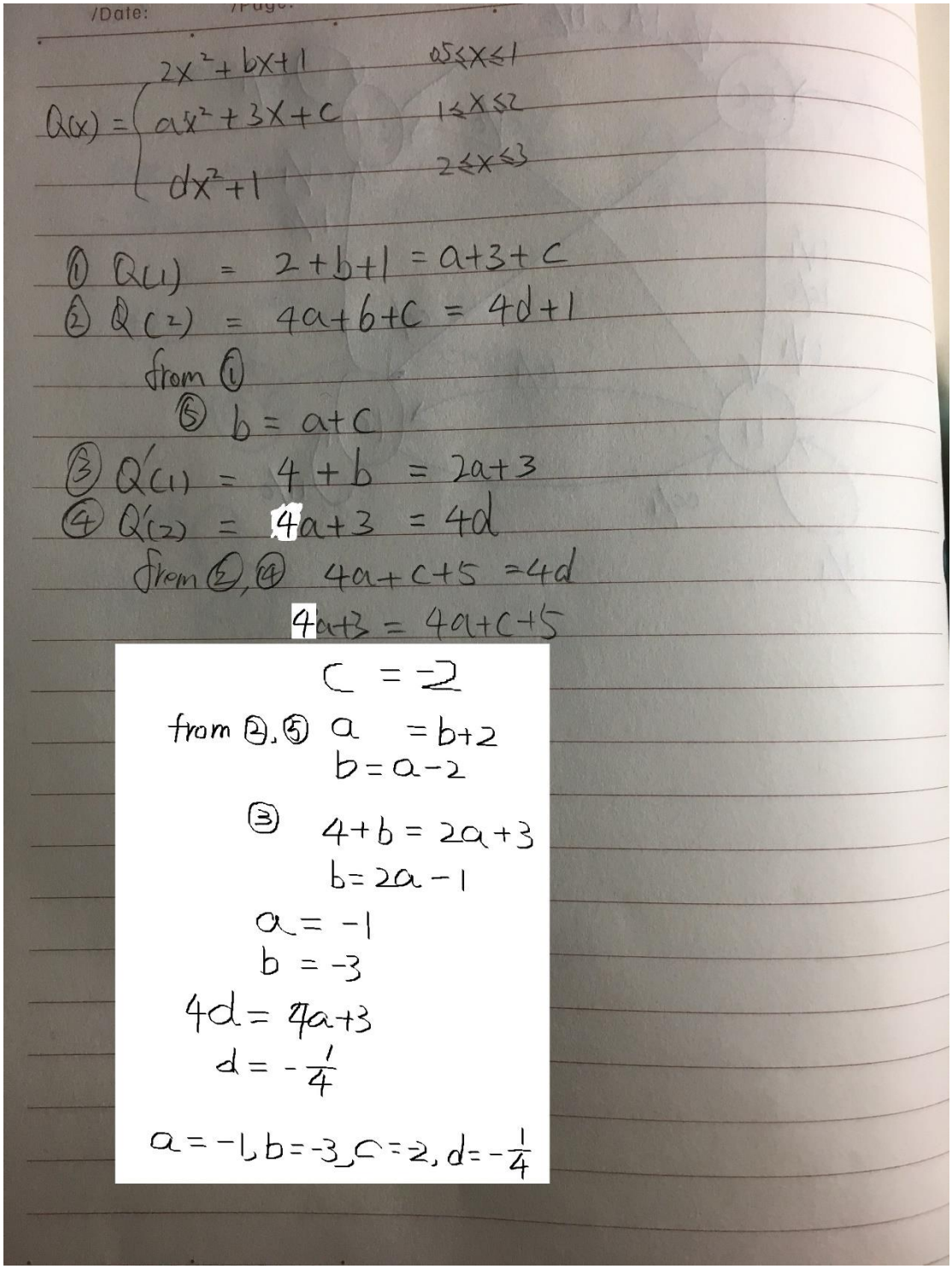
Assignment4 Paul(Pengshengnan) Cheng V00838497

1.a)-1 -3 -2 -1/4

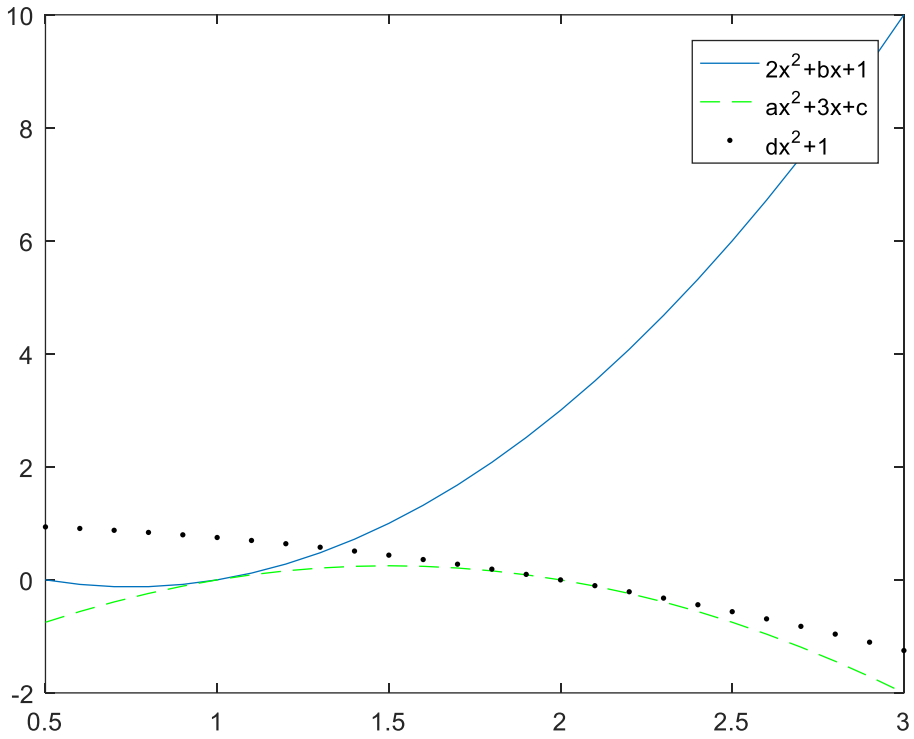


b)

```
>> x=0.5:0.1:3;
```

>> plot(x,2*x.^2-3*x+1,x,(-1)*x.^2+3*x-2,'g--',x,(-1/4)*x.^2+1,'black.');

>> legend('2x^2+bx+1','ax^2+3x+c','dx^2+1')



2.

f(x)=1; $\int_{-1}^{1} 1\,dx$ = 2 = a+b;

f(x)=x; $\int_{-1}^{1} x\,dx$ = 0 = -a+b+c+d;

f(x)=x^2 $\int_{-1}^{1} x\text{^}2\,dx$ = 2/3 = a+b-2c+2d;

f(x)=x^3; $\int_{-1}^{1} x\text{^}3\,dx$ = 0 = -a+b+3c+3d;

a = 1, b = 1, c = 1/3, d = -1/3.

$\int_{-1}^{1} f(x)\,dx$ = f(-1)+f(1)+1/3f'(-1)-1/3f'(1)

3.(a)

```
function trap(a, b,f, maxiter, tol)
m = 1;
x = linspace(a, b, m+1);
y = f(x);
```

```
approx = trapz(x, y);
disp('m integral approximation');
fprintf(' %5.0f %16.10f \n ', m, approx);
for i = 1 : maxiter
m = 2*m ;
oldapprox = approx ;
x = linspace ( a , b , m+1 ) ;
y = f(x);
approx = trapz(x, y);
fprintf(' %5.0f %16.10f \n ', m, approx);
if abs( (approx-oldapprox)/oldapprox ) < tol
return
end
end
fprintf('Did not converge in %g iterations', maxiter)
end
```

(b)

```
function y=f(x)
y=(x.*cos(1./(x)));

return ;
```

>> trap(0.1,3,@f,20,10^(-5))

m integral approximation

1	3.9888973448
2	3.7902074408
4	3.5976493493
8	3.4808457876
16	3.4678411685
32	3.4856113710
64	3.4877924488
128	3.4870325249

256	3.4867926880
512	3.4867333190
1024	3.4867185769

```
function y=f1(x)
y=exp(3.*x).*sin((x+1).^(1/2)+1);


end
```

>> trap(-1,1,@f1,20,10^(-7))

m integral approximation

1	13.3970553517
2	7.6078251027
4	5.6929741681
8	5.1698664471
16	5.0360666322
32	5.0024583324
64	4.9940594943
128	4.9919647293
256	4.9914430366
512	4.9913133379
1024	4.9912811709
2048	4.9912732205
4096	4.9912712651
8192	4.9912707877