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Problem Solving Set B -> Chapter 5

Bronze:

$$a) \sqrt{(7-10)^2 + (1-k)^2} = 4$$

$$\sqrt{(-3)^2 + (1-k)^2} = 4$$

$$\sqrt{9 + (k^2 - 2k + 1)} = 4$$

$$9 + k^2 - 2k + 1 = 16$$

$$k^2 - 2k + 10 = 16$$

$$\underline{k^2 - 2k - 6 = 0}$$

$$b) k^2 - 2k - 6 = 0$$

↳ Using quadratic formula $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ Where: $a = 1$

$$b = -2$$

$$c = -6$$

$$\underline{k = 1 + \sqrt{7}} \text{ or } k = 1 - \sqrt{7}$$

Silver:

$$\sqrt{(3-k)^2 + (-4-2)^2} = 10$$

$$\sqrt{k^2 - 6k + 9 + 36} = 10$$

$$k^2 - 6k + 45 = 100$$

$$k^2 - 6k - 55 = 0$$

↳ Using quadratic formula $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ Where: $a = 1$

$$b = -6$$

$$c = -55$$

$$\underline{k = 11 \text{ or } k = -5}$$

Gold:

Let P's coordinates be (x, x)

↳ using distance formula:

$$\sqrt{(x-0)^2 + (x-4)^2} = 6$$

$$\sqrt{x^2 + x^2 - 8x + 16} = 6$$

$$\sqrt{2x^2 - 8x + 16} = 6$$

$$2x^2 - 8x + 16 = 36$$

$$2x^2 - 8x - 20 = 0 \quad \div 2$$

$$x^2 - 4x - 10 = 0$$

↳ using quadratic formula $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

where: $a=1$
 $b=-4$
 $c=-10$

$$x = \frac{2 + \sqrt{14}}{1} \quad \text{or} \quad x = \frac{2 - \sqrt{14}}{1}$$



$$P \rightarrow (2 + \sqrt{14}, 2 + \sqrt{14})$$

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