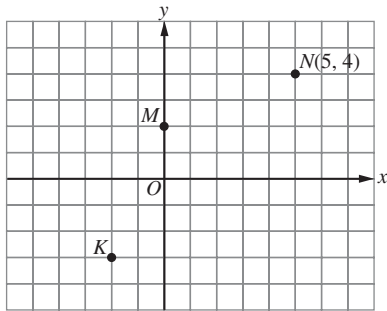


Fully-worked Solutions

Practice 7

Formative Practice

1



The possible coordinates of K are $(-2, -3)$.

Answer: **B**

2 (a) 5 (b) 3 (c) 5 (d) 10

3 (a) $PQ = 10 - 6$

$$= 4 \text{ units}$$

(b) $PQ = 5 - (-2)$

$$= 7 \text{ units}$$

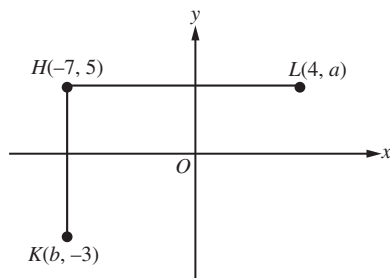
(c) $PQ = 7 - (-11)$

$$= 18 \text{ units}$$

(d) $PQ = -3 - (-14)$

$$= 11 \text{ units}$$

4



A $a = 5$

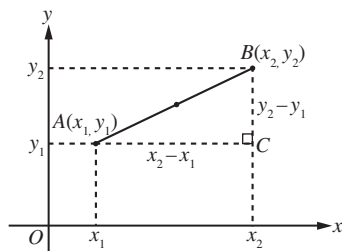
B $b = -7$

C $HL = 4 - (-7) = 4 + 7 = 11$ units

D $HK = 5 - (-3) = 5 + 3 = 8$ units

Answer: **C**

5 (a)



(b) Distance between A and B

$$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

6 (a) Distance between two points

$$= \sqrt{(-7 + 2)^2 + (2 - 6)^2}$$

$$= \sqrt{(-5)^2 + (-4)^2}$$

$$= \sqrt{25 + 16}$$

$$= \sqrt{41}$$

$$= 6.40 \text{ units}$$

(b) Distance between two points

$$= \sqrt{(10 + 4)^2 + (-8 - 2)^2}$$

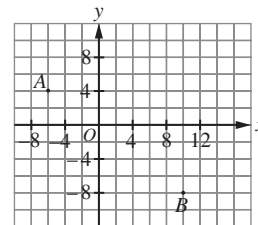
$$= \sqrt{14^2 + (-10)^2}$$

$$= \sqrt{196 + 100}$$

$$= \sqrt{296}$$

$$= 17.20 \text{ units}$$

7 (a)



(b) Distance between A and B

$$= \sqrt{(-6 - 10)^2 + (4 + 8)^2}$$

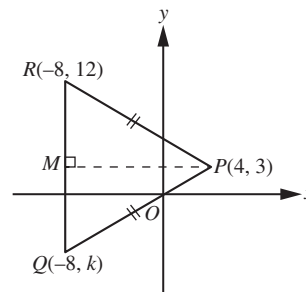
$$= \sqrt{(-16)^2 + 12^2}$$

$$= \sqrt{256 + 144}$$

$$= \sqrt{400}$$

$$= 20 \text{ units}$$

8



(a) $PR = \sqrt{(4 + 8)^2 + (3 - 12)^2}$

$$= \sqrt{12^2 + (-9)^2}$$

$$= \sqrt{144 + 81}$$

$$= \sqrt{225}$$

$$= 15 \text{ units}$$

$$PQ = 15 \text{ units}$$

(b) $M(-8, 3)$ is the midpoint of QR .

$$\begin{aligned} \text{Distance of } RM &= 12 - 3 \\ &= 9 \text{ units} \end{aligned}$$

$$\begin{aligned} \text{Distance of } MQ &= 9 \text{ units} \\ 3 - k &= 9 \end{aligned}$$

$$k = -6$$

(c) $QR = 12 - (-6)$

$$\begin{aligned} &= 12 + 6 \\ &= 18 \text{ units} \end{aligned}$$

9 (a) $AB = 4$ units

$$5 - h = 4$$

$$h = 1$$

CD is parallel to the x -axis.

$$\therefore k = -3$$

(b) (i) Distance of AD

$$= \sqrt{(1 - 6)^2 + (9 + 3)^2}$$

$$= \sqrt{(-5)^2 + 12^2}$$

$$= \sqrt{25 + 144}$$

$$= \sqrt{169}$$

$$= 13 \text{ units}$$

(ii) Distance of BC

$$= \sqrt{(5 - 14)^2 + (9 + 3)^2}$$

$$= \sqrt{(-9)^2 + 12^2}$$

$$= \sqrt{81 + 144}$$

$$= \sqrt{225}$$

$$= 15 \text{ units}$$

(c) Perimeter of trapezium $ABCD$

$$= 4 + 15 + 8 + 13$$

$$= 40 \text{ units}$$

$$10 \quad \left(\frac{x+8}{2}, \frac{7+1}{2}\right) = (5, y)$$

$$\left(\frac{x+8}{2}, 4\right) = (5, y)$$

$$\frac{x+8}{2} = 5$$

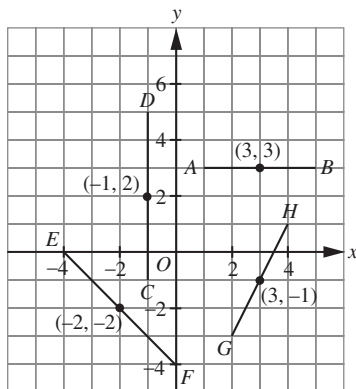
$$x + 8 = 10$$

$$x = 2$$

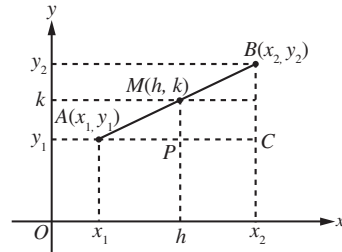
$$y = 4$$

Answer: B

11



12 (a)



(b)

$$AP = PC$$

$$h - x_1 = x_2 - h$$

$$2h = x_1 + x_2$$

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

$$CQ = QB$$

$$k - y_1 = y_2 - k$$

$$2k = y_1 + y_2$$

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

(c) Coordinates of the midpoint of AB

$$= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

13 (a) Coordinates of the midpoint

$$= \left(\frac{3+7}{2}, \frac{0+6}{2}\right)$$

$$= (5, 3)$$

(b) Coordinates of the midpoint

$$= \left(\frac{2-8}{2}, \frac{4-4}{2}\right)$$

$$= (-3, 0)$$

(c) Coordinates of the midpoint

$$= \left(\frac{-1-5}{2}, \frac{9+3}{2}\right)$$

$$= (-3, 6)$$

$$14 \text{ (a) } \frac{x-5}{2} = 6$$

$$x - 5 = 12$$

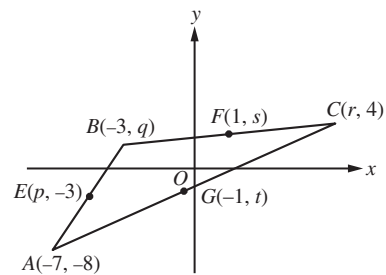
$$x = 17$$

$$\text{(b) } \frac{y+3}{2} = -1$$

$$y + 3 = -2$$

$$y = -5$$

15



$$p = \frac{-7 - 3}{2}$$

$$= -5$$

$$\frac{-8+q}{2} = -3$$

$$-8+q = -6$$

$$q = 2$$

$$\frac{-3+r}{2} = 1$$

$$-3+r = 2$$

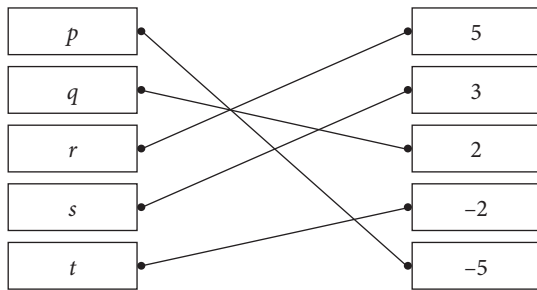
$$r = 5$$

$$s = \frac{2+4}{2}$$

$$= 3$$

$$t = \frac{-8+4}{2}$$

$$= -2$$



16 Midpoint of QS = Midpoint of PR

$$\left(\frac{m+0}{2}, \frac{n+4}{2}\right) = \left(\frac{8+4}{2}, \frac{0+12}{2}\right)$$

$$\left(\frac{m}{2}, \frac{n+4}{2}\right) = (6, 6)$$

$$\frac{m}{2} = 6$$

$$m = 12$$

$$\frac{n+4}{2} = 6$$

$$n+4 = 12$$

$$n = 8$$

17 $M(-2, 9)$ is the midpoint of HK .

$$\frac{-7+r}{2} = -2$$

$$-7+r = -4$$

$$r = 3$$

Answer: A

18 (a) $AD = BC$

$$AD = 6 - 3 = 3 \text{ units}$$

Coordinates of point D are $(-6, -3)$. [✓]

(b) Coordinates of the midpoint of AC

$$= \left(\frac{-6+2}{2}, \frac{0+3}{2}\right)$$

$$= \left(-2, \frac{3}{2}\right) \quad [\times]$$

(c) $AB = \sqrt{(2+6)^2 + (6-0)^2}$

$$= \sqrt{8^2 + 6^2}$$

$$= \sqrt{64 + 36}$$

$$= \sqrt{100}$$

$$= 10 \text{ units}$$

$$\text{Perimeter of } ABCD = 2(10 + 3)$$

$$= 2(13)$$

$$= 26 \text{ units} \quad [\checkmark]$$

19 (a) $PS = 7 - (-5)$

$$= 7 + 5$$

$$= 12 \text{ units}$$

$$RS^2 = 13^2 - 12^2$$

$$= 169 - 144$$

$$= 25$$

$$RS = 5 \text{ units}$$

The coordinates of point R are $(7, 3)$.

(b) (i) Coordinates of the centre of circle

= Coordinates of the midpoint of PR

$$= \left(\frac{-5+7}{2}, \frac{-2+3}{2}\right)$$

$$= \left(1, \frac{1}{2}\right)$$

(ii) $PR = \sqrt{(-5-7)^2 + (-2-3)^2}$

$$= \sqrt{(-12)^2 + (-5)^2}$$

$$= \sqrt{144 + 25}$$

$$= \sqrt{169}$$

$$= 13 \text{ units}$$

Radius of circle

$$= \frac{1}{2}PR$$

$$= \frac{13}{2}$$

$$= 6\frac{1}{2} \text{ units}$$

(c) Distance of K from the centre of circle

$$= \sqrt{(3-1)^2 + \left(6 - \frac{1}{2}\right)^2}$$

$$= \sqrt{2^2 + \left(\frac{11}{2}\right)^2}$$

$$= \sqrt{4 + \frac{121}{4}}$$

$$= \sqrt{\frac{137}{4}}$$

$$= 5.85 \text{ units}$$

The distance of K from the centre of the circle is less than the radius of circle.

$\therefore K$ lies inside the circle.

Summative Practice

1 $PQ = 2 - (-6)$

$$= 2 + 6$$

$$= 8 \text{ units}$$

$QR = 4 - (-2)$

$$= 4 + 2$$

$$= 6 \text{ units}$$

$$PR^2 = (2+6)^2 + (4+2)^2$$

$$= 8^2 + 6^2$$

$$= 100$$

$$PR = 10 \text{ units}$$

$$PQ : QR = 8 : 6 \\ = 4 : 3$$

Answer: **D**

$$2 \quad OP^2 = (4 - 0)^2 + (3 - 0)^2 \\ = 16 + 9 \\ = 25$$

$$OP = 5 \text{ units}$$

$$A \quad OT^2 = (2 - 0)^2 + (5 - 0)^2 \\ = 4 + 25 \\ = 29$$

$$OT = \sqrt{29} \text{ units}$$

$$B \quad OU^2 = (-3 - 0)^2 + (5 - 0)^2 \\ = 9 + 25 \\ = 34$$

$$OU = \sqrt{34} \text{ units}$$

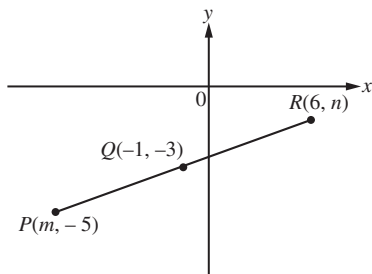
$$C \quad OV = 0 - (-5) \\ = 5 \text{ units}$$

$$D \quad OW^2 = (1 - 0)^2 + (-5 - 0)^2 \\ = 1 + 25 \\ = 26$$

$$OW = \sqrt{26} \text{ units}$$

Answer: **C**

3



$$\left(\frac{m+6}{2}, \frac{-5+n}{2} \right) = (-1, -3)$$

$$\frac{m+6}{2} = -1$$

$$m+6 = -2$$

$$m = -8$$

$$\frac{-5+n}{2} = -3$$

$$-5+n = -6$$

$$n = -1$$

Answer: **A**

4 VW is parallel to the x -axis.

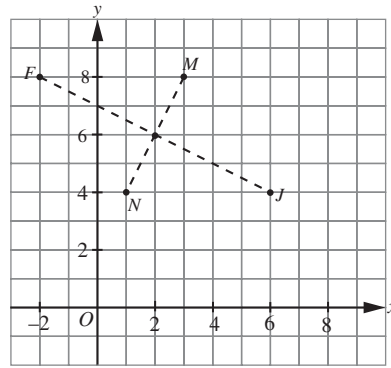
$$VW = 7$$

$$k - 2 = 7 \text{ or } 2 - k = 7$$

$$k = 9 \text{ or } k = -5$$

Answer: **B**

5

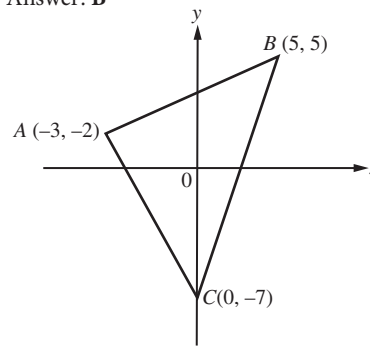


Midpoint of FJ is $(2, 6)$.

The coordinates of point N are $(1, 4)$.

Answer: **B**

6



$$AB^2 = (5 + 3)^2 + (5 + 2)^2 \\ = 8^2 + 7^2 \\ = 113$$

$$BC^2 = (5 - 0)^2 + (5 + 7)^2 \\ = 5^2 + 12^2 \\ = 169$$

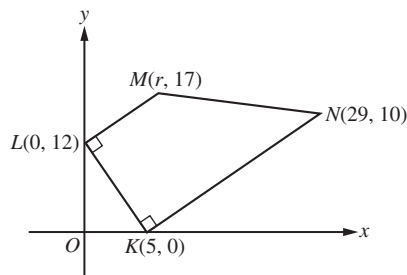
$$AC^2 = (-3 - 0)^2 + (-2 + 7)^2 \\ = (-3)^2 + 5^2 \\ = 34$$

$$AB^2 + AC^2 = 113 + 34 \\ = 147$$

$$AB^2 + AC^2 \neq BC^2$$

$\therefore ABC$ is not a right-angled triangle.

7

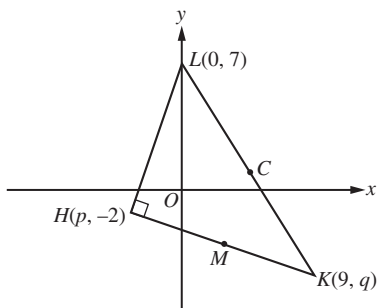


$$(a) \quad KN^2 = (29 - 5)^2 + (10 - 0)^2 \\ = 24^2 + 10^2 \\ = 676$$

$$\begin{aligned}
 KN &= \sqrt{676} \\
 &= 26 \text{ units} \\
 \text{(b) } KN &= 2LM \\
 LM &= 13 \text{ units} \\
 LM^2 &= 169 \\
 (r-0)^2 + (17-12)^2 &= 169 \\
 r^2 + 25 &= 169 \\
 r^2 &= 144 \\
 r &= 12
 \end{aligned}$$

$$\begin{aligned}
 \text{(c) Area of trapezium} \\
 &= \frac{1}{2} \times (13 + 26) \times 13 \\
 &= \frac{1}{2} \times 39 \times 13 \\
 &= 253.5 \text{ units}^2
 \end{aligned}$$

8



$$\begin{aligned}
 \text{(a) } \left(\frac{p+9}{2}, \frac{-2+q}{2} \right) &= (3, -4) \\
 \frac{p+9}{2} &= 3 \\
 p+9 &= 6 \\
 p &= -3 \\
 \frac{-2+q}{2} &= -4 \\
 -2+q &= -8 \\
 q &= -6
 \end{aligned}$$

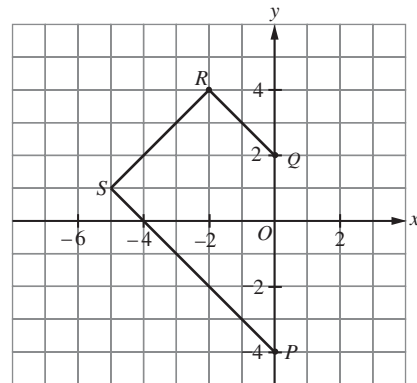
(b) KL is the diameter of the circle.
Centre of circle, C is the midpoint of KL .

$$\begin{aligned}
 C\left(\frac{9+0}{2}, \frac{-6+7}{2}\right) &= C\left(\frac{9}{2}, \frac{1}{2}\right) \\
 CH^2 &= \left(\frac{9}{2} + 3\right)^2 + \left(\frac{1}{2} + 2\right)^2 \\
 &= \left(\frac{15}{2}\right)^2 + \left(\frac{5}{2}\right)^2 \\
 &= \frac{225}{4} + \frac{25}{4} \\
 &= \frac{250}{4} \\
 CH &= \sqrt{\frac{250}{4}} \\
 &= 7.91 \text{ units}
 \end{aligned}$$

Alternative method

$$\begin{aligned}
 KL^2 &= (9-0)^2 + (-6-7)^2 \\
 &= 9^2 + (-13)^2 \\
 &= 81 + 169 \\
 &= 250 \\
 KL &= \sqrt{250} \\
 &= 15.81 \text{ units} \\
 CH &= \frac{1}{2}KL \\
 &= \frac{1}{2}(15.81) \\
 &= 7.91 \text{ units}
 \end{aligned}$$

9 (a)



$$\begin{aligned}
 S(-5, k) &= S(-5, 1) \\
 k &= 1
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) Midpoint of } PS \\
 &= \left(\frac{0-5}{2}, \frac{-4+1}{2} \right) \\
 &= \left(-\frac{5}{2}, -\frac{3}{2} \right)
 \end{aligned}$$

$$\begin{aligned}
 \text{(c) } RS^2 &= (-2+5)^2 + (4-1)^2 \\
 &= 3^2 + 3^2 \\
 &= 9 + 9 \\
 &= 18 \\
 RS &= \sqrt{18} = 4.24 \text{ units}
 \end{aligned}$$