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This program graphs a parabola and a straight line which intersect twice. It plots these two graphs with various plotting tools to make it more informative and interpretable.

```
clc;clear;close all
c=datetime;
fprintf('Last run was %s\n',c)
```

Last run was 29-Jan-2022 17:40:21

Graph each line with different colors and LineWidth=2.

```
x=-7:0.1:7;
y1=x.^2-2;
y2=2.*x+1;
plot(x,y1,'r','LineWidth',2)
hold on
plot(x,y2,'b','LineWidth',2);
```

Add labels to each line in the corresponding color.

```
captiony1 = sprintf('y = x^2-2');
text(-6.5, 7, captiony1, 'FontSize', 16, 'Color', 'r');
captiony2 = sprintf('y = 2*x+1');
text(3.5, 6, captiony2, 'FontSize', 16, 'Color', 'b');
```

Place origin in the middle of the plot.

```
ax = gca;
ax.XAxisLocation = 'origin';
ax.YAxisLocation = 'origin';
```

Add grid lines and make the graph square.

```
grid on
axis('square')
```

Set axis boundaries and tick marks, and make the lines and labels bolder.

```
ylim([-5 9])
xlim([-7 7])
set(gca,'xtick',[-7:1:7],'ytick',[-9:1:9])
set(findobj(gcf,'type','axes'),'FontSize',12,'FontWeight','Bold','LineWidth',2);
box off;
```

Find x and y values of the intersection points of the lines.

```
d=abs(y1-y2);
[val idx]=sort(d);
```

```
xintercept1=x(idx(1));
yintercept1=2*xintercept1+1;
xintercept2=x(idx(2));
yintercept2=xintercept2^2-2;
hold on
```

Plot points at the intercepts.

```
plot(xintercept1,yintercept1,'k*', 'LineWidth',8)
plot(xintercept2,yintercept2,'k*', 'LineWidth',8)
```

Label intercept points with their coordinates.

```
intlabeled1=sprintf('(%i, %i)',xintercept1,yintercept1);
text(-4.1, -1.5, intlabeled1, 'FontSize', 16, 'Color', 'k');
intlabeled2=sprintf('(%i, %i)',xintercept2,yintercept2);
text(3.4, 7, intlabeled2, 'FontSize', 16, 'Color', 'k');
```

Add arrows to the end of the axes.

```
h1=arrows(-4,0,2.9,270,[0.05,0.1,0.1,0], 'FaceColor','k','LineWidth',2);
h2=arrows(4,0,2.9,90,[0.05,0.1,0.1,0], 'FaceColor','k','LineWidth',2);
h3=arrows(0,6,2.9,0,[0.05,0.1,0.1,0], 'FaceColor','k','LineWidth',2);
h4=arrows(0,-2,2.9,180,[0.05,0.1,0.1,0], 'FaceColor','k','LineWidth',2);
```

