SOLUCIONÁRIO DOS EXERCÍCIOS DO MINICURSO DO MATLAB

1. Formatos Numéricos

Exercício 1

```
a)
>> (5+8*3-2)/(4^3*3)

b)
>> sqrt(10-2*32/13)-1/4*10

c)
>> 2^2+sqrt(5-4*1)
```

Exercício 2

```
>> x1=-20-sqrt(20^2-4*5*10)
>> x2 = -20 + sqrt(20^2-4*5*10)
```

Exercício 3

```
>>format long
>> 1 + 11,5*1/17
>>format short
>> ans
>> format hex
>> ans
>> format rat
>> ans
```

Exercício 4

```
>> e = 2.718
>> t = 2018
>> (157273000)/(1+e^(-0.0313*(t-1913.25)))
```

2. Comandos básicos

Exercício 1

```
>> h = 15;
>> alfa = 30;
>> A =
 ((h*sin(degtorad(alfa)))*(h*cos(degtorad(alfa))))/2;
```

Exercício 2

```
>> a = round(11.3);
>> b = round(35/3);
>> c = round(-12.5);
>> d = round(52/3);
>> e = round(-16.2);
>> T = a+b+c+d+e+17;
```

Exercício 3

```
>> x = degtorad(45);
>> a = x/factorial(1);
>> b = (-1)*(x^3)/factorial(3);
>> c = (x^5)/factorial(5);
>> d = (-1)*(x^7)/factorial(7);
>> s = a+b+c+d;
```

Exercício 4

```
>> t = 5;
>> a = log((t^2)+t+2);
>> b = exp(t*(1+cos(3*t)));
>> c = (sec(t))^2+cot(t)-1;
>> t = 10;
>> a2 = log((t^2)+t+2);
>> b2 = exp(t*(1+cos(3*t)));
>> c2 = (sec(t))^2+cot(t)-1;
```

3. Matrizes e Vetores

Exercício 1

```
>> v = 15:-5:-25
>> v'
```

Exercício 2

```
>> v = linspace(-1,-15,12)
>> v'
```

Exercício 3

```
>> M = [1:3:25; 72:-6:24; 0:0.125:1]
```

Exercício 4

letra (a)

```
>> A = [1:1:7; 2:2:14; 21:-3:3; 5:5:35];
>> aux = [A(1,:); A(3,:); A(4,:)];
>> B = [aux(:,1) aux(:,3) aux(:,5) aux(:,7)];
```

letra (b)

```
>> A = [1:1:7; 2:2:14; 21:-3:3; 5:5:35];
>> u =[A(3,:) (A(:,5))' (A(:,7))'];
```

Exercício 5

```
>> A = eye(7);
>> A(1:2,1:3)=2;
>> A(1:3,5:7)=5;
>> A(3,1:3)=3;
>> A(5:7,1:2)=4;
>> A(5:7,3)=7;
>> A(5:7,5:7)=9;
```

Exercício 6

```
>> M=ones(3);
>> B(1:2,1:2)=5;
>> A(1:3,1:3)=M;
>> A(4:5,4:5)=B;
```

Exercício 7

```
>> g = 9.81;
>> m = [2, 4, 5, 10, 20, 50];
>> F = [12.5, 23.5, 30, 61, 117, 294];
>> mi = F./(m*g);
```

4. Polinômios

Exercício 1

```
>> x=-2:.1:2;
>> y=1.5*x.^3-6*x.^2+x+2;
```

Exercício 2

```
>> p=[4 6 -2 -5 3];
>> q=[1 4 2];
>> [t,r]=deconv(p,q)
```

Exercício 3

```
>> p=[(4/3*pi+4*pi) 0 0 -.85]
>> roots(p)
```

5. Números Complexos

Exercício 1

```
>> x = sqrt(3) + i;
>> m = abs(x);
>> ang = radtodeg(angle(x));
>> y = 4 - 3*i;
>> m = abs(y);
>> ang = radtodeg(angle(y));
>> z = 5*i;
>> m = abs(z);
>> ang = radtodeg(angle(z));
```

Exercício 2

```
>> r = [10 5 1];
>> tetha = [135 240 200];
>> x = r.*cos(degtorad(tetha));
>> y = r.*sin(degtorad(tetha));
```

Exercício 3

```
>> a = 1;
>> b = 10;
>> c = 20;
>> x1 = (-b+(sqrt(b^2-4*a*c)))/(2*a);
>> x2 = (-b-(sqrt(b^2-4*a*c)))/(2*a);
>> y1 = sqrt(x1);
>> y2 = -sqrt(x1);
>> y3 = sqrt(x2);
>> y4 = -sqrt(x2);
>> r1 = abs(y1);
>> ang1 = angle(y1);
>> r2 = abs(y2);
>> ang2 = angle(y2);
>> r3 = abs(y3);
>> ang3 = angle(y3);
>> r4 = abs(y4);
>> ang4 = angle(y4);
```

6. Gráficos

Exercício 1

```
>> x = -50:0.1:50;
>> y = 3*x.^3-26*x+10;
>> plot(x,y);
```

Exercício 2

```
>> x=0:0.01:pi;
>> y=sin(x);
>> z=cos(x);
>> plot(x,y,'.','color','blue');
>> hold on;
>> plot(x,z,'--','color','red');
```

Exercício 3

```
>> t=1900:1:2100;
>> P=157273000./(1+exp(-0.0313.*(t-1913.25)));
>> plot(t,P)
```

Exercício 4

```
>> t=0:0.01:6*pi;
>> z=t;
>> x=sin(t);
>> y=cos(t);
>> plot3(x,y,z)
```

7. Comandos de fluxo

Exercício 1

```
>> A=zeros(6,7)
>> for i = 1:6
>> for j = 1:7
>> if (i>=j)
>> A(i,j)=2*i-3*j;
>> else
>> A(i,j)=sqrt(7*i^2+5*j^2);
>> end
>> end
>> end
>> A
```

Exercício 2

```
>> N=[10 7 9 8 7.5 1 1];
```

```
>> MEDIA=mean(N);
>> aulas=20;
>> faltas=7;
>> FREQUENCIA=100*(aulas-faltas)/aulas;

>> if (MEDIA>=6&FREQUENCIA>=70)
>> fprintf("Aprovado\n")
>> else
>> fprintf("Reprovado\n")
>> if MEDIA<6&FREQUENCIA>=70
>> fprintf("Causa: Nota insuficiente\n")
>> elseif MEDIA<6&amp;FREQUENCIA<70
>> fprintf("Causa: Nota e frequência insuficientes\n")
>> else
>> fprintf("Causa: Frequência insuficiente\n")
>> end
>> end
```

Exercício 3

```
>> V=[9;6;2;3;8;6;4;45;26;9;8;22;6;589;21;7;9];
>> tamanho_de_V=length(V);
>> contador=0;
>> for i=1:tamanho_de_V
>> if rem(V(i,1),2)==0
>> contador=contador+1;
>> end
>> end
>> contador
```

Exercício 4

```
>> A=[7;2;1];
>> B=3*A;
>> produto_interno=dot(A,B);
>> a=A/norm(A);
>> b=B/norm(A);
>> if produto_interno==0
>> fprintf("Os vetores são ortogonais entre si");
>> end
>> if b==a
>> fprintf("Os vetores são paralelos entre si");
>> else
>> C=cross(A,B);
>> c=C/norm(C);
>> end
```

8. Interpolação e Ajuste de curvas

Exercício 1
letra (a)

```
>> T=[27.0228 25.4152 23.7288 22.3201 21.4839 21.3796]
```

```
>> P=0:.5:2.5
>> p=1.75
>> t=interp1(P,T,p)
```

letra (b)

```
>> PolIn=polyfit(P,T,5)
>> t2=polyval(PolIn,p)
```

letra (c)

```
>> t2-t
```

letra (d)

```
>> tprox=polyval(Polin,3.0)
```

Exercício 2

```
>> n=5 %grau do polinômio de ajuste
>> P=polyfit(x,y,n) %polinômio de ajuste
```

Exercício 3

```
>> V= [0.75 0.65 0.55 0.45 0.35];
>> T =[25 37 45 56 65];
>> P=[1.63 1.93 2.37 3 3.96];
>> a = polyfit(V,T/P,1)
>> b = -a(1)/0.05;
```

Exercício 4

```
a)
>> ano = [1940 1950 1960 1970 1980 1990 2000];
>> pop = [537 557 682 826 981 1135 1262];
>> a = polyfit(ano,log(pop),1);
>> pop1955 = exp(a(2))*exp(a(1)*1955);
b)
>> b = polyfit(ano,pop,2);
>> pop1955 = (b(1)*(1955^2))+(b(2)*1955)+(b(3));
c)
>> c1 = spline(ano,pop,1955);
>> c2 = polyfit(ano,pop,1);
>> pop1955 = (c2(1)*1955+c2(2));
```

Exercício 5

```
>> x = [0.5 1.9 3.3 4.7 6.1 7.5];
>> y = [0.8 10.1 25.7 59.2 105 122];
>> b = polyfit(log(x),log(y),1);
>> yy=x.^(b(1))*exp(b(2));
>> plot(x,y,x,yy)
```

9. Máximos e Mínimos

Exercício 1

```
>> [x_min valor_min] = fminbnd('x^3 - 3*x^2 + 3', -2, 3);
>> x_min
>> valor_min
>> [x_max valor_max] = fminbnd('-x^3+3*x^2-3', -2, 3);
>> x_max
>> - valor_max
```

Exercício 2

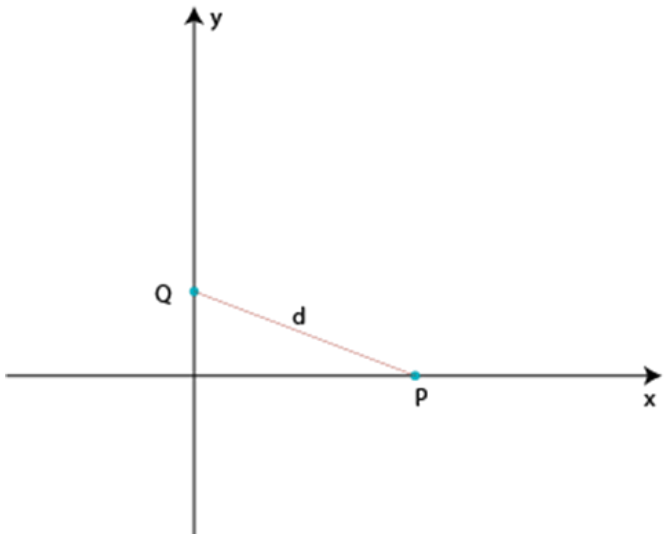
$$\begin{cases} x + y = 20 \\ A = xy \end{cases}$$

$$y = 20 - x$$

$$A = x(20 - x) = -x^2 + 20x$$

```
>> [x valor] = fminbnd('x^2 - 20*x', 0, 40);
>> x
>> y = 20 - x
```

Exercício 3



$$\begin{cases} x = \sqrt{t} \\ y = t^2 - \frac{3}{4} \end{cases} \Rightarrow d = \sqrt{y^2 + x^2} \Rightarrow d = \sqrt{\left(t^2 - \frac{3}{4}\right)^2 + \left(\sqrt{t}\right)^2} \Rightarrow d = t^4 - \frac{3}{2}t^2 + t + \frac{9}{16}$$

```
>> [t d_min] = fminbnd('t^4 - (3/2)*t^2 + t + 9/16', 0, 100);
>> d_min
```

Exercício 4

$$A_{cilindro} = 2\pi rh$$
$$A_{semiesfera} = 4\pi r^2$$
$$A_{total} = A_{cilindro} + A_{semiesfera} = 2\pi rh + 4\pi r^2 = 5\pi \Rightarrow h = 2{,}5 - 2r$$
$$V = \frac{2}{3}\pi r^3 + \pi r^2 h \Rightarrow V = -\frac{4}{3}\pi r^3 + 2{,}5\pi r^2$$

```
>> [r V_max] = fminbnd('(4/3)*pi*r^3 - 2,5*pi*r^2', 0, 100);
>> r
>> h = 2.5 - 2*r
```

10. Derivação

Exercício 1
Letra (a)

```
>> syms x
>> y=sin(x*(2*x-1))+cos(x*(x^2+1))
>> diff(y,x)
```

Letra (b)

```
>> syms t
>> y=8*t*(t^2+3)^3
>> diff(y,t)
```

Letra (c)

```
>> syms t
>> y=(2*t+3)/(t^2+3*t+9)
>> diff(y,t)
```

Exercício 2

```
>> syms x
>> y=log(x)+1-x^2
>> subs(y,5)
```

Exercício 3

```
>> syms a x
>> y=sin(a+2*x)-2*sin(a+x)+sin(a)
>> yy=x^2
>> dy1 = diff(y,x)
>> dy2 = diff(dy1,x)
>> dyy1 = diff(yy,x)
>> dyy2 = diff(dyy1,x)
>> subs((dy2/dyy2),0)
```

Exercício 4

Letra (a)

```
>> syms t
>> s=24.5*t-4.9*t^2
>> v=diff(s,t)
>> solve(v==0,t)
>> subs(s,5/2)
```

Letra (b)

```
>> syms t
>> s=24.5*t-4.9*t^2
>> solve(s==29.4,t)
>> v=diff(s,t)
>> subs(v,2)
>> subs(v,3)
```

Exercício 5

```
>> syms t
>> Q=t^3-2*t^2+6*t+2
>> i=diff(Q,t)
(a)
>> subs(i,0.5)
(b)
>> subs(i,1)
```

11. Integração

Exercício 1

```
>> syms x
>> z = 1/(0.8*x^2+0.5*x+2)
>> diff(z,x)
>> int(z,x,0,5)
```

Exercício 2

```
a)
>> syms x
>> S=x^3+9*(x^2)+27*x-27;
>> S1=(x+3)^3-x^2-5*x-12;
>> S*S1;
>> subs(ans,x,10)

b)
>> syms x
>> S=x^3+9*(x^2)+27*x-27;
>> S1=(x+3)^3-x^2-5*x-12;
>> S/S1;
>> subs(ans,x,10)

c)
>> syms x
>> S=x^3+9*(x^2)+27*x-27;
>> S1=(x+3)^3-x^2-5*x-12;
>> S+S1;
>> subs(ans,x,10)

d)
>> S*S1
>> [x valor]=fminbnd('-(x^3 + 9*x^2 + 27*x - 27)*(5*x - (x
+ 3)^3 + x^2 + 12)',0,10)
>> [x valor]=fminbnd('-(-(x^3 + 9*x^2 + 27*x - 27)*(5*x -
(x + 3)^3 + x^2 + 12))',0,10)

>> S/S1
>> [x valor]=fminbnd('-(x^3 + 9*x^2 + 27*x - 27)/(5*x - (x
+ 3)^3 + x^2 + 12)',0,10)
>> [x valor]=fminbnd('-(-(x^3 + 9*x^2 + 27*x - 27)/(5*x -
(x + 3)^3 + x^2 + 12))',0,10)

>> S+S1
>> [x valor]=fminbnd('22*x + (x + 3)^3 + 8*x^2 + x^3 -
39',0,10)
>> [x valor]=fminbnd('-(22*x + (x + 3)^3 + 8*x^2 + x^3 -
39)',0,10)
```

Exercício 3

```
>> syms x
>> I = exp(2*x)*sqrt(2-exp(2*x))
>> diff(I)
>> int(I)
```