

```
Clear["Global`*"]
(*Task 1*)
Roots[x^4 - 2 x^3 + x^2 - 8 x - 12 == 0, x]
```

```
Clear["Global`*"]
(*Task 2*)
a := 2
b := {{x + 2, y + 3}, {3, 0}}
c := {{3, 6}, {y, z}} // Transpose
Solve[a * b == c, {x, y, z}]
```

Out[139]= $\left\{\left\{x \rightarrow -\frac{1}{2}, y \rightarrow -6, z \rightarrow 0\right\}\right\}$

```
Clear["Global`*"]
(*Task 3*)
a := 3
b := {{1, 0}, {-3, 3}, {2, 5}}
c := {{4, 3}, {0, 6}, {-1, 2}}
X := {{x11, x12}, {x21, x22}, {x31, x32}}
Solve[3 (a - X) == X + b, Flatten[X]]
```

Out[135]= $\left\{\left\{x_{11} \rightarrow 2, x_{12} \rightarrow \frac{9}{4}, x_{21} \rightarrow 3, x_{22} \rightarrow \frac{3}{2}, x_{31} \rightarrow \frac{7}{4}, x_{32} \rightarrow 1\right\}\right\}$

```
In[36]:= Clear["Global`*"]
(*Task 4*)
a := {{a11, a12}, {a21, a22}}
b := {{1, 3, 1}, {2, 1, 1}}
c := {{-1, 2, x}, {4, 2, y}}
Reduce[a.b == c, {x, y}]
```

Out[40]= $a_{12} == -1 \ \&\& \ a_{11} == 1 \ \&\& \ a_{22} == 2 \ \&\& \ a_{21} == 0 \ \&\& \ x == 0 \ \&\& \ y == 2$

```
In[32]:= Clear["Global`*"]
(*Task 5*)
p := {s, 2, 1 - s}
q := {s, 1, -2}
Solve[p.q == 0, s]
```

Out[35]= $\{\{s \rightarrow -2\}, \{s \rightarrow 0\}\}$

```
Clear["Global`*"]
(*Task 6*)
A := Table[a*2^i + b*3^i + c*4^i, {i, -1, 1, 1}]
B := {3/4, 1, 1}
Solve[A == B, {a, b, c}]
```

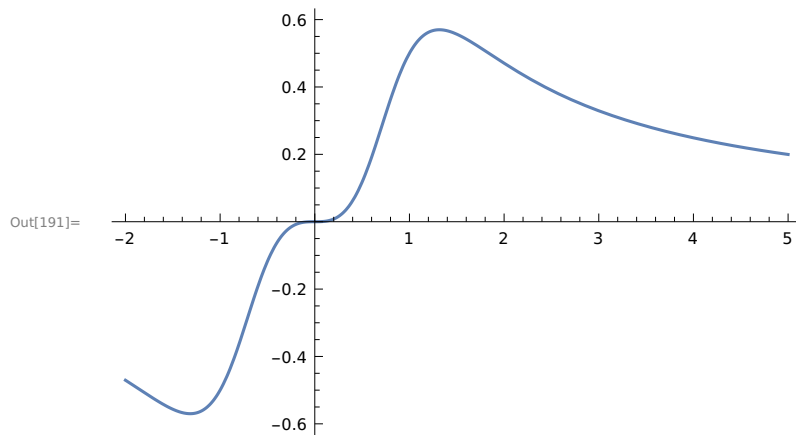
Out[123]= $\{\{a \rightarrow 3, b \rightarrow -3, c \rightarrow 1\}\}$

```
In[184]:= Clear["Global`*"]
(*Task 7*)
f[x_] := x^3 / (x^4 + 1)
g[x_, y_] := Sqrt[25 - x^2 - y^2]
h[x_, y_] := {x + 2 y, x * y}
f[5]
g[1, 2]
h[f[3], 2]
Plot[f[x], {x, -2, 5}]
```

Out[188]= $\frac{125}{626}$

Out[189]= $2\sqrt{5}$

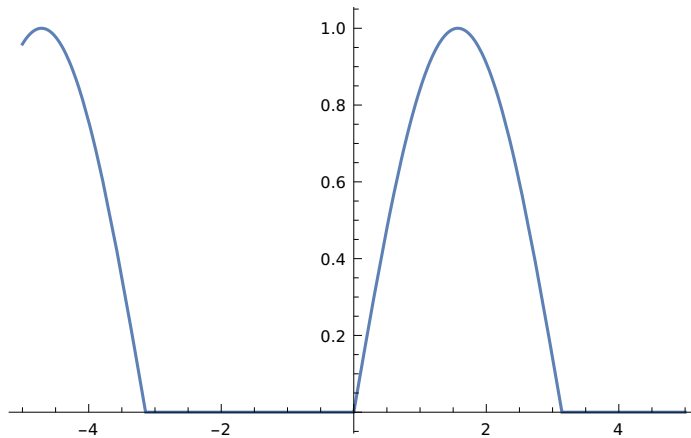
Out[190]= $\left\{\frac{355}{82}, \frac{27}{41}\right\}$



```
Clear["Global`*"]
(*Task 8*)
f[x_] := Abs[Sin[x]]
f[Pi/2]
Plot[f[x], {x, -5, 5}]
```

```
In[212]:= Clear["Global`*"]
(*Task 9*)
f[x_] := Sin[x] /; Sin[x] > 0
f[x_] := 0 /; Sin[x] ≤ 0
Plot[f[x], {x, -5, 5}]
```

Out[215]=



```
In[238]:= Clear["Global`*"]
(*Task 10*)
sing[x_] := If[x == 0, Return[0], If[x < 0, Return[-1], If[x > 0, Return[1], 0]]]
sing[x_] := Which[x == 0, Return[0], x < 0, Return[-1], x > 0, Return[1]]
sing[x_] := Sign[x]
Clear["Global`*"]
sing[x_] := 1
sing[0] := 0
sing[x_] := -1 /; x < 0
sing[-2]
sing[0]
sing[2]
```

Out[246]= -1

Out[247]= 0

Out[248]= 1

```
Clear["Global`*"]
(*Task 11*)
sum[x_] := Total[x]
sum[{1, 2, 3}]
```

Out[113]= 6

```

In[161]:= Clear["Global`*"]
(*Task 12*)
sumPositive[x_] := Total[Select[x, Positive]]
sumPositive[{1, -9, 3, 4}]

Out[163]= 8

In[268]:= Clear["Global`*"]
(*Task 13*)
sumAll[x_] := {Total[Select[x, Positive]], Total[Select[x, Negative]]}
l = {-3, -5, 2, -76, 1, 8, 9, 0, 0, 0}
sumAll[l]

Out[270]= {-3, -5, 2, -76, 1, 8, 9, 0, 0, 0}
Out[271]= {20, -84}

In[377]:= Clear["Global`*"]
(*Task 14*)
c := {c1, c2, c3}
poly[c_] := Total[Table[c[[i]]*x^(i-1), {i, 1, Length[c], 1}]]
Plus@@(c*Table[x^(i-1), {i, 1, Length[c], 1}])(*alternatywnie*)
poly[c]

Out[380]= c1 + c2 x + c3 x^2
Out[381]= c1 + c2 x + c3 x^2

In[385]:= Clear["Global`*"]
(*Task 15*)
gcd[m_, n_] := Module[{d, r, M, N},
M = Max[{m, n}];
N = Min[{m, n}];
d = IntegerPart[M/N];
r = Mod[M, N];
If[r == 0, Return[N], Return[gcd[d*N, r]]]
]
gcd[48, 36]
(*AAAAAAAAAAAAAAAAAAAA GCD jest standardOw0 *)

Out[387]= 12

In[382]:= Clear["Global`*"]
(*Task 16*)
sum := Total[Table[i/(i+(i+1)), {i, 1, 10, 1}]]
sum

Out[384]= 
$$\frac{64\,157\,087}{14\,549\,535}$$


```

Out[298]= 4.40956

10

10

Out[258]= $c1 + c2 x + c3 x^2$

In[272]:=

Out[50]= {}

Out[3]= $x == 2 i || x == -2 i || x == -1 || x == 3$