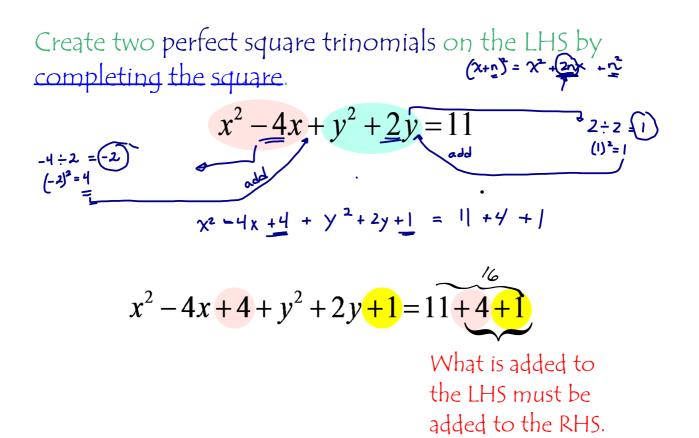
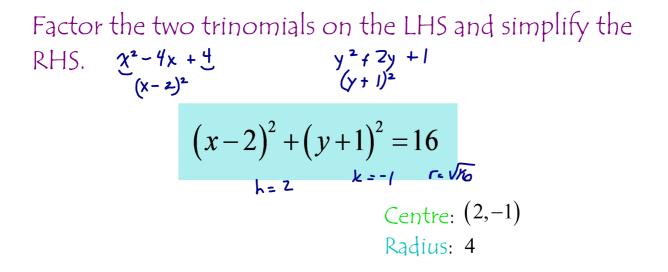
General to Standard Form

Example: Find the centre and radius of the circle. $\begin{array}{c} (x-2)^{2}+(y-1)^{2}=7\\ x^{2}-4x+1+y^{2}-2y+1+7\\ \end{array} \\ \begin{array}{c} x^{2}+y^{2}-4x+2y-1\\ \end{array} \\ \end{array}$ \\ \begin{array}{c} x^{2}+y^{2}-4x+2y-1\\ \end{array} \\ \begin{array}{c} x^{2}+y^{2}-4x+2y-1\\ \end{array} \\ \begin{array}{c} x^{2}+y^{2}-4x+2y-1\\ \end{array} \\ \begin{array}{c} x^{2}+y^{2}-4x+2y-1\\ \end{array} \\ \end{array} \\ \begin{array}{c} x^{2}+y^{2}-4x+2y-1\\ \end{array} \\ \begin{array}{c} x^{2}+y^{2}-4x+2y-1\\ \end{array} \\ \begin{array}{c} x^{2}+y^{2}-4x+2y-1\\ \end{array} \\ \end{array} \\ \begin{array}{c} x^{2}+y^{2}-4x+2y-1\\ \end{array} \\ \end{array} \\ \begin{array}{c} x^{2}+y^{2}-4x+2y-1\\ \end{array} \\ \end{array} \\ \begin{array}{c} x^

Rearrange the equation so that the x terms and y terms are together and the constant is on the right hand side.

$$x^2 - 4x + y^2 + 2y = 11$$





Convert $x^{2} + y^{2} + 12x - 8y + 47 = 0$ $\chi^{2} + 12\chi + y^{2} - 8y = -47$ $x^{2} + 12\chi + 346 + y^{2} - 8y = -47$ $y^{2} + 12\chi + 346 + y^{2} - 8y + 16 = -47 + 36 + 166$ $(\chi + 66)^{2} + (y - 4)^{2} = 5$

$$x^{2} + y^{2} - 5x - 16y + 60 = 0$$

$$\chi^{2} - 5x + y^{2} - 16y = -60$$

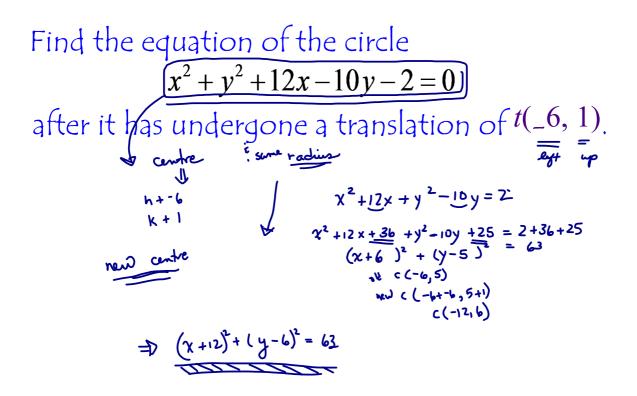
$$-5 \div 2 = -2.5 - 16 \div 2 = -8$$

$$(-2.5)^{2} = 6.25 - (-8)^{2} = 64$$

$$\chi^{2} - 5x + 6.25 + y^{2} - 16y + 64 = -6016.25 + 64$$

$$(x - 2.5)^{2} + (y - 8)^{2} = 10.25$$

Find the equation of the circle whose centre is the
same as
$$x^2 + y^2 - 10x - 1 = 0$$
, but passes through
 $P(2, -3)$.
 \bigcirc Find the order : $x^2 - 10x + y^2 = 1$
 $(x-5)^2 + (x-5)^2 + (x-5)^2 + y^2 = 1$
 $(x-5)^2 + (x-5)^2 + y^2 = 12$
 $x=2 \quad y=-3 \quad (2-5)^2 + (-3)^2 = r^2$
 $(x-5)^2 + y^2 = 18$
 $x^2 - 10x + 25 + y^2 = 18$
gon: $x^2 + y^2 - 10x + 7 = 0$



Tangents to Circles

- A tangent line is a line that shares only one point in common with the circle.
- A tangent line is perpendicular to the radius of the circle at the point of contact.

radius tangent line