frac{3}{2}.$

REF: 060822a

10 ANS: 2

$M_x = \frac{8+(-3)}{2} = 2.5.\ M_Y = \frac{-4+2}{2} = -1.$

REF: 061312ge

11 ANS: 2

$M_x = \frac{3x+5+x-1}{2} = \frac{4x+4}{2} = 2x+2.\ M_Y = \frac{3y+(-y)}{2} = \frac{2y}{2} = y.$

REF: 081019ge

12 ANS: 4

$-5 = \frac{-3+x}{2}. \quad 2 = \frac{6+y}{2}$

$-10 = -3+x \qquad 4 = 6+y$

$-7 = x \qquad -2 = y$

REF: 081203ge

13 ANS: 2

$\frac{6+x}{2} = 4. \quad \frac{-4+y}{2} = 2$

$x = 2 \qquad y = 8$

REF: 011401ge

14 ANS: 2

$2 = \frac{10+x}{2}. \quad 8 = \frac{12+y}{2}$

$4 = 10+x \quad 16 = 12+y$

$-6 = x \qquad 4 = y$

REF: 061505ge

15 ANS: 3

$M_x = \frac{x_A + x_B}{2} \quad M_y = \frac{y_A + y_B}{2}$

$3 = \frac{-1+x_B}{2}. \quad 3 = \frac{5+y_B}{2}$.

$x_B = 7 \qquad y_B = 1$

REF: 080217a

16 ANS: 1

$$M_x = \frac{x_A + x_B}{2} \qquad M_y = \frac{y_A + y_B}{2}$$

$$5 = \frac{2 + x_B}{2} \quad . \qquad -1 = \frac{-3 + y_B}{2} .$$

$$x_B = 8 \qquad y_B = 1$$

REF: 010914a

17 ANS: 1

$$M_x = \frac{x_A + x_B}{2} \qquad M_y = \frac{y_A + y_B}{2}$$

$$-1 = \frac{-3 + x_B}{2} . \qquad 5 = \frac{2 + y_B}{2} \quad .$$

$$x_B = 1 \qquad y_B = 8$$

REF: 010718a

18 ANS: 2

$$M_y = \frac{y_A + y_B}{2}$$

$$7 = \frac{4 + y_B}{2}$$

$$y_B = 10$$

REF: 080515a

19 ANS: 1

$$1 = \frac{-4 + x}{2}. \qquad 5 = \frac{3 + y}{2}.$$

$$-4 + x = 2 \qquad 3 + y = 10$$

$$x = 6 \qquad y = 7$$

REF: 081115ge

20 ANS: 3

$$6 = \frac{4 + x}{2}. \qquad 8 = \frac{2 + y}{2}.$$

$$4 + x = 12 \qquad 2 + y = 16$$

$$x = 8 \qquad y = 14$$

REF: 011305ge

21 ANS:

(6,–4). $C_x = \dfrac{Q_x + R_x}{2}$. $C_y = \dfrac{Q_y + R_y}{2}$.

$3.5 = \dfrac{1 + R_x}{2}$ $\quad$ $2 = \dfrac{8 + R_y}{2}$

$7 = 1 + R_x$ $\quad$ $4 = 8 + R_y$

$6 = R_x$ $\quad$ $-4 = R_y$

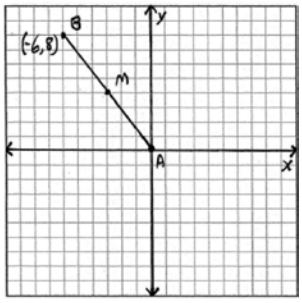
REF: 011031ge

22 ANS:

$(2a - 3, 3b + 2)$. $\left(\dfrac{3a + a - 6}{2}, \dfrac{2b - 1 + 4b + 5}{2}\right) = \left(\dfrac{4a - 6}{2}, \dfrac{6b + 4}{2}\right) = (2a - 3, 3b + 2)$

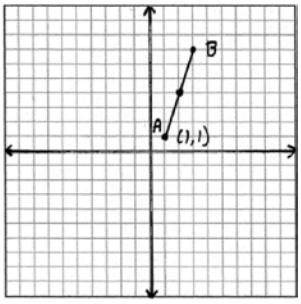
REF: 061134ge

23 ANS:

(–6, 8). 

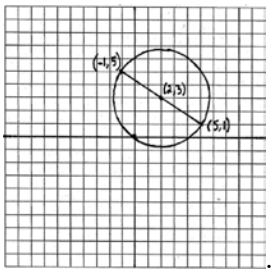
REF: 010021a

24 ANS:

(1,1). 

REF: 060434a

25 ANS:

(5,1). 

. $C_x = \dfrac{A_x + B_x}{2}$. $C_y = \dfrac{A_y + B_y}{2}$.

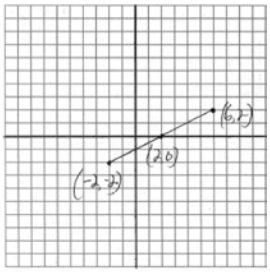
$2 = \dfrac{-1 + R_x}{2}$ $\quad 3 = \dfrac{5 + R_y}{2}$

$4 = -1 + R_x$ $\quad 6 = 5 + R_y$

$5 = R_x$ $\quad 1 = R_y$

REF: 010633a

26 ANS:

(–2,–2). 

REF: 080834a