

Quiz Problem

(1) Find the x-, y- intercept for

(a) $4x + 5y = 60$.

① Let $x=0$, $4(0) + 5y = 60 \Rightarrow 5y = 60 \Rightarrow y = 12 \Rightarrow y$ intercept $(0, 12)$

② Let $y=0$, $4x + 5(0) = 60 \Rightarrow 4x = 60 \Rightarrow x = 15 \Rightarrow x$ intercept $(15, 0)$

(b) $4x + 10y = 60$.

① Let $x=0$, $4(0) + 10y = 60 \Rightarrow 10y = 60 \Rightarrow y = 6 \Rightarrow y$ intercept $(0, 6)$

② Let $y=0$, $4x + 10(0) = 60 \Rightarrow 4x = 60 \Rightarrow x = 15 \Rightarrow x$ intercept $(15, 0)$.

(2) Find the center and radius for

(a) $(x-4)^2 + (y+5)^2 = 25$.

center $(4, -5)$, $r = \sqrt{25} = 5$

(b) $x^2 + y^2 = 24$

center $(0, 0)$, $r = \sqrt{24} = 2\sqrt{6}$

(c) $x^2 + y^2 = 18$

center $(0, 0)$, $r = \sqrt{18} = 3\sqrt{2}$

Find the distance and midpoint of the following points.

(1) $(2, 3)$, $(11, 15)$.

$$d = \sqrt{(11-2)^2 + (15-3)^2} = \sqrt{9^2 + 12^2} = \sqrt{81 + 144} = \sqrt{225} = 15$$

$$\text{midpoint } \left(\frac{2+11}{2}, \frac{3+15}{2} \right) = \left(\frac{13}{2}, \frac{18}{2} \right) = (6.5, 9)$$

(2) $(-1, 8)$, $(4, 20)$

$$d = \sqrt{(4-(-1))^2 + (20-8)^2} = \sqrt{5^2 + 12^2} = \sqrt{25 + 144} = \sqrt{169} = 13$$

$$\text{midpoint } \left(\frac{-1+4}{2}, \frac{8+20}{2} \right) = \left(\frac{3}{2}, 14 \right)$$

(3) (2, 4), (8, 10)

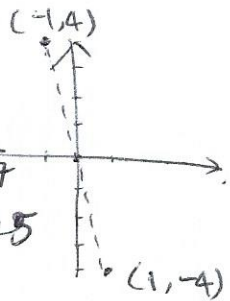
$$d = \sqrt{(8-2)^2 + (10-4)^2} = \sqrt{6^2 + 6^2} = 6\sqrt{2}$$

$$\text{midpoint} \left(\frac{2+8}{2}, \frac{4+10}{2} \right) = (5, 7)$$

(4) (1, -4), (-1, 4)

$$d = \sqrt{(-1-1)^2 + (4-(-4))^2} = \sqrt{(-2)^2 + 8^2} = \sqrt{4+64} = \sqrt{68} = 2\sqrt{17}$$

$$\text{midpoint} \left(\frac{1+(-1)}{2}, \frac{(-4)+4}{2} \right) = (0, 0)$$



Check if the triangle with the following sides are right triangles. (Use the Pythagorean Theorem)

(5) 6, 8, 10

$$a^2 + b^2 = 6^2 + 8^2 = 36 + 64 = 100 = 10^2 = c^2 \quad \checkmark$$

(6) 8.1, 10.8, 13.5

$$a^2 + b^2 \stackrel{?}{=} c^2$$

$$8.1^2 + 10.8^2 \stackrel{?}{=} 13.5^2$$

$$64.61 + 116.64 \stackrel{?}{=} 182.25$$

$$182.25 = 182.25 \quad \checkmark$$

(7) 7, 9, 11 ~~is~~ NOT a right triangle.

$$a^2 + b^2 = 7^2 + 9^2 = 49 + 81 = 130$$

$$c^2 = 11^2 = 121 \neq 130 \quad \text{X}$$

(8) 10.4, 19.5, 22.1

$$a^2 + b^2 = 10.4^2 + 19.5^2 = 108.16 + 380.25 = 488.41$$

$$c^2 = 22.1^2 = 488.41 = a^2 + b^2 \quad \checkmark$$

Find the missing side of a right triangle.

$$\begin{aligned} (9) \quad a &= 20 \\ b &= \underline{21} \\ c &= 29. \end{aligned}$$

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 20^2 + b^2 &= 29^2 \\ 400 + b^2 &= 841. \end{aligned} \quad \rightarrow \quad \begin{aligned} b^2 &= 841 - 400 \\ &= 441 \\ b &= \sqrt{441} = \boxed{21} \end{aligned}$$

$$\begin{aligned} (10) \quad a &= 9 \\ b &= 40 \\ c &= \underline{41}. \end{aligned}$$

$$\begin{aligned} 9^2 + 40^2 &= c^2 \\ 81 + 1600 &= c^2 \\ \sqrt{1681} &= c \Rightarrow c = \boxed{41} \end{aligned}$$

$$\begin{aligned} (11) \quad a &= 28 \\ b &= \underline{45} \\ c &= 53 \end{aligned}$$

$$\begin{aligned} 28^2 + b^2 &= 53^2 \\ 784 + b^2 &= 2809 \\ b^2 &= 2809 - 784 = 2025 \\ b &= \sqrt{2025} = \boxed{45} \end{aligned}$$

