$x^2 - 6x + y^2 - 8y = 0$

$(a-b)^2 = a^2 - 2ab + b^2$

$(a+b)^2 = a^2 + 2ab + b^2$

want the b^2

$x^2 - 6x + ?$ will give an $(a+b)^2$?

x^2 ↑ $-6x$ ↑ that's my $2ab$

$a = x$

$\& \; 2ab = -6x$

$\frac{-6x}{2x} = \frac{-6}{2} = -3 = b$

So $b^2 = 3^2$!

Standard Eq'n of Circle

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

$x^2 - 6x + y^2 - 8y = 0$

$x^2 - 6x + 3^2 + y^2 - 8y + 4^2 = 9 + 16$

$(x-3)^2 + (y-4)^2 = 25$

$(h, k) = (3, 4)$

$r = 5$

$\frac{8}{2} = 4 \rightsquigarrow 4^2$

Domain:

① $\sqrt{\text{negative}}$ BAD

$\sqrt{\text{stuff}}$: Solve $\text{stuff} \geq 0$
That'll be the domain

② $\frac{\text{stuff}}{0}$ BAD

$\frac{\text{stuff}}{\text{whatever}}$: Solve whatever $= 0$
the solutions will NOT be in the domain.
Everything else is!

We need this ② for probs like

$\frac{3}{x-1} = 5$

Right Away: $D = \{x \mid x \neq 1\}$ b/c

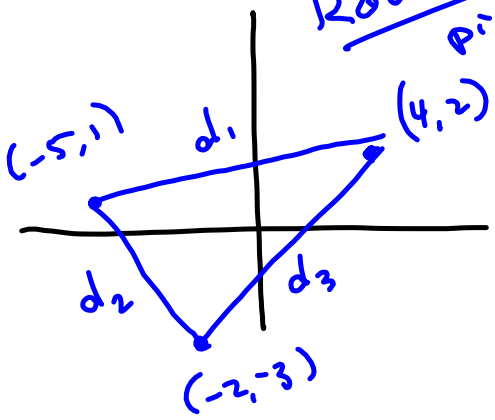
$x - 1 = 0 \Rightarrow$

$x = 1.$

93 § 1.3

$(-5,1)$ $(-2,-3)$ $(4,2)$ are they vertices on a right triangle?

Rough picture.



$$d_1 = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$
$$= \sqrt{(4-(-5))^2+(2-1)^2}$$
$$= \sqrt{9^2+1^2} = \sqrt{82}$$

$d_2 = \ldots$

See if the 3 distances give you an $a^2+b^2=c^2$ triangle.

80 mph on 1st half

wants 60 mph avg for whole trip

	D	r	t
1st half	D	80	$\frac{D}{80}$
2nd half	D	x	$\frac{D}{x}$

Want Avg = 60

$$\text{Avg Speed} = \frac{2D}{\frac{D}{80} + \frac{D}{x}} = 60$$

Total Distance

Total Time

Solve this for x:

$$\frac{2D}{\frac{D}{80} + \frac{D}{x}} = 60$$ (Ans: x=48)

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

$x^2-3x+\left(\frac{3}{2}\right)^2+y^2+4y+2^2=0+\frac{9}{4}+4=\frac{9+16}{4}=\frac{25}{4}$

$\frac{3}{2}\rightarrow\left(\frac{3}{2}\right)^2=\frac{9}{4}$

$\frac{4}{2}=2\rightarrow 2^2=4$

$(x-\frac{3}{2})^2+(y+2)^2=\frac{25}{4}$

Find eqn in slope-intercept form that's $\parallel$ to $y=3x+2$, thru $(1,-4)$

TEACHER LOVES POINT SLOPE:

$y-y_1=m(x-x_1)$ in this form:

$$\boxed{y=m(x-x_1)+y_1}$$

$m=3=m_{\parallel}$, so,

$$\boxed{y=3(x-1)-4}$$ is good.

To get slope-intercept for stupid book:

$y=3x-3-4$

$$\boxed{y=3x-7}$$ by expanding $y=3(x-1)-4$.

Same switch, perpendiculars.

$m=3 \Rightarrow$

$m_{\perp}=-\frac{1}{3}$

$$\boxed{y=-\frac{1}{3}(x-1)-4}$$