What do you think the equation $x^2+y^2 = 9$ would look like as a graph?

autograph

In pairs draw one of these graphs:

$y^2 = 9 - x^2$

$x^2 + y^2 = 9$

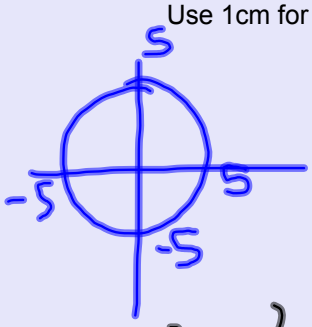
$x^2 + y^2 = 16$

$x^2 + y^2 = 25$

$x^2 + y^2 = 36$

$x^2 + y^2 = 49$

You will need a 4 quadrant pair of axes, with -8<x<8 and -8<y<8. Use 1cm for one unit.



General eqn for circles $x^2+y^2=r^2$ with centre (0,0)

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Circles and equations

Review of Quadratics

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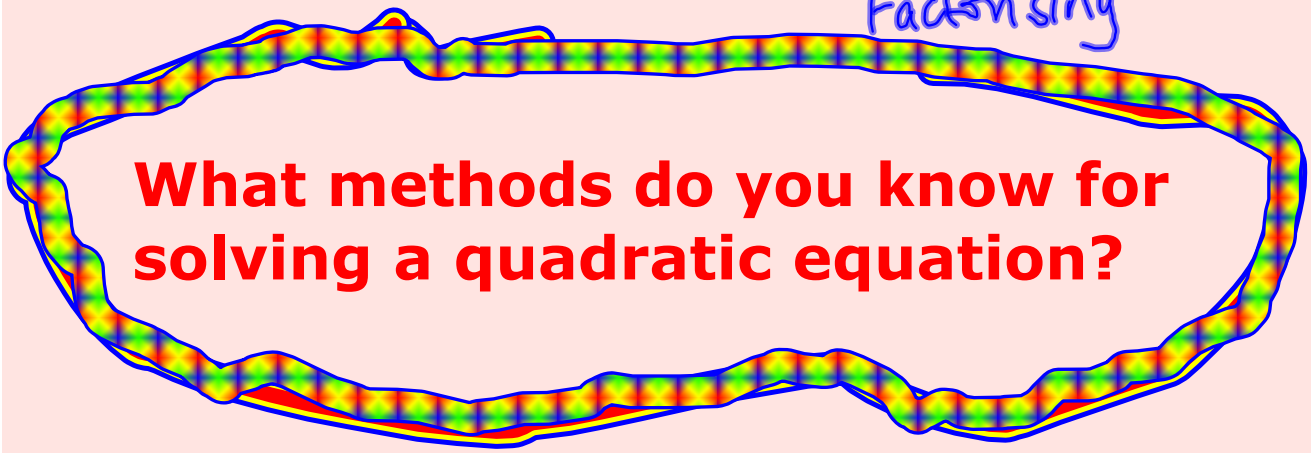
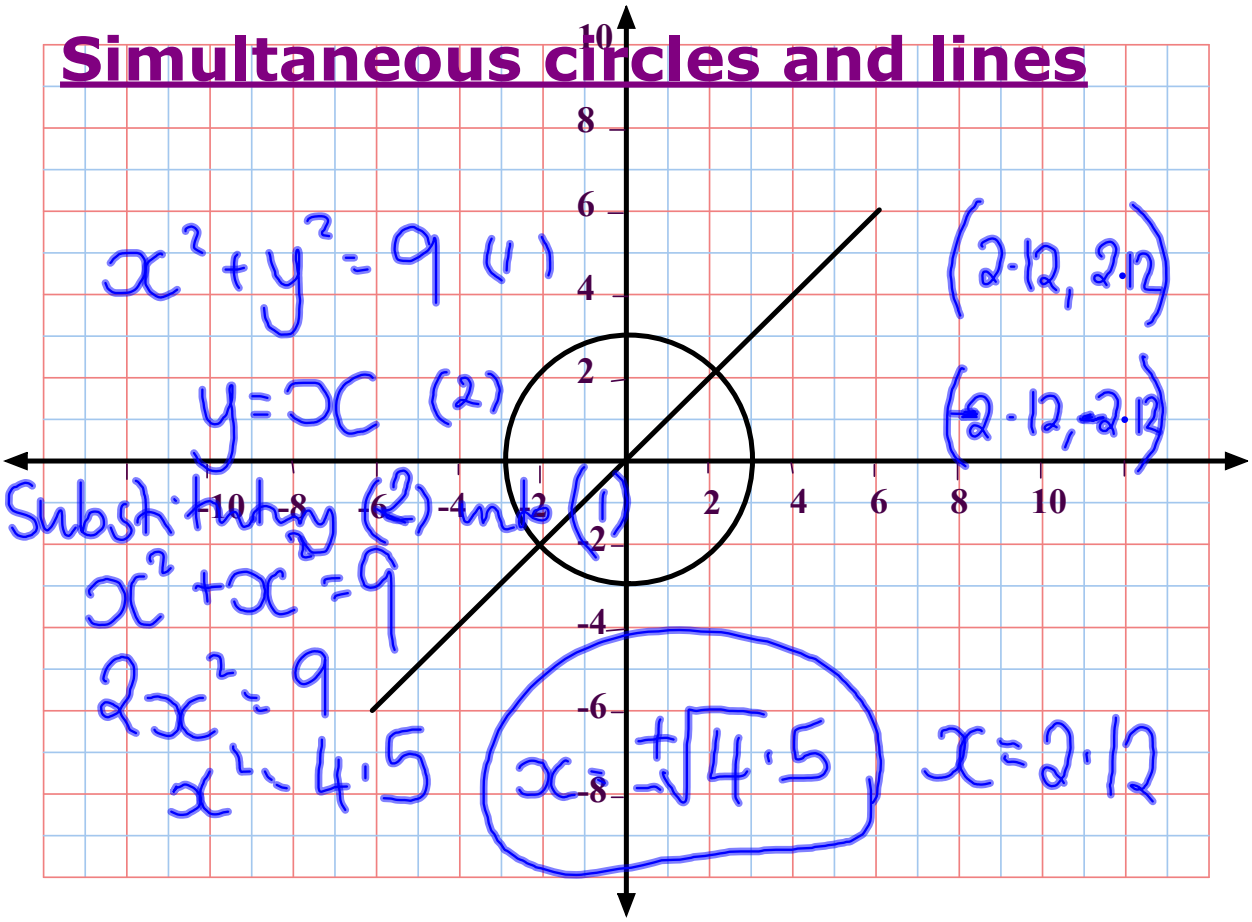
Completing the square
The Formula
Factorising



Simultaneous circles and lines



$x^2 + y^2 = 9$ (1)

$y = x$ (2)

$(2.12, 2.12)$

$(-2.12, -2.12)$

Subst. (2) into (1)

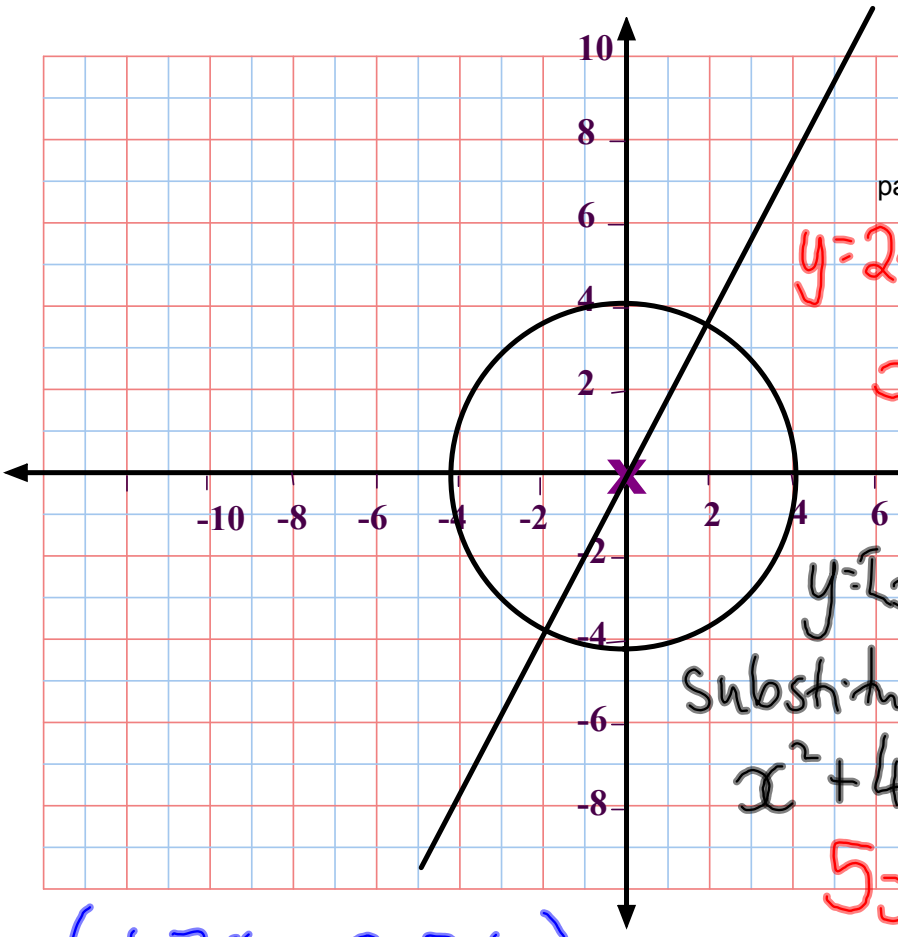
$x^2 + x^2 = 9$

$2x^2 = 9$

$x^2 = 4.5$

$x = \pm\sqrt{4.5}$

$x = 2.12$



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$y = 2x$

$x^2 + y^2 = 16$ (2)

$y = 2x \Rightarrow y^2 = 4x^2$ (1)

Substituting (1) into (2)

$x^2 + 4x^2 = 16$

$5x^2 = 16$

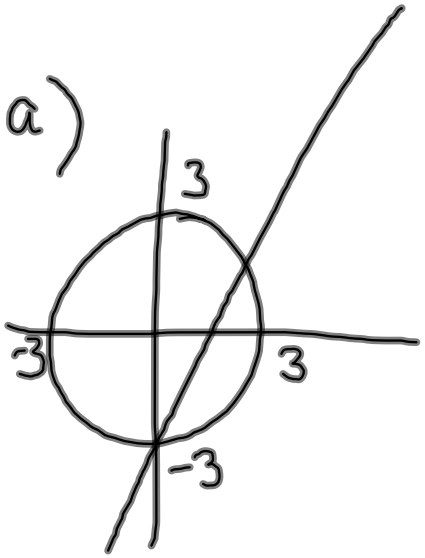
$x^2 = \frac{16}{5}$

$x = \pm 1.789$

$(1.78, 3.56)$

$(-1.78, -3.56)$

a)



$y = 2x - 3$

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

$y^2 = (2x-3)(2x-3)$

$= 4x^2 - 6x - 6x + 9$

$= 4x^2 - 12x + 9$ (1)

substituting (1) into (2)

$x^2 + 4x^2 - 12x + 9 = 9$

$5x^2 - 12x = 0$

$x(5x - 12) = 0$

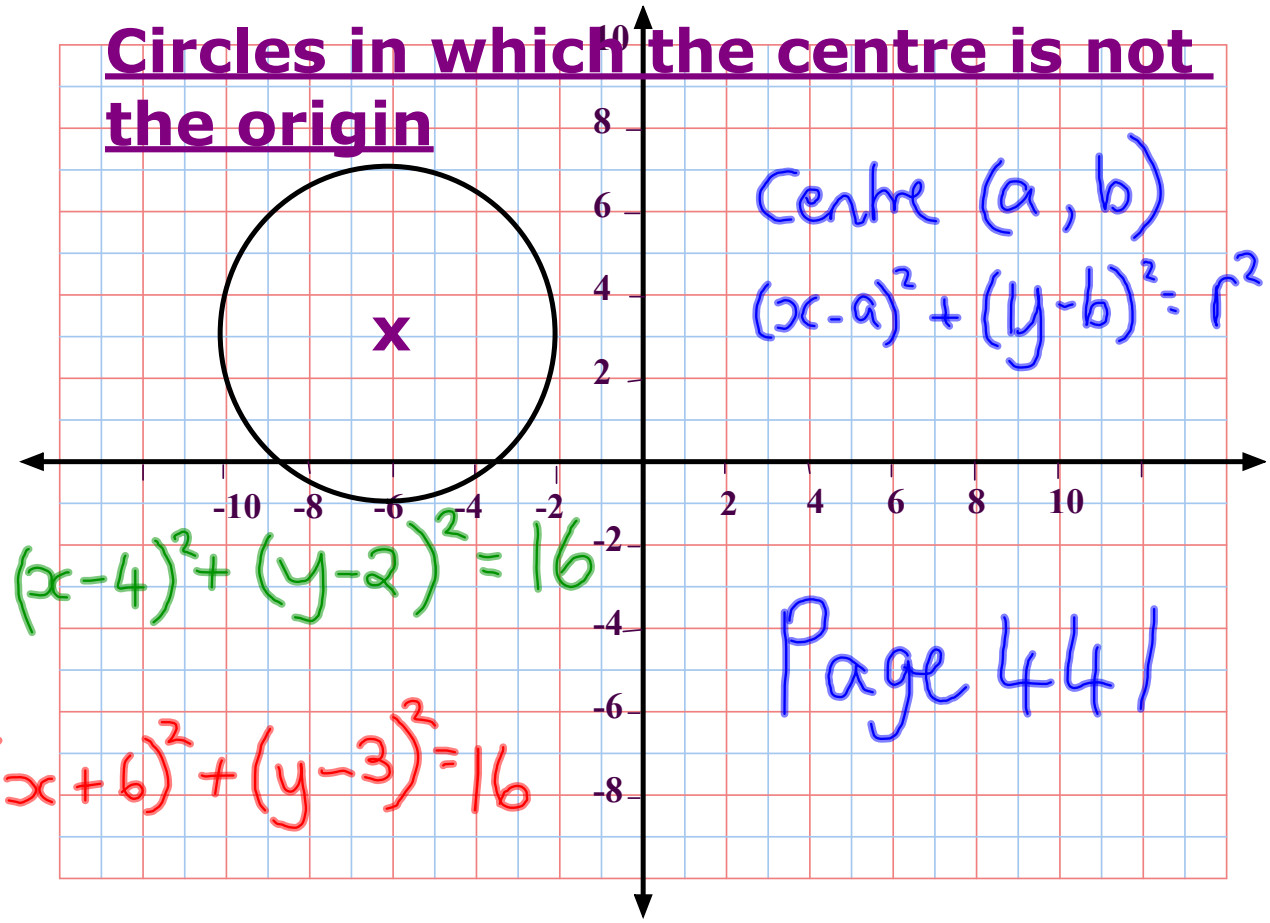
$x = 0$ or $5x - 12 = 0$

$x = 0$ or $x = \frac{12}{5} = 2\frac{2}{5}$

$(0, -3)$

$(2\frac{2}{5}, 1\frac{4}{5})$ $y = 2 \times \frac{12}{5} - 3 = 4\frac{4}{5} - 3 = 1\frac{4}{5}$

Circles in which the centre is not the origin



Centre (a, b)

$(x-a)^2 + (y-b)^2 = r^2$

$(x-4)^2 + (y-2)^2 = 16$

$(x+6)^2 + (y-3)^2 = 16$

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$$(x-1)^2+(y-6)^2=17$$

$$(0-1)^2+(y-6)^2=17$$

$$1+(y-6)^2=17$$

$$(y-6)^2=16$$

$$y-6=\pm 4$$

$y=4+6=2$ $\quad y=+4+6=10$