

```

Sort[
{
  Area[#] / (4 Pi) * CountryData["World", "Area"] / CountryData[#, "Area"],
  #
} & /@ AllCountries
]

{{0., AmericanSamoa}, {0., Andorra}, {0., Anguilla}, {0., AntiguaBarbuda},
{0., Belize}, {0., Bermuda}, {0., BritishVirginIslands}, {0., CaymanIslands},
{0., ChristmasIsland}, {0., CocosKeelingIslands}, {0., CookIslands},
{0., Gibraltar}, {0., Grenada}, {0., Guernsey}, {0., Jersey}, {0., Liechtenstein},
{0., Maldives}, {0., MarshallIslands}, {0., Micronesia}, {0., Monaco},
{0., Montserrat}, {0., Nauru}, {0., NorfolkIsland}, {0., NorthernMarianaIslands},
{0., PitcairnIslands}, {0., SaintHelena}, {0., SaintKittsNevis},
{0., SaintPierreMiquelon}, {0., SaintVincentGrenadines}, {0., SanMarino},
{0., Singapore}, {0., Tokelau}, {0., TurksCaicosIslands}, {0., Tuvalu},
{0., UnitedStatesVirginIslands}, {0., VaticanCity}, {0., WallisFutuna},
{0.0694978, Liberia}, {0.100546, Taiwan}, {0.118739, Bhutan},
{0.131868, Denmark}, {0.175281, Togo}, {0.25725, FrenchPolynesia},
{0.324502, SriLanka}, {0.349045, FaroeIslands}, {0.382411, Fiji},
{0.447267, Ecuador}, {0.501278, Vanuatu}, {0.561986, Luxembourg},
{0.566408, Qatar}, {0.570596, Japan}, {0.580869, Nicaragua}, {0.592983, Cyprus},
{0.598475, Brunei}, {0.61859, Kuwait}, {0.619785, Netherlands},
{0.620056, Swaziland}, {0.623953, Madagascar}, {0.62719, Kyrgyzstan},
{0.641789, Iceland}, {0.667969, Tonga}, {0.680242, Jordan}, {0.686969, HongKong},
{0.688168, Honduras}, {0.688871, Slovenia}, {0.693782, SierraLeone},
{0.720113, Ireland}, {0.722352, UnitedKingdom}, {0.725726, Iraq},
{0.726982, Macedonia}, {0.734991, Mozambique}, {0.745207, Suriname},
{0.774442, Namibia}, {0.783902, CzechRepublic}, {0.788308, Tanzania},
{0.790226, FrenchGuiana}, {0.803191, Afghanistan}, {0.805441, Estonia},
{0.809857, Greece}, {0.814566, Turkmenistan}, {0.823121, Guyana},
{0.827564, Gabon}, {0.828743, Gambia}, {0.82893, Portugal}, {0.830704, Cambodia},
{0.838301, EastTimor}, {0.843115, Tunisia}, {0.847061, Lithuania},
{0.851332, Egypt}, {0.854845, Tajikistan}, {0.863439, Nigeria},
{0.874567, SolomonIslands}, {0.875414, Montenegro}, {0.876258, Senegal},
{0.877687, PuertoRico}, {0.886338, Spain}, {0.893243, TrinidadTobago},
{0.89394, Austria}, {0.894133, Vietnam}, {0.897739, Chad}, {0.901609, Mali},
{0.902932, Comoros}, {0.908524, DominicanRepublic}, {0.910225, Uruguay},
{0.91066, EquatorialGuinea}, {0.913295, Cameroon}, {0.927081, SouthKorea},
{0.928657, Canada}, {0.92892, Djibouti}, {0.929226, Bangladesh},
{0.933931, Argentina}, {0.937665, Mauritania}, {0.937676, BurkinaFaso},
{0.941775, Svalbard}, {0.942589, Bolivia}, {0.944104, India}, {0.944341, Albania},
{0.953018, Guadeloupe}, {0.955766, China}, {0.956652, Greenland},
{0.956798, DemocraticRepublicCongo}, {0.957185, Ghana}, {0.958026, Sudan},
{0.958345, Kazakhstan}, {0.95935, SaudiArabia}, {0.960814, Algeria},
{0.966131, Belarus}, {0.971966, Colombia}, {0.974215, NewCaledonia},
{0.976652, Angola}, {0.976974, Germany}, {0.978673, Mongolia},
{0.98754, UnitedStates}, {0.989456, Russia}, {0.989921, Philippines},
{0.99205, Venezuela}, {0.996056, Australia}, {0.997831, Samoa},
{1.00066, ElSalvador}, {1.00556, Israel}, {1.00971, Bahamas}, {1.01182, Myanmar},

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{1.01629, Guatemala}, {1.02579, CentralAfricanRepublic}, {1.02741, IsleOfMan},
{1.02794, Mauritius}, {1.0309, Bahrain}, {1.03297, Finland}, {1.0335, Ukraine},
{1.03464, Jamaica}, {1.03635, Brazil}, {1.03754, Romania}, {1.03845, Paraguay},
{1.04117, Malaysia}, {1.04594, Zambia}, {1.04996, Yemen}, {1.04997, France},
{1.05081, Libya}, {1.06204, Latvia}, {1.06381, GuineaBissau}, {1.07392, Poland},
{1.07443, Kosovo}, {1.07762, Ethiopia}, {1.08002, UnitedArabEmirates},
{1.08531, Rwanda}, {1.08542, Zimbabwe}, {1.08771, Bulgaria},
{1.08961, WestBank}, {1.09101, NetherlandsAntilles}, {1.09416, Turkey},
{1.09612, Guam}, {1.10228, IvoryCoast}, {1.10555, Thailand}, {1.1076, Burundi},
{1.11448, Peru}, {1.11479, BosniaHerzegovina}, {1.11982, Botswana},
{1.12802, Iran}, {1.1402, Guinea}, {1.14277, Niger}, {1.14885, Palau},
{1.17562, Lesotho}, {1.19511, Kenya}, {1.19611, Reunion}, {1.20434, Laos},
{1.20788, SouthAfrica}, {1.20913, Dominica}, {1.21415, Pakistan},
{1.21894, Uganda}, {1.22032, Benin}, {1.22047, Sweden}, {1.2209, Morocco},
{1.22277, Uzbekistan}, {1.22294, FalklandIslands}, {1.24866, Seychelles},
{1.24873, Panama}, {1.25633, Malawi}, {1.25635, Lebanon}, {1.26821, Indonesia},
{1.26908, Azerbaijan}, {1.27413, SaoTomePrincipe}, {1.27639, Slovakia},
{1.29636, Hungary}, {1.31244, Switzerland}, {1.32354, Chile},
{1.3326, SaintLucia}, {1.33882, Kiribati}, {1.33902, Mexico},
{1.34693, Haiti}, {1.35567, PapuaNewGuinea}, {1.35806, Syria}, {1.36308, Oman},
{1.37587, Martinique}, {1.38435, Barbados}, {1.38618, NewZealand},
{1.43116, RepublicCongo}, {1.44707, Serbia}, {1.45663, CapeVerde},
{1.516, Moldova}, {1.53313, Italy}, {1.54171, Mayotte}, {1.57791, Belgium},
{1.60789, WesternSahara}, {1.61912, Malta}, {1.62954, NorthKorea}, {1.63223, Cuba},
{1.66986, Armenia}, {1.67399, Somalia}, {1.85355, Eritrea}, {1.85618, Georgia},
{1.87293, Norway}, {1.88192, Nepal}, {1.97352, Niue}, {2.01681, Croatia},
{2.08729, CostaRica}, {2.16233, GazaStrip}, {2.76548, Aruba}, {18.5439, Macau}}
```

CountryColour["Canada"]

0.986297

CountryShape["Monaco"]

CountryShape[]

Length[CountryShape["Canada"]]

15

Total[Length[CountryShape[#]] & /@ AllCountries]

316

(# → CountryColour[#] - CountryColour["Russia"]) & /@ AllCountries

```
{Afghanistan → 0.0177232, Albania → -0.234125, Algeria → -0.314224,
AmericanSamoa → 0.12928, Andorra → 0.141245, Angola → 0.279489,
Anguilla → 0.379264, AntiguaBarbuda → -0.303132, Argentina → -0.156456,
Armenia → 0.0055331, Aruba → 0.0243164, Australia → 0.0627303, Austria → -0.237648,
Azerbaijan → -0.244993, Bahamas → 0.469062, Bahrain → 0.326599,
Bangladesh → 0.595385, Barbados → 0.326809, Belarus → -0.248864, Belgium → 0.523315,
Belize → -0.268748, Benin → -0.0666363, Bermuda → -0.128688, Bhutan → 0.215197,
Bolivia → 0.343625, BosniaHerzegovina → 0.263213, Botswana → -0.218618,
Brazil → 0.0934789, BritishVirginIslands → 0.238447, Brunei → 0.0592401,
```

Bulgaria → -0.0929078, BurkinaFaso → 0.185898, Burundi → -0.219491,
 Cambodia → 0.414624, Cameroon → 0.33645, Canada → 0.6, CapeVerde → -0.0314686,
 CaymanIslands → 0.507891, CentralAfricanRepublic → -0.273022, Chad → -0.073022,
 Chile → 0.0935848, China → 0.523234, ChristmasIsland → -0.279093,
 CocosKeelingIslands → -0.0866444, Colombia → 0.593413, Comoros → 0.168921,
 CookIslands → 0.5501, CostaRica → 0.493567, Croatia → -0.231218, Cuba → 0.325995,
 Cyprus → 0.365372, CzechRepublic → 0.503906, DemocraticRepublicCongo → 0.526978,
 Denmark → 0.512418, Djibouti → 0.23421, Dominica → -0.0303694,
 DominicanRepublic → -0.0723847, EastTimor → 0.313287, Ecuador → 0.218413,
 Egypt → -0.340508, ElSalvador → -0.271144, EquatorialGuinea → 0.00300495,
 Eritrea → -0.099208, Estonia → -0.373864, Ethiopia → 0.567237,
 FalklandIslands → 0.0944592, FaroeIslands → -0.175696, Fiji → -0.085848,
 Finland → 0.333488, France → -0.232134, FrenchGuiana → -0.239867,
 FrenchPolynesia → -0.0801568, Gabon → -0.330272, Gambia → 0.188843,
 GazaStrip → 0.324431, Georgia → 0.505422, Germany → 0.0066635, Ghana → -0.0623991,
 Gibraltar → 0.00757009, Greece → 0.510856, Greenland → -0.2, Grenada → -0.0971483,
 Guadeloupe → 0.561253, Guam → 0.214143, Guatemala → 0.0632295,
 Guernsey → -0.0318007, Guinea → 0.188755, GuineaBissau → 0.438799,
 Guyana → -0.239867, Haiti → 0.427615, Honduras → 0.396043, HongKong → 0.0232335,
 Hungary → 0.241374, Iceland → -0.303669, India → -0.0947089, Indonesia → -0.189015,
 Iran → 0.509609, Iraq → -0.0589602, Ireland → -0.216189, IsleOfMan → -0.0733923,
 Israel → -0.0155007, Italy → 0.262448, IvoryCoast → -0.311484,
 Jamaica → 0.0563629, Japan → -0.2, Jersey → -0.251914, Jordan → 0.305371,
 Kazakhstan → -0.238383, Kenya → 0.0473975, Kiribati → 0.394422, Kosovo → 0.307092,
 Kuwait → 0.283641, Kyrgyzstan → 0.142178, Laos → 0.043231, Latvia → 0.251136,
 Lebanon → 0.305371, Lesotho → -0.382743, Liberia → 0.438636, Libya → 0.126978,
 Liechtenstein → 0.140292, Lithuania → 0.501136, Luxembourg → 0.264989,
 Macau → 0.0232335, Macedonia → 0.107092, Madagascar → 0.455968,
 Malawi → 0.535797, Malaysia → 0.5571, Maldives → 0.559397, Mali → -0.0626295,
 Malta → -0.0432977, MarshallIslands → -0.177306, Martinique → -0.0907369,
 Mauritania → 0.324536, Mauritius → -0.0792387, Mayotte → -0.102451, Mexico → 0.4,
 Micronesia → 0.191874, Moldova → 0.0916844, Monaco → 0.267866, Mongolia → 0.261617,
 Montenegro → 0.0159975, Montserrat → 0.176315, Morocco → 0.235433,
 Mozambique → -0.216102, Myanmar → 0.283232, Namibia → 0.530435, Nauru → 0.0112797,
 Nepal → 0.214262, Netherlands → 0.264989, NetherlandsAntilles → 0.0612532,
 NewCaledonia → -0.0126377, NewZealand → 0.56273, Nicaragua → -0.0551953,
 Niger → 0.433062, Nigeria → -0.31998, Niue → -0.00566647, NorfolkIsland → -0.364866,
 NorthernMarianaIslands → -0.0471899, NorthKorea → 0.282341,
 Norway → -0.333256, Oman → 0.294108, Pakistan → 0.263666, Palau → 0.284984,
 Panama → 0.0434901, PapuaNewGuinea → 0.309915, Paraguay → 0.593585,
 Peru → -0.156554, Philippines → -0.248972, PitcairnIslands → 0.410541,
 Poland → 0.24147, Portugal → 0.00757009, PuertoRico → 0.192541,
 Qatar → 0.126243, RepublicCongo → 0.00323342, Reunion → 0.605938,
 Romania → -0.292908, Russia → 0., Rwanda → 0.0339039, SaintHelena → -0.329816,
 SaintKittsNevis → 0.439923, SaintLucia → 0.323551, SaintPierreMiquelon → -0.1843,
 SaintVincentGrenadines → 0.543545, Samoa → 0.294802, SanMarino → -0.237552,
 SaoTomePrincipe → 0.493496, SaudiArabia → -0.376795, Senegal → -0.311915,
 Serbia → 0.507092, Seychelles → -0.0438661, SierraLeone → -0.186305,
 Singapore → 0.462289, Slovakia → 0.00186323, Slovenia → 0.5124,
 SolomonIslands → 0.24234, Somalia → -0.192683, SouthAfrica → 0.116719,

```

SouthKorea → 0.0411703, Spain → 0.50165, SriLanka → 0.247245, Sudan → 0.326978,
Suriname → 0.426806, Svalbard → 0.572681, Swaziland → 0.450309,
Sweden → 0.000116346, Switzerland → 0.5124, Syria → -0.376795, Taiwan → 0.191162,
Tajikistan → -0.229522, Tanzania → 0.287188, Thailand → -0.199835,
Togo → 0.559631, Tokelau → -0.21654, Tonga → 0.548094, TrinidadTobago → 0.557945,
Tunisia → 0.406377, Turkey → 0.255477, Turkmenistan → 0.263666,
TurksCaicosIslands → 0.262401, Tuvalu → 0.360533, Uganda → -0.219559,
Ukraine → 0.474281, UnitedArabEmirates → -0.0413434, UnitedKingdom → 0.275838,
UnitedStates → 0.2, UnitedStatesVirginIslands → -0.0602883,
Uruguay → 0.468512, Uzbekistan → 0.512641, Vanuatu → 0.315691,
VaticanCity → -0.237552, Venezuela → 0.343446, Vietnam → -0.216768,
WallisFutuna → 0.105068, WestBank → -0.355065, WesternSahara → -0.0393957,
Yemen → -0.0413434, Zambia → 0.0316935, Zimbabwe → 0.449051}

```

```
Simplify[
```

```

  #,
  {Element[φ, Reals], Element[θ, Reals]}
] & /@ S1Act[-Arg[First[sigma[LonLat[φ, θ]]], sigma[LonLat[φ, θ]]] /. {
  Arg[ei φ √(1 + Sin[θ])] → φ
}
C2[
$$\frac{e^{-i(\phi + \text{Arg}[e^{-i\phi} \sqrt{1 + \text{Sin}[\theta]})]} \sqrt{1 + \text{Sin}[\theta]}}{\sqrt{2}}, \frac{e^{-i \text{Arg}[e^{-i\phi} \sqrt{1 + \text{Sin}[\theta]})]} \sqrt{1 - \text{Sin}[\theta]}}{\sqrt{2}}$$
]

```

```
Simplify[
```

```

  #,
  {Element[φ, Reals], Element[θ, Reals], Element[α, Reals]}
] & /@ pi[S1Act[α, sigma[LonLat[φ, θ]]]]
R[Abs[Cos[θ]] Cos[φ], -Abs[Cos[θ]] Sin[φ], Sin[θ]]
False && MakeImage["G20DiskMap", Graphics[{
  EdgeForm[Black], Circle[{0, 0}, 1], Circle[{0, 0}, 1],
  {
    Hue[CountryColour[#]],
    CountryShape[#]
    /. p_LonLat := (s = sigma[p][[1]]; s = {Re[s], Im[s]}; s)
    /. {CountryShape → List, Region[pts___] := Polygon[{pts}]}
  } & /@
  G20
}]]
False

```

```

False && MakeImage["WhirlCanada", Graphics3D[{
  Whirl["Canada"],
  grid
}]]
False

```

```
False && MakeImage["WhirlFirst10", Graphics3D[Whirl /@ Take[AllCountries, 10]]]
```

```
False
```

```
False && MakeImage["WhirlAusCan", Graphics3D[Whirl /@ {"Australia", "Canada"}]]
```

```
False
```

```
False && MakeImage["WhirlG20", Graphics3D[Whirl /@ G20]]
```

```
False
```