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```

%4.3.1
%b there is one root in the intervval
f = @(x) x.^2 - exp(-x);
dfdx = @(x) 2.*x + exp(-x);
fplot(f, [-2 2]);
%c
true_root = fzero(f, 0);
true_root
%d
results = newton(f, dfdx, 1);
root = results(end);
root
%e
xn = [0.1];
e = [xn(1) - true_root];
for k =1:4
    xn(end+1) = xn(end) - f(xn(end))/dfdx(xn(end));
    e(end+1) = xn(end) - true_root;
end
e

function x = newton(f, dfdx, x1)
funtol = 100*eps; xtol = 100*eps; maxiter=40;
x = x1;
y = f(x1);
dx = Inf;
k =1;
while(abs(dx) > xtol)&&(abs(y) > funtol)&&(k < maxiter)
    dydx = dfdx(x(k));
    dx = -y/dydx;
    x(k+1) = x(k) + dx;
    k = k+1;
    y=f(x(k));
end
end

true_root =

    0.7035

root =

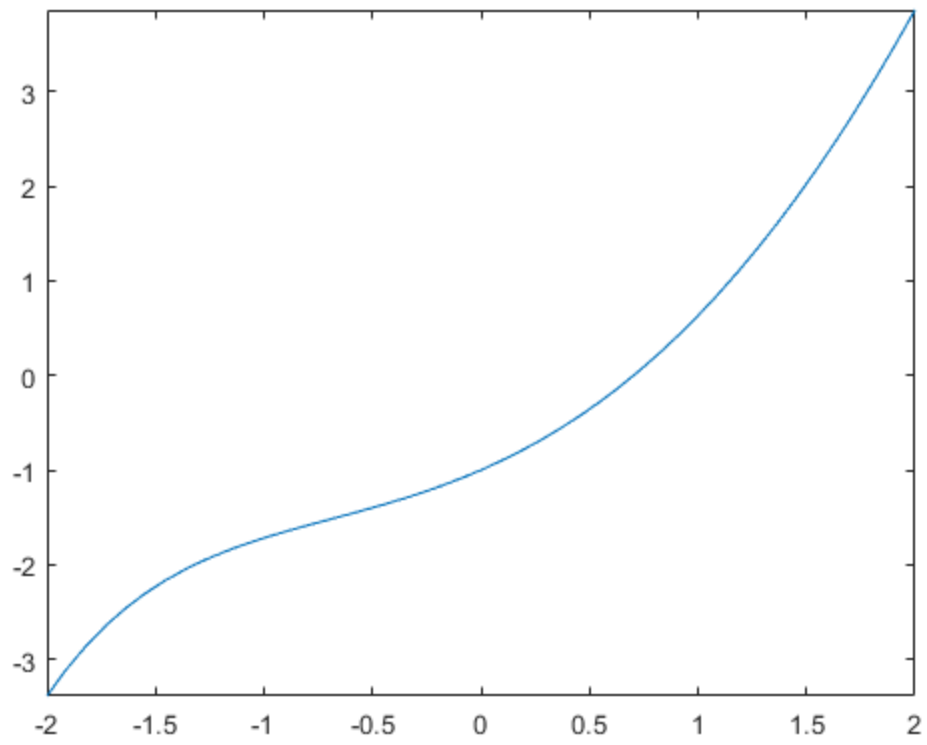
    0.7035

e =

    -0.6035    0.2065    0.0150    0.0001    0.0000

```

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