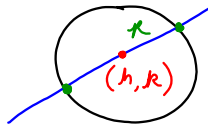


June 8, 2016

Circles: $(x-h)^2 + (y-k)^2 = r^2$

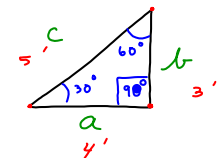
- where (h, k) is the center
- r is the radius



* Distance
 $d = \sqrt{(x-x_1)^2 + (y-y_1)^2}$

* Mid-Point
 $mp = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right)$

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Pythagorean Theorem

$$a^2 + b^2 = c^2$$

$$(4)^2 + (3)^2 = (5)^2$$

$$16 + 9 = 25$$

$$25 = 25$$

$$(x-x_1)^2 + (y-y_1)^2 = \sqrt{d^2}$$

solve for d

$$\pm \sqrt{(x-x_1)^2 + (y-y_1)^2} = d$$

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$(-5, 10)$ & $(8, 17)$

$mp = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right)$

$$= \left(\frac{-5+8}{2}, \frac{10+17}{2} \right)$$

$$= \left(\frac{3}{2}, \frac{27}{2} \right)$$

$(x-\frac{3}{2})^2 + (y-\frac{27}{2})^2 = (\frac{27}{2})^2$

$d = \sqrt{(8-\frac{3}{2})^2 + (17-\frac{27}{2})^2}$

$$= \sqrt{(\frac{14-3}{2})^2 + (\frac{34-27}{2})^2}$$

$$= \sqrt{(\frac{11}{2})^2 + (\frac{7}{2})^2}$$

$$= \sqrt{\frac{121}{4} + \frac{49}{4}}$$

$$= \sqrt{\frac{169+49}{4}}$$

$$= \sqrt{\frac{218}{4}}$$

$$= \frac{\sqrt{218}}{2}$$

$$= \frac{\sqrt{4 \cdot 54.5}}{2}$$

$$= \frac{2\sqrt{54.5}}{2}$$

$$= \sqrt{54.5}$$

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$$\left(\frac{\sqrt{218}}{2} \right)^2 = \frac{218}{4} = 54.5$$

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C. Bowman

#6) Rational

$$\frac{x-4}{x-1} = \frac{12}{3-x} + 1$$

① $x-1=0$ | $3-x=0$ do, $x \neq 1$ or 3 !

② find LCD to clear fractions
 LCD: $(x-1)(3-x)$

③ Clear fractions

$$(x-1)(3-x) \left[\frac{x-4}{x-1} = \frac{12}{3-x} + 1 \right]$$

$$\frac{(x-1)(3-x) \cdot (x-4)}{x-1} = \frac{(x-1)(3-x) \cdot 12}{3-x} + (x-1)(3-x) \cdot 1$$

$$(3-x)(x-4) = (x-1)(12) + (x-1)(3-x)$$

$$3x-12-x^2+4x = 12x-12+3x-x^2-3+x$$

$$-x^2+7x-12 = -x^2+16x-15$$

$$+x^2-16x+12+x^2-16x+15$$

$$\frac{-9x}{-9} = \frac{-3}{-9}$$

$$x = \frac{1}{3}$$

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$$\frac{\frac{1}{3} - 4}{\frac{1}{3} - 1} = \frac{12}{\frac{3}{1} - \frac{1}{3}} + 1$$

$$\frac{1-12}{3} = \frac{12}{\frac{9-1}{3}} + 1$$

$$\frac{-11}{3} = \frac{12 \cdot 3}{8} + 1$$

$$-\frac{11}{3} \cdot \frac{3}{2} = \frac{12}{1} \cdot \frac{3}{2} + 1$$

$$\frac{-11}{2} = \frac{9}{1} + 1$$

$$= \frac{9+2}{1}$$

$$\frac{-11}{2} = \frac{11}{2} \checkmark$$

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#1) $3x - \frac{1}{2} - \frac{1}{x} = 0$

① $x \neq 0$

② find LCD: $2x$

③ Clear fractions

$$2x \left[3x - \frac{1}{2} - \frac{1}{x} = 0 \right]$$

$$\boxed{6x^2 - x - 2} = 0$$

Quadratic → *this needs to be zero!*

* Discriminate

$$b^2 - 4ac$$

$$(-1)^2 - 4(6)(-2)$$

$$1 - 24(-2)$$

$$1 + 48$$

$$(49) > 0 \rightarrow 2 \text{ Real Solutions}$$

$$x = \frac{-(-1) \pm \sqrt{49}}{2(6)}$$

$$= \frac{1 \pm 7}{12}$$

① $x = \frac{8}{12} = \frac{2}{3}$

② $x = \frac{-6}{12} = -\frac{1}{2}$

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