Contents

Copyright

```
close all; format compact; clc;
fprintf("Engineer: Rodrigo Becerril Ferreyra\n");
fprintf("Company: California State University, Long Beach\n");
fprintf("Project Name: Task 1\n");
fprintf("Start Date: 30 August 2020\n");
fprintf("End date: 30 August 2020\n");
```

```
Engineer: Rodrigo Becerril Ferreyra
Company: California State University, Long Beach
Project Name: Task 1
Start Date: 30 August 2020
End date: 30 August 2020
```

Task 1.1

```
fprintf("\nTask 1.1\n");
clear variables;

y = polyval([1, 3, 1], 1.3);
fprintf("(1.3)^2 + 3(1.3) + 1   = %6.3f.\n", y);

y = sin(30 * pi/180);
fprintf("sin(30 deg)            = %6.3f.\n", y);

y = atan(1);
fprintf("arctan(1)              = %6.3f.\n", y);

y = sin(acos(sqrt(3)/2));
fprintf("sin(arccos(sqrt(3)/2)) = %6.3f.\n", y);
```

```
Task 1.1
(1.3)^2 + 3(1.3) + 1   =  6.590.
sin(30 deg)            =  0.500.
arctan(1)              =  0.785.
sin(arccos(sqrt(3)/2)) =  0.500.
```

Task 1.2

```
fprintf("\nTask 1.2\n");
clear variables;

x = [pi/3, pi/6];
y = abs(x).*sin(x.^2);
fprintf("x              = {"); fprintf("%6.3f ", x); fprintf("}\n");
fprintf("abs(x)sin(x^2) = {"); fprintf("%6.3f ", y); fprintf("}\n");
```

```
Task 1.2
x              = { 1.047  0.524 }
abs(x)sin(x^2) = { 0.932  0.142 }
```

Task 1.3

```
fprintf("\nTask 1.3\n");
clear variables;

fprintf("sin(pi/2)   = %6.3f.\n", sin(pi/2));
fprintf("cos(pi/3)   = %6.3f.\n", cos(pi/3));
fprintf("tan(60 deg) = %6.3f.\n", tan(60 * pi/180));
fprintf("\n");

x = [1/2, 1];
y = log(x + sqrt(x.^2 + 1));
fprintf("x                    = {"); fprintf("%6.3f ", x); fprintf("}\n");
fprintf("ln(x + sqrt(x^2 + 1)) = {"); fprintf("%6.3f ", y); fprintf("}\n");
fprintf("\n");

x = [pi/4, pi/2];
y = x./((x.^2 + 1).*sin(x));
fprintf("x                  = {"); fprintf("%6.3f ", x); fprintf("}\n");
fprintf("x/((x^2 + 1)sin(x)) = {"); fprintf("%6.3f ", y); fprintf("}\n");
```

```
Task 1.3
sin(pi/2)   =  1.000.
cos(pi/3)   =  0.500.
tan(60 deg) =  1.732.

x                    = { 0.500  1.000 }
ln(x + sqrt(x^2 + 1)) = { 0.481  0.881 }

x                  = { 0.785  1.571 }
```

```
x/((x^2 + 1)sin(x)) = { 0.687  0.453 }
```

Task 1.4

```
fprintf("\nTask 1.4\n");
clear variables;

x = [0.3, 1/3, 0.5, 1/2, 1.65, -1.34];
fprintf("x        = {"); fprintf("%6.3f ", x); fprintf("}\n");
fprintf("round(x) = {"); fprintf("%6.3f ", round(x)); fprintf("}\n");
fprintf("ceil(x)  = {"); fprintf("%6.3f ", ceil(x)); fprintf("}\n");
fprintf("floor(x) = {"); fprintf("%6.3f ", floor(x)); fprintf("}\n");
fprintf("fix(x)   = {"); fprintf("%6.3f ", fix(x)); fprintf("}\n");
```

```
Task 1.4
x        = { 0.300  0.333  0.500  0.500  1.650 -1.340 }
round(x) = { 0.000  0.000  1.000  1.000  2.000 -1.000 }
ceil(x)  = { 1.000  1.000  1.000  1.000  2.000 -1.000 }
floor(x) = { 0.000  0.000  0.000  0.000  1.000 -2.000 }
fix(x)   = { 0.000  0.000  0.000  0.000  1.000 -1.000 }
```

Task 1.5

```
fprintf("\nTask 1.5\n");
clear variables;

x = [3, 4, 5];
y = [3, 4, -4, 6];

for yval = 1:1:4
    for xval = 1:1:3
        a = x(xval); b = y(yval);
        fprintf("%2d rem %2d = %2d\t%2d mod %2d = %2d\n",...
        a, b, rem(a, b), a, b, mod(a, b));
    end
end
```

```
Task 1.5
 3 rem  3 =  0   3 mod  3 =  0
 4 rem  3 =  1   4 mod  3 =  1
 5 rem  3 =  2   5 mod  3 =  2
 3 rem  4 =  3   3 mod  4 =  3
 4 rem  4 =  0   4 mod  4 =  0
 5 rem  4 =  1   5 mod  4 =  1
 3 rem -4 =  3   3 mod -4 = -1
 4 rem -4 =  0   4 mod -4 =  0
 5 rem -4 =  1   5 mod -4 = -3
 3 rem  6 =  3   3 mod  6 =  3
 4 rem  6 =  4   4 mod  6 =  4
 5 rem  6 =  5   5 mod  6 =  5
```

Task 1.6

```
fprintf("\nTask 1.6\n");
clear variables;

x = 1 : 0.1 : 2;
fprintf("x                          = {"); fprintf("%6.3f ", x); fprintf("}\n");

y = polyval([1, 3, 0, 1], x);
fprintf("x^3 + 3x^2 + 1             = {"); fprintf("%6.3f ", y); fprintf("}\n");

y = sin(x.^2);
fprintf("sin(x^2)                   = {"); fprintf("%6.3f ", y); fprintf("}\n");

y = (sin(x)).^2;
fprintf("sin^2(x)                   = {"); fprintf("%6.3f ", y); fprintf("}\n");

y = sin(2.*x) + x.*cos(4.*x);
fprintf("sin(2x) + xcos(4x)         = {"); fprintf("%6.3f ", y); fprintf("}\n");

y = x./(x.^2 + 1);
fprintf("x/(x^2 + 1)                = {"); fprintf("%6.3f ", y); fprintf("}\n");

y = cos(x)./(1 + sin(x));
fprintf("cos(x)/(1 + sin(x))        = {"); fprintf("%6.3f ", y); fprintf("}\n");

y = 1./x + x.^3./(x.^4 + 5.*sin(x));
fprintf("1/x + x^3/(x^4 + 5sin(x)) = {"); fprintf("%6.3f ", y); fprintf("}\n");
```

```
Task 1.6
x                          = { 1.000  1.100  1.200  1.300  1.400  1.500  1.600  1.700  1.800  1.900  2.000
x^3 + 3x^2 + 1             = { 5.000  5.961  7.048  8.267  9.624 11.125 12.776 14.583 16.552 18.689 21.000
sin(x^2)                   = { 0.841  0.936  0.991  0.993  0.925  0.778  0.549  0.249 -0.098 -0.451 -0.757
sin^2(x)                   = { 0.708  0.794  0.869  0.928  0.971  0.995  0.999  0.983  0.948  0.895  0.827
sin(2x) + xcos(4x)         = { 0.256  0.470  0.780  1.125  1.421  1.581  1.531  1.222  0.653 -0.134 -1.048
x/(x^2 + 1)                = { 0.500  0.498  0.492  0.483  0.473  0.462  0.449  0.437  0.425  0.412  0.400
cos(x)/(1 + sin(x))        = { 0.293  0.240  0.188  0.136  0.086  0.035 -0.015 -0.065 -0.115 -0.166 -0.218
1/x + x^3/(x^4 + 5sin(x)) = { 1.192  1.134  1.090  1.056  1.027  1.002  0.980  0.957  0.935  0.912  0.889
```

Task 1.7

```
fprintf("\nTask 1.7\n");
clear variables;

x = 3 : 0.01 : 5;
y = x./(x + (1./x.^2));
fprintf("x             = {"); fprintf("%7.5f ", x); fprintf("}\n");
fprintf("x/(x + x^-2)) = {"); fprintf("%7.5f ", y); fprintf("}\n");
```

```
Task 1.7
x             = {3.00000 3.01000 3.02000 3.03000 3.04000 3.05000 3.06000 3.07000 3.08000 3.09000 3.10000
x/(x + x^-2)) = {0.96429 0.96463 0.96497 0.96530 0.96563 0.96595 0.96628 0.96659 0.96691 0.96722 0.96752
```

Task 1.8

```
fprintf("\nTask 1.8\n");
clear variables;

x = -2 : 0.1 : -1;
y = 1./x.^3 + 1./x.^2 + 3./x;
fprintf("x                 = {"); fprintf("%6.3f ", x); fprintf("}\n");
fprintf("x^-3 + x^-2 + 3/x = {"); fprintf("%6.3f ", y); fprintf("}\n");
```

```
Task 1.8
x                 = {-2.000 -1.900 -1.800 -1.700 -1.600 -1.500 -1.400 -1.300 -1.200 -1.100 -1.000 }
x^-3 + x^-2 + 3/x = {-1.375 -1.448 -1.529 -1.622 -1.729 -1.852 -1.997 -2.171 -2.384 -2.652 -3.000 }
```

Task 1.9

```
fprintf("\nTask 1.9\n");
clear variables;

x = linspace(0, 1, 200);
g = x.^3 + 1;
h = x + 2;
z = x.^2;
y = cos(pi.*x);
f = (y.*z)./(g.*h);

fprintf("f(200) = %6.3f\n", f(x==1));
```

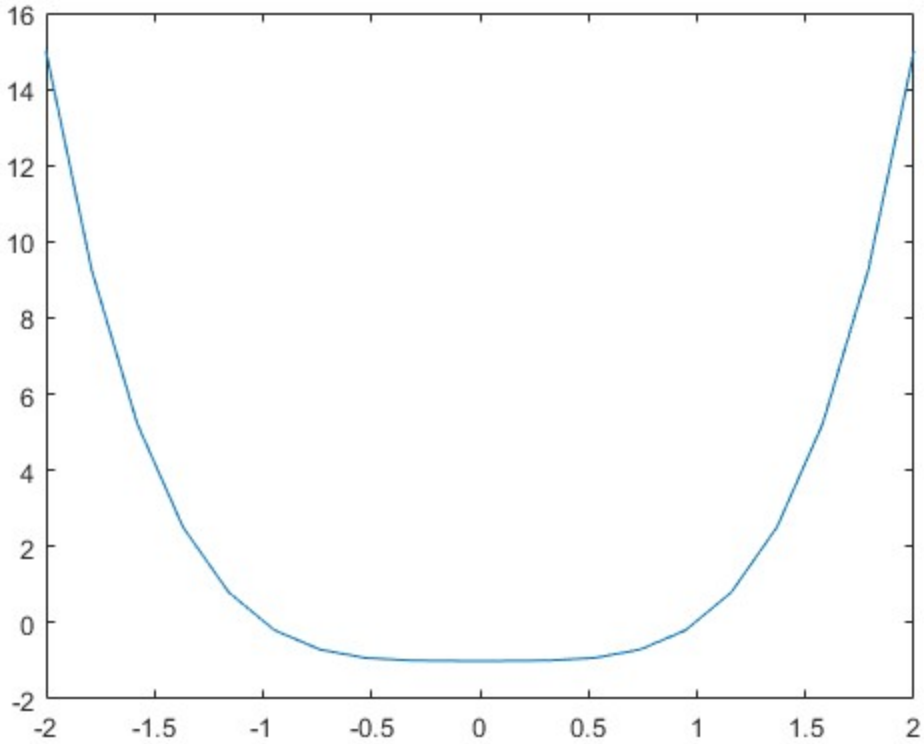
```
Task 1.9
f(200) = -0.167
```

Task 1.10

```
fprintf("\nTask 1.10\n");
clear variables;

x = linspace(-2, 2, 20);
y = polyval([1, 0, 0, 0, -1], x);
plot(x, y);
```

```
Task 1.10
```



Task 1.11

```
fprintf("\nTask 1.11\n");
clear variables;

x = 0 : 0.1 : 3;
f = x.^3 .* cos(x + 1);
fprintf("f(2) = %6.3f\n", f(x==2));
fprintf("f(3) = %6.3f\n", f(x==3));
```

```
Task 1.11
f(2) = -7.920
f(3) = -17.648
```

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