

分数の計算

```
1 program BunsuuNoKeisan; // 学生証番号 氏名
2 {$APPTYPE CONSOLE}
3 uses
4   SysUtils;
5
6 function Gcd(M,N : Integer) : Integer;
7   { mとnの最大公約数 }
8   var
9     R : Integer;
10
11   begin
12     while N > 0 do
13       begin
14         R := M mod N;
15         M := N;
16         N := R;
17       end;
18     Gcd := M;
19   end; {Gcd}
20
21 var
22   Bunsu1,Bunbo1 : Integer;
23   Bunsu2,Bunbo2 : Integer;
24   Bunsu3,Bunbo3 : Integer;
25   Bunsu4,Bunbo4 : Integer;
26   Bunsu5,Bunbo5 : Integer;
27   Bunsu6,Bunbo6 : Integer;
28   D : Integer;
29
30 begin {Main}
31   WriteLn('分数の計算');
32   WriteLn;
33   WriteLn('和が整数になるものを入ると終わります');
34   repeat
35     WriteLn;
36     Write('分数 1 [分子 分母] ? ');
37     ReadLn(Bunsu1,Bunbo1);
38     Write('分数 2 [分子 分母] ? ');
39     ReadLn(Bunsu2,Bunbo2);
40     WriteLn;
41     // 足し算
42     D := Gcd(Bunbo1,Bunbo2);
43     Bunbo3 := (Bunbo1 div D)*Bunbo2;
44     Bunsu3 := Bunsu1*(Bunbo3 div Bunbo1)+Bunsu2*(Bunbo3 div Bunbo2);
45     D := Gcd(Bunsu3,Bunbo3);
46     Bunsu3 := Bunsu3 div D;
47     Bunbo3 := Bunbo3 div D;
48     Write(Bunsu1, '/', Bunbo1);
49     Write(' + ');
50     Write(Bunsu2, '/', Bunbo2);
51     Write(' = ');
52     Write(Bunsu3, '/', Bunbo3);
53     WriteLn;
54     // 引き算
55     D := Gcd(Bunbo1,Bunbo2);
56     Bunbo4 := (Bunbo1 div D)*Bunbo2;
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57     Buns14 := Buns11*(Bunbo4 div Bunbo1)-Buns12*(Bunbo4 div Bunbo2);
58     D := Gcd(Abs(Buns14),Bunbo4);
59     Buns14 := Buns14 div D;
60     Bunbo4 := Bunbo4 div D;
61     Write(Buns11, '/', Bunbo1);
62     Write(' - ');
63     Write(Buns12, '/', Bunbo2);
64     Write(' = ');
65     Write(Buns14, '/', Bunbo4);
66     WriteLn;
67     // 掛け算
68     D := Gcd(Buns11,Bunbo2);
69     Buns15 := Buns11 div D;
70     Bunbo5 := Bunbo2 div D;
71     D := Gcd(Bunbo1,Buns12);
72     Buns15 := Buns15*(Buns12 div D);
73     Bunbo5 := Bunbo5*(Bunbo1 div D);
74     Write(Buns11, '/', Bunbo1);
75     Write(' x ');
76     Write(Buns12, '/', Bunbo2);
77     Write(' = ');
78     Write(Buns15, '/', Bunbo5);
79     WriteLn;
80     // 割り算
81     D := Gcd(Buns11,Buns12);
82     Buns16 := Buns11 div D;
83     Bunbo6 := Buns12 div D;
84     D := Gcd(Bunbo1,Bunbo2);
85     Buns16 := Buns16*(Bunbo2 div D);
86     Bunbo6 := Bunbo6*(Bunbo1 div D);
87     Write(Buns11, '/', Bunbo1);
88     Write(' ÷ ');
89     Write(Buns12, '/', Bunbo2);
90     Write(' = ');
91     Write(Buns16, '/', Bunbo6);
92     WriteLn;
93     until Bunbo3 = 1;
94     ReadLn;
95     end.
```

分数の計算, 改良版

```
1 program BunsuuNoKeisan2; // 学生証番号 氏名
2 {$APPTYPE CONSOLE}
3 uses
4   SysUtils;
5
6 function Gcd(M,N : Integer) : Integer;
7   { mとnの最大公約数 (Greatest Common Divisor) }
8   var
9     R : Integer;
10
11   begin
12     M := Abs(M);
13     N := Abs(N);
14     while N > 0 do
15       begin
16         R := M mod N;
17         M := N;
18         N := R;
19       end;
20     Gcd := M;
21   end; {Gcd}
22
23 function Lcm(M,N : Integer) : Integer;
24   { mとnの最小公倍数 (Least Common Multiple) }
25   begin
26     Lcm := Abs((M div Gcd(M,N))*N);
27   end; {Lcm}
28
29 procedure Yakubun(Si1,Bo1 : Integer; var Si2,Bo2 : Integer);
30   { 約分 (reduce) }
31   { Si1/Bo1 = 約分 Si2/Bo2 }
32   { Bo2>0 になるようにする }
33   var
34     D : Integer;
35   begin
36     D := Gcd(Si1,Bo1);
37     Si2 := Si1 div D;
38     Bo2 := Bo1 div D;
39     if Bo2 < 0
40     then begin
41       Si2 := -Si2;
42       Bo2 := -Bo2;
43     end;
44   end; {Yakubun}
45
46 procedure AddBunsuu(Si1,Bo1,Si2,Bo2 : Integer; var Si3,Bo3 : Integer);
47   { 足し算 (add) }
48   { Si1/Bo1 + Si2/Bo2 Si3/Bo3 }
49   begin
50     Bo3 := Lcm(Bo1,Bo2);
51     Si3 := Si1*(Bo3 div Bo1)+Si2*(Bo3 div Bo2);
52     Yakubun(Si3,Bo3,Si3,Bo3);
53   end; {AddBunsuu}
54
55 procedure SubBunsuu(Si1,Bo1,Si2,Bo2 : Integer; var Si3,Bo3 : Integer);
56   { 引き算 (subtract) }
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```
57         { Si1/Bo1 - Si2/Bo2   Si3/Bo3 }
58     begin
59         Bo3 := Lcm(Bo1,Bo2);
60         Si3 := Si1*(Bo3 div Bo1)-Si2*(Bo3 div Bo2);
61         Yakubun(Si3,Bo3,Si3,Bo3);
62     end; {SubBunsuu}
63
64 procedure MulBunsuu(Si1,Bo1,Si2,Bo2 : Integer; var Si3,Bo3 : Integer);
65     { 掛け算 (multiply)           }
66     { Si1/Bo1 × Si2/Bo2   Si3/Bo3 }
67     begin
68         Yakubun(Si1,Bo2,Si1,Bo2);
69         Yakubun(Si2,Bo1,Si2,Bo1);
70         Si3 := Si1*Si2;
71         Bo3 := Bo1*Bo2;
72     end; {MulBunsuu}
73
74 procedure DivBunsuu(Si1,Bo1,Si2,Bo2 : Integer; var Si3,Bo3 : Integer);
75     { 割り算 (divide)             }
76     { Si1/Bo1 ÷ Si2/Bo2   Si3/Bo3 }
77     begin
78         Yakubun(Si1,Si2,Si1,Si2);
79         Yakubun(Bo2,Bo1,Bo2,Bo1);
80         Si3 := Si1*Bo2;
81         Bo3 := Bo1*Si2;
82     end; {DivBunsuu}
83
84 procedure ReadBunsuu(var Si,Bo : Integer);
85     { 分数を読む                   }
86     { 読んだ分数は約分する }
87     begin
88         Write(' [分子 分母] ? ');
89         ReadLn(Si,Bo);
90         Yakubun(Si,Bo,Si,Bo);
91     end; {ReadBunsuu}
92
93 procedure WriteBunsuu(Si,Bo : Integer);
94     { 分数を書く                   }
95     { 整数は分子だけ書く }
96     begin
97         if Bo = 1
98             then Write(Si)
99             else Write(Si, '/', Bo);
100    end; {WriteBunsuu}
101
102 var
103     Buns11,Bunbo1 : Integer;
104     Buns12,Bunbo2 : Integer;
105     Buns13,Bunbo3 : Integer;
106     Buns14,Bunbo4 : Integer;
107     Buns15,Bunbo5 : Integer;
108     Buns16,Bunbo6 : Integer;
109
110 begin {Main}
111     WriteLn(' 分数の計算 ');
112     WriteLn;
113     WriteLn(' 和が整数になるものを入れると終わります ');
114     repeat
```

```
115     WriteLn;
116     Write('分数 1 ');
117     ReadBunsuu(Bunsi1,Bunbo1);
118     Write('分数 2 ');
119     ReadBunsuu(Bunsi2,Bunbo2);
120     WriteLn;
121     // 足し算
122     AddBunsuu(Bunsi1,Bunbo1,Bunsi2,Bunbo2,Bunsi3,Bunbo3);
123     WriteBunsuu(Bunsi1,Bunbo1);
124     Write(' + ');
125     WriteBunsuu(Bunsi2,Bunbo2);
126     Write(' = ');
127     WriteBunsuu(Bunsi3,Bunbo3);
128     WriteLn;
129     // 引き算
130     SubBunsuu(Bunsi1,Bunbo1,Bunsi2,Bunbo2,Bunsi4,Bunbo4);
131     WriteBunsuu(Bunsi1,Bunbo1);
132     Write(' - ');
133     WriteBunsuu(Bunsi2,Bunbo2);
134     Write(' = ');
135     WriteBunsuu(Bunsi4,Bunbo4);
136     WriteLn;
137     // 掛け算
138     MulBunsuu(Bunsi1,Bunbo1,Bunsi2,Bunbo2,Bunsi5,Bunbo5);
139     WriteBunsuu(Bunsi1,Bunbo1);
140     Write(' × ');
141     WriteBunsuu(Bunsi2,Bunbo2);
142     Write(' = ');
143     WriteBunsuu(Bunsi5,Bunbo5);
144     WriteLn;
145     // 割り算
146     DivBunsuu(Bunsi1,Bunbo1,Bunsi2,Bunbo2,Bunsi6,Bunbo6);
147     WriteBunsuu(Bunsi1,Bunbo1);
148     Write(' ÷ ');
149     WriteBunsuu(Bunsi2,Bunbo2);
150     Write(' = ');
151     WriteBunsuu(Bunsi6,Bunbo6);
152     WriteLn;
153     until Bunbo3 = 1;
154     ReadLn;
155     end.
```