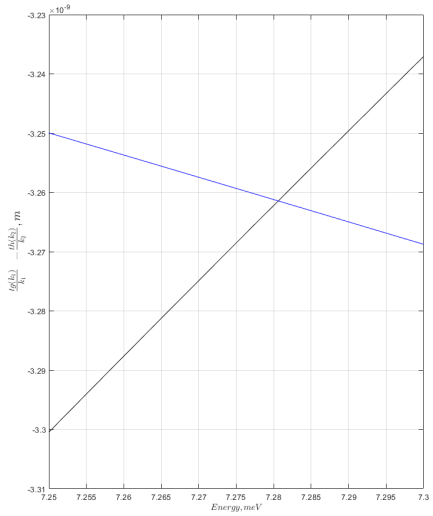
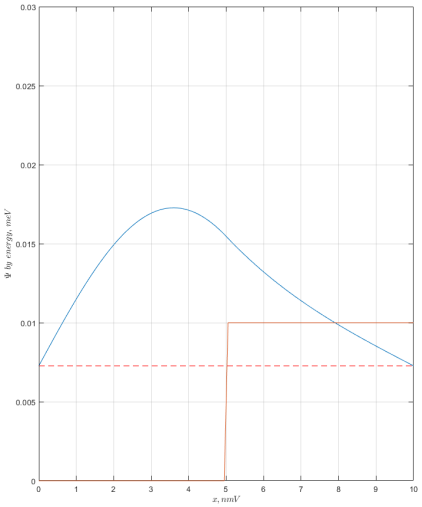
```
clear
close all
clc
figure('Units','normalized','OuterPosition', [0 0 1
 1],'NumberTitle','off')

hbar=1.0546e-34;
m0=9.1e-31;
e=1.6e-19;
U0=0.01*e;
L=1e-8;
a=L/2;
b=L;

E=linspace(0,U0,1000);
k1=sqrt(2*m0/hbar^2*E);
k2=sqrt(2*m0/hbar^2*(U0-E));

A=tan(k1*a)./k1;
B=-tanh(k2*(b-a))./k2;

subplot(1,2,1)
plot(E/e*1000,A,'k')
hold on
grid on
xlabel('$Energy, meV$','Interpreter','latex')
ylabel('${tg(k_1)\over k_1}$ $ $ $-{th(k_2)\over k_2}, m
$','Interpreter','latex','FontSize',15)
plot(E/e*1000,B,'b')
xlim([7.25 7.3])

E=7.27/1000*e;
k1=sqrt(2*m0/hbar^2*E);
k2=sqrt(2*m0/hbar^2*(U0-E));

x=linspace(0,a);
Psi1=sin(k1*x);
x=linspace(a,b);
Psi2=sin(k1*a)./(exp(k2*a)-exp(2*k2*b-k2*a)).*exp(k2*x).*(1-
exp((2*k2*b-2*k2*x)));

subplot(1,2,2)
hold off
x=[linspace(0,a),linspace(a,b)];
plot(x*1e9,E/e+[Psi1 Psi2]/100)
hold on
plot(x*1e9,heaviside(x-a)*U0/e)
plot([0, L]*1e9,[E E]/e,'--r')
grid on
xline(a)
ylim([0 0.03])
xlabel('$x, nmV$','Interpreter','latex')
```

```
ylabel('$\Psi$ $by$ $energy,$ $meV$','Interpreter','latex')
```





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