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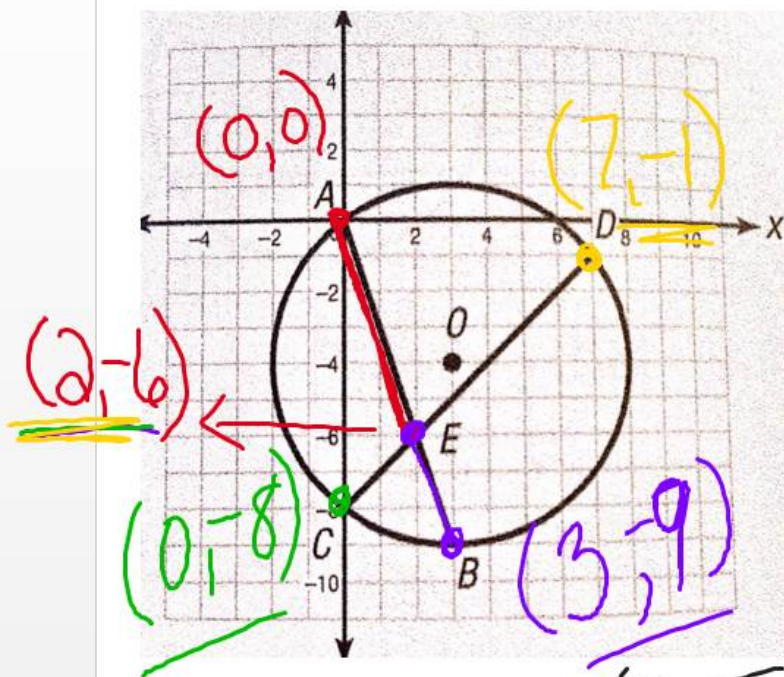
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Example A) Demonstrate the *intersecting chords theorem* by showing that $(AE)(BE) = (CE)(DE)$



$$\overline{AE} = \sqrt{(2-0)^2 + (-6-0)^2} = 2\sqrt{10}$$

$$\overline{EB} = \sqrt{(3-2)^2 + (-9-(-6))^2} = \sqrt{10}$$

$$\overline{CE} = \sqrt{(0-2)^2 + (-8-(-6))^2} = 2\sqrt{2}$$

$$\overline{DE} = \sqrt{(7-2)^2 + (-1-(-6))^2} = 5\sqrt{2}$$

$$20 = (2\sqrt{10})(\sqrt{10}) \stackrel{?}{=} (2\sqrt{2})(5\sqrt{2}) = 20$$

Example B) The line $y = -\frac{4}{3}x + 2$ is tangent to the circle $(x+7)^2 + (y-3)^2 = 25$ at the point $(-3, 6)$. Prove the

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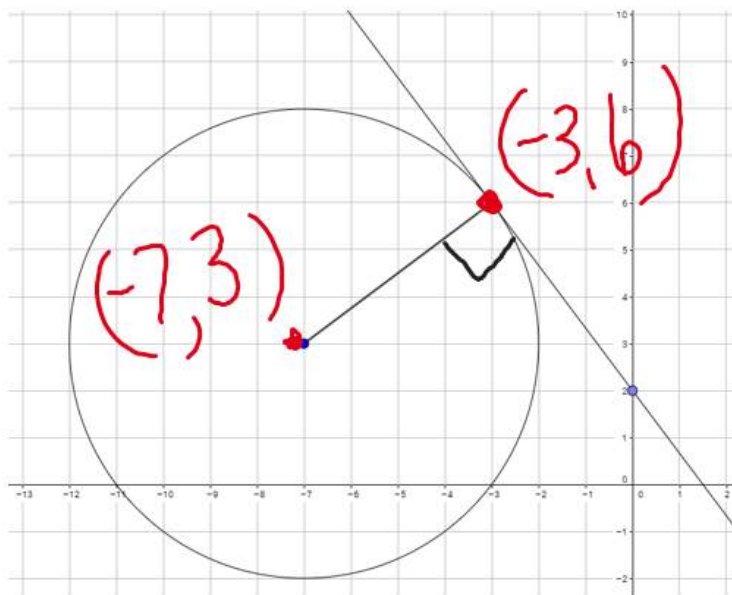
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Example B) The line $y = -\frac{4}{3}x + 2$ is tangent to the circle $(x+7)^2 + (y-3)^2 = 25$ at the point $(-3, 6)$. Prove the tangent line is perpendicular to the radius at the point of tangency.



opposite reciprocal slopes

$$-\frac{4}{3} \rightarrow \frac{3}{4}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - 3}{-3 - (-7)} = \frac{3}{4}$$



Calibri (Body) 20

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Example Bb) The line $y = x - 1$ is tangent to the circle $x^2 + (y - 3)^2 = 8$ at the point $(2, 1)$. Prove the tangent line is perpendicular to the radius at the point of tangency.

$$m = 1 \rightarrow m = -1$$

$$\text{center } (0, 3) \quad (2, 1) \quad m = \frac{1 - 3}{2 - 0} = -1$$

Example C) Prove or disprove that the point $(11, 3)$ lies on the circle centered at $(2, -1)$ and containing the point $(10, 5)$.

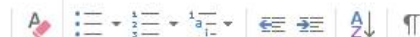


Calibri (Body) 20

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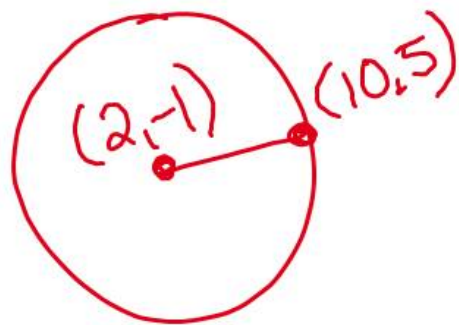
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Example C) Prove or disprove that the point $(11, 3)$ lies on the circle centered at $(2, -1)$ and containing the point $(10, 5)$.



$$r = \sqrt{(2-10)^2 + (-1-5)^2} = 10$$

$$(x-2)^2 + (y+1)^2 = 100$$

$$(11-2)^2 + (3+1)^2 = 97 \text{ not on circle}$$

Example Cc) Prove or disprove that the point $(-13, 5)$ lies on the circle centered at $(-3, 5)$ and containing the point $(5, -1)$.



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Calibri (Body) 20

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Example Cc) Prove or disprove that the point $(-13, 5)$ lies on the circle centered at $(-3, 5)$ and containing the point $(5, -1)$.

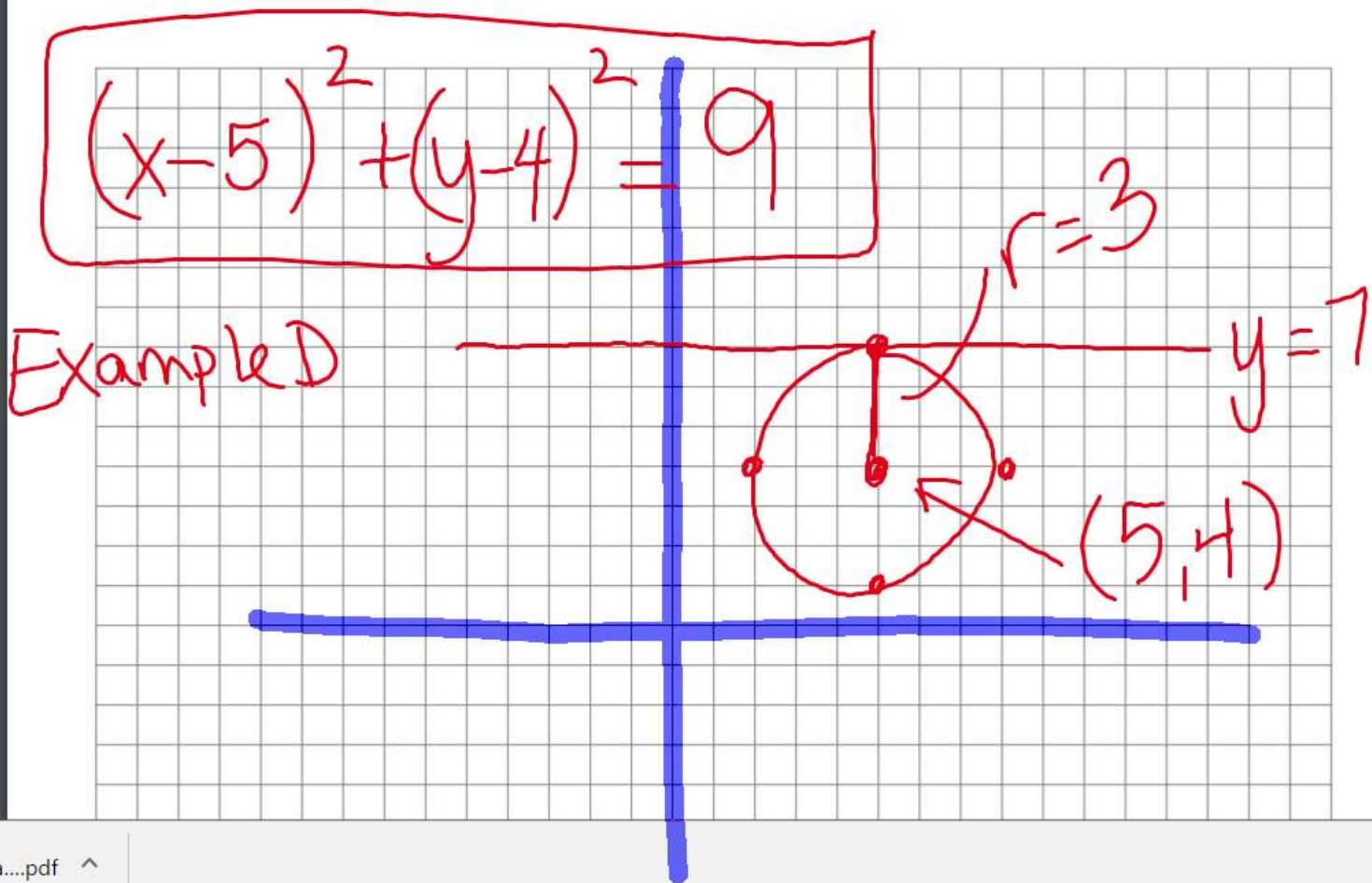
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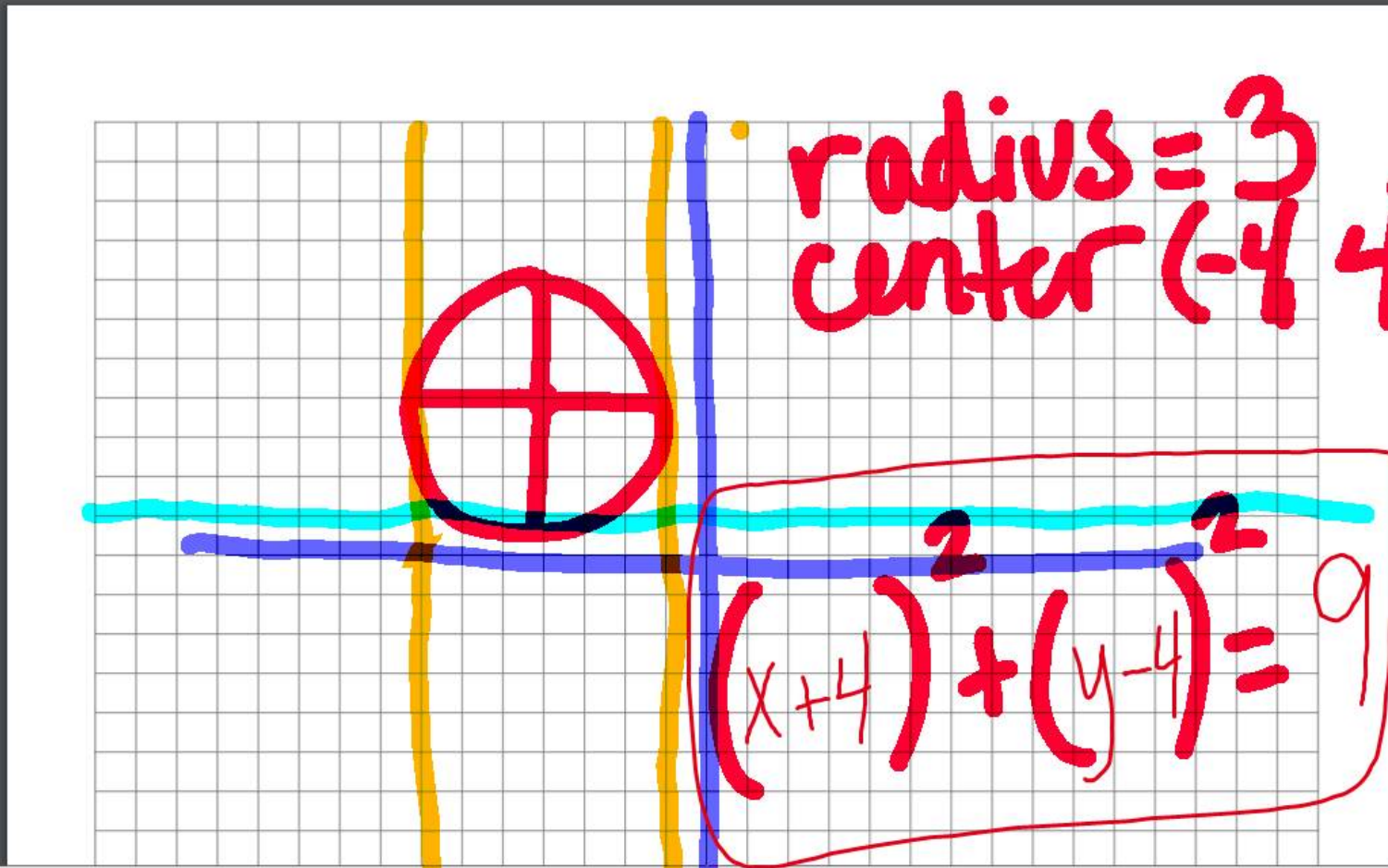
$$r = \sqrt{(-3-5)^2 + (5-(-1))^2} = 10$$

$$(-13+3)^2 + (5-5)^2 = 100 \quad + (4-5)^2 = 100$$

Example D) Write the equation of the circle with center $(5, 4)$ and tangent to the line $y = 7$.







Calibri (Body) 20

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Example D) Write the equation of the circle with center (5, 4) and tangent to the line $y = 7$.

$$(x+4)^2 + (y-3)^2 = 9$$

Example Dd) Write the equation of the line whose center is in the 2th quadrant and is tangent to the lines $x = -7$, $x = -1$, and $y = 1$.

$$(x+4)^2 + (y-4)^2 = 9$$