Rania — PS 5 — 2025-02-04

EIWL3 Sections 14 and 17

Very nice!

A minor comment about units on p. 9 (hardly worth noting. Comment regarding sphere radius below.

8/8

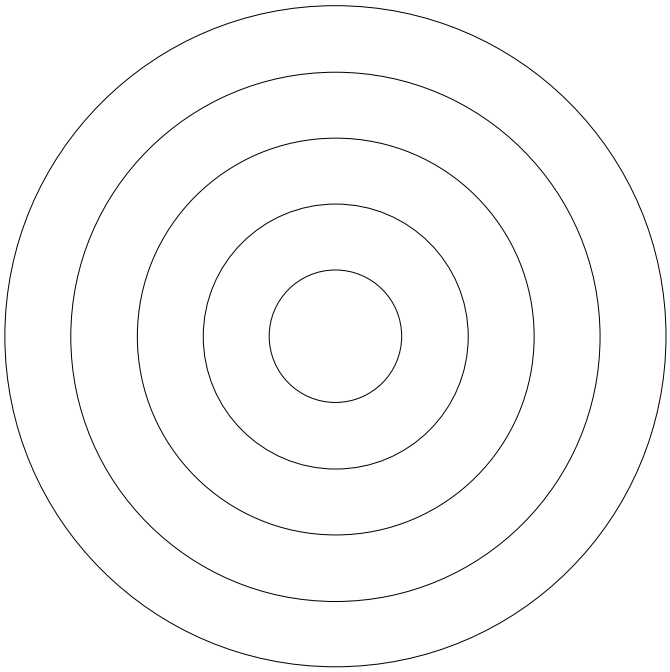
Section 14 Problems

In[51]:=
```
(*14.1 5 concentric circles centered at {0,0} with radii 1,2,...,5. *)
Graphics[Table[Circle[{0, 0}, r], {r, 5}]]
(*14.2 10 concentric circles with random colors*)
Graphics[Table[Style[Circle[{0, 0}, r], RandomColor[]], {r, 10}]]
(*14.3 Graphics of a 10×10 grid of circles
 with radius 1 centered at integer points {x,y}*)
Graphics[Table[Circle[{x, y}, 1], {x, 10}, {y, 10}]]
(*14.4 A 10×10 grid of points with coordinates at integer positions up to 10*)
Graphics[Table[Point[{x, y}], {x, 10}, {y, 10}]]
(*14.5 A Manipulate with between 1 and 20 concentric circles*)
Manipulate[Graphics[Table[Circle[{0, 0}, r], {r, 1, n}]], {n, 20, 1}]
(*14.6 Place 50 spheres with random
 colors at random integer coordinates up to 10*)
Graphics3D[Table[Style[Sphere[RandomInteger[10, 3]], RandomColor[]], 50]]
(*14.7 An 11×11×11 array of spheres with RGB components ranging
 from 0 to 1. The spheres should be centered at integer coordinates,
and should just touch each other*)
Graphics3D[Table[{RGBColor[x / 10, y / 10, z / 10], Sphere[{x, y, z}, 1 / 2]},
  {x, 11}, {y, 11}, {z, 11}, {h, 0, 1.1, .1}]]
```

Two spheres of radius 1/2 just touch if one apart, yah?

```
(*Doing it to 1/2 makes the sphere barely touch, but I'm not sure why....*)
(*14.8 A Manipulate with t varying between-2 and+2 that contains
  circles of radius x centered at {t*x,0} with x going from 1 to 10*)
Manipulate[ Graphics[Table[Circle[{t * x, 0}, x], {x, 1, 10}]], {t, -2, 2}]
(*14.9 A 5×5 array of regular hexagons with size 1/2,
centered at integer points*)
Graphics[Table[RegularPolygon[{x, y}, 1 / 2, 6], {x, 5}, {y, 5}]]
(*14.10 A line in 3D that goes through 50 random
 points with integer coordinates randomly chosen up to 50*)
Graphics3D[Line[Table[RandomInteger[50, 3], 50]]]
(*14.11 Manipulate of an icosahedron with side length
 varying from 1 to 2 and a dodecahedron with side length 1,
both having opacity 0.5 and the same center *)
Manipulate[Graphics3D[{Style[Dodecahedron[{1, 1, 1}, 1], Opacity[.5]],
   Style[Icosahedron[{1, 1, 1}, n], Opacity[.5]]}], {n, 1, 2, .1}]
```

Out[51]=



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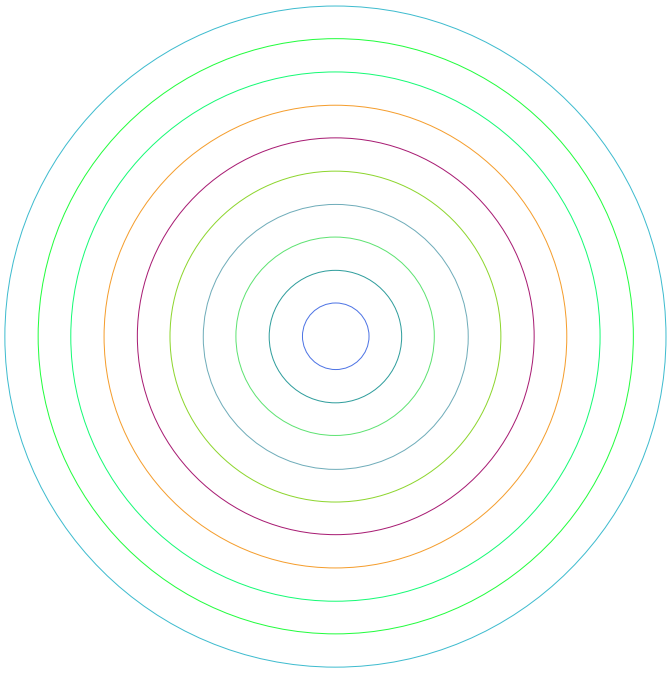

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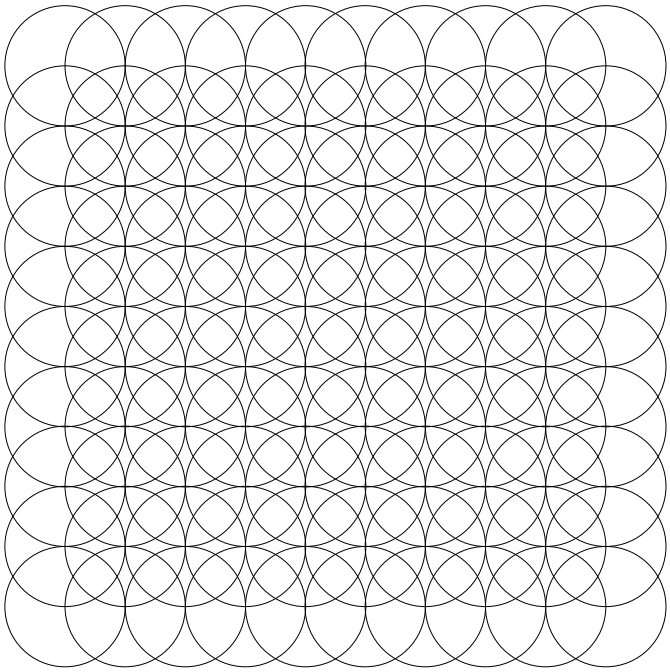

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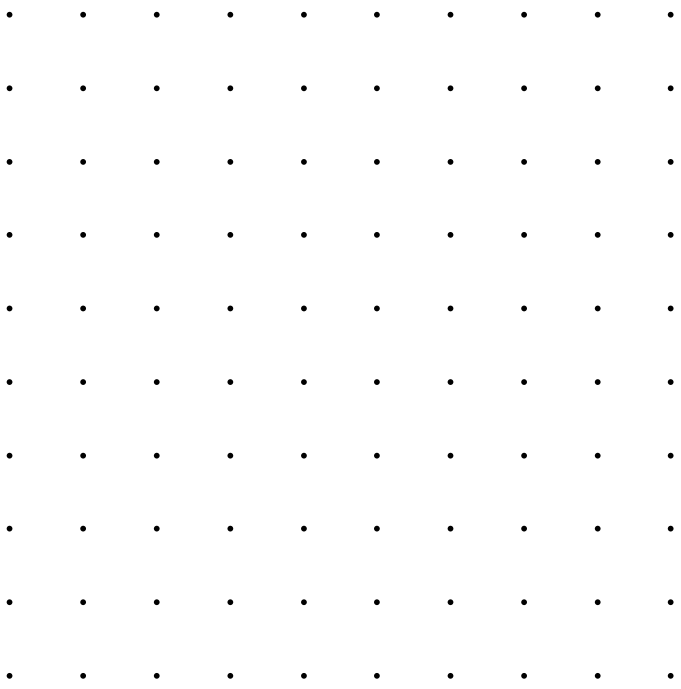

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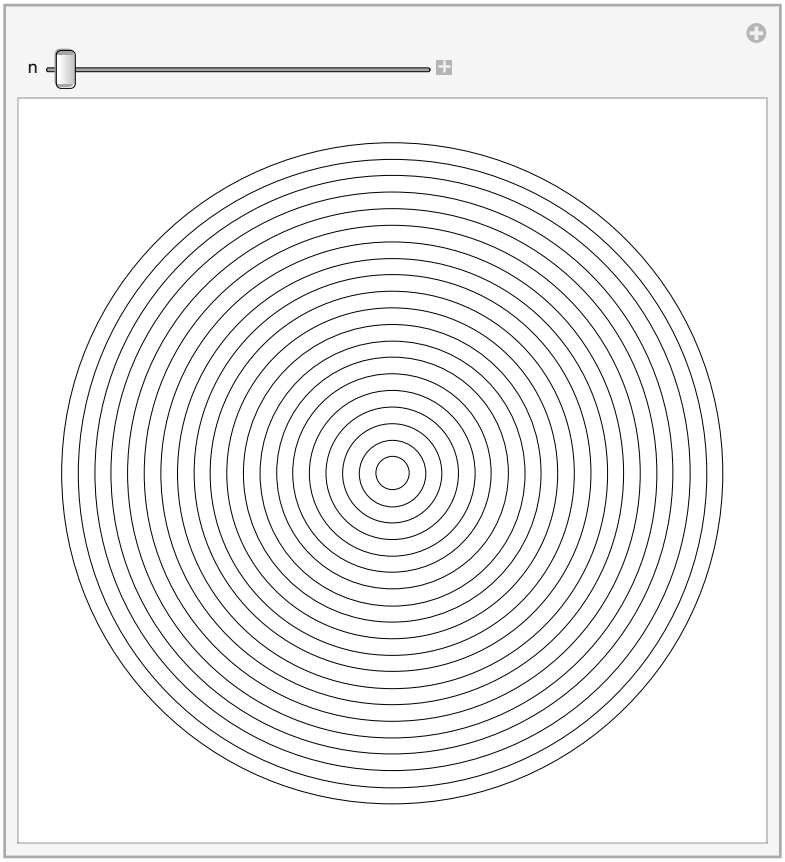

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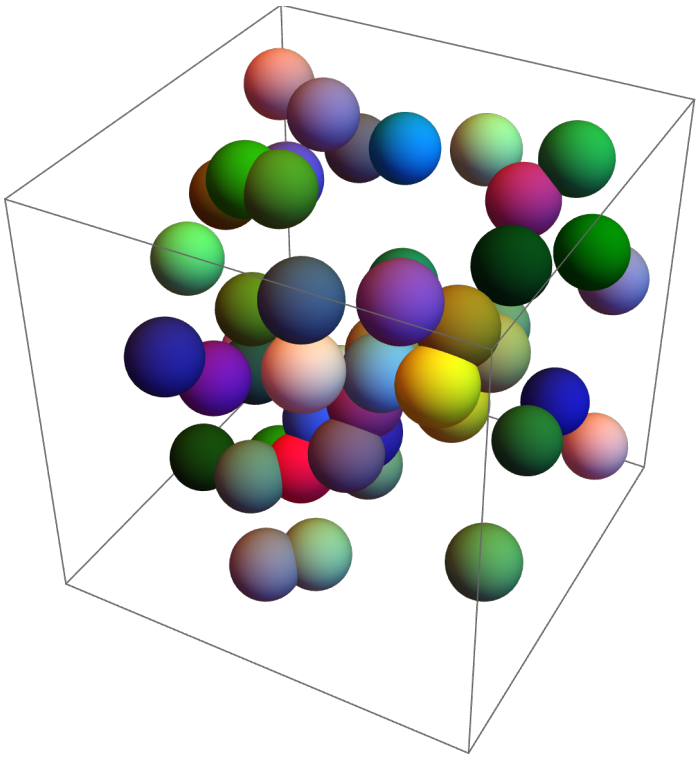

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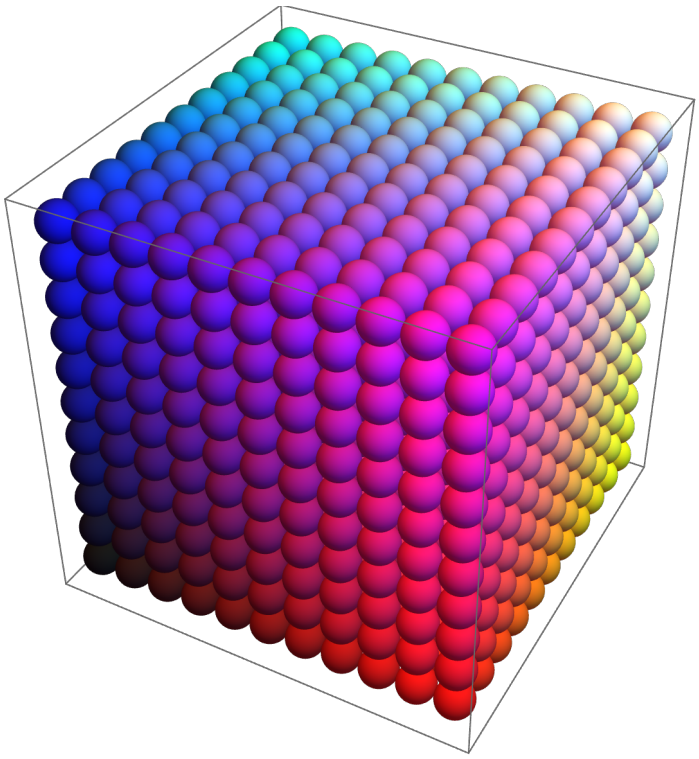

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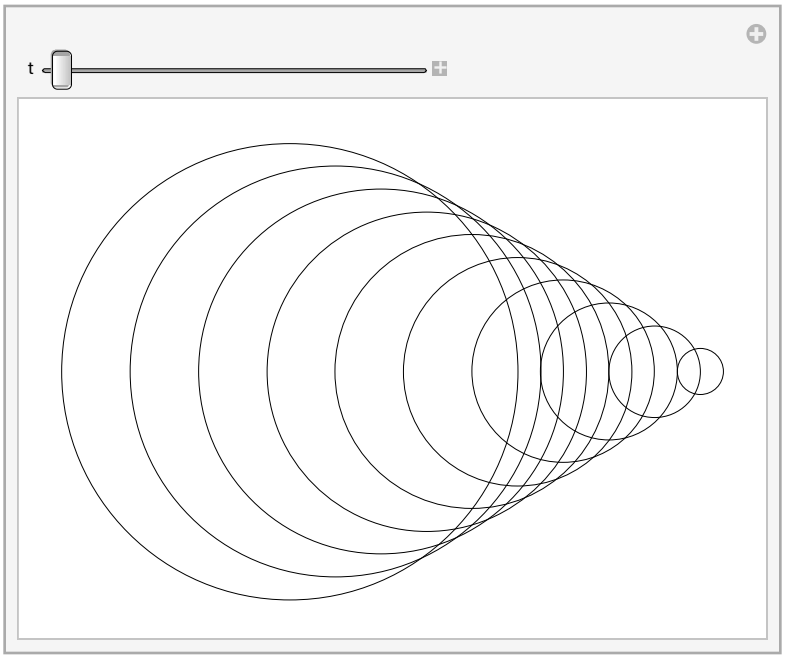

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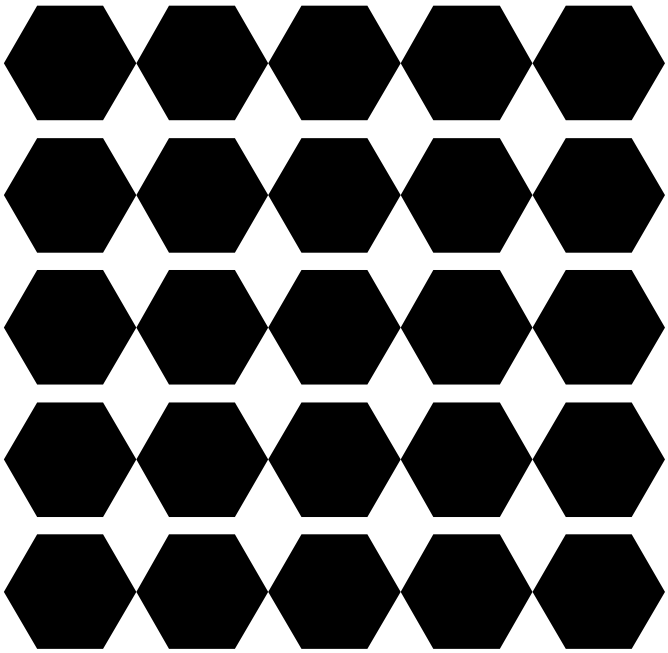

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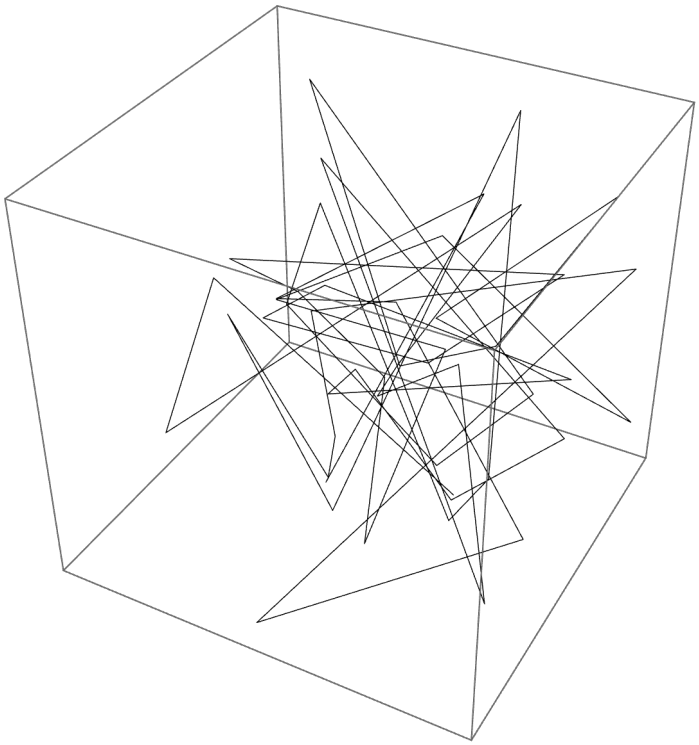

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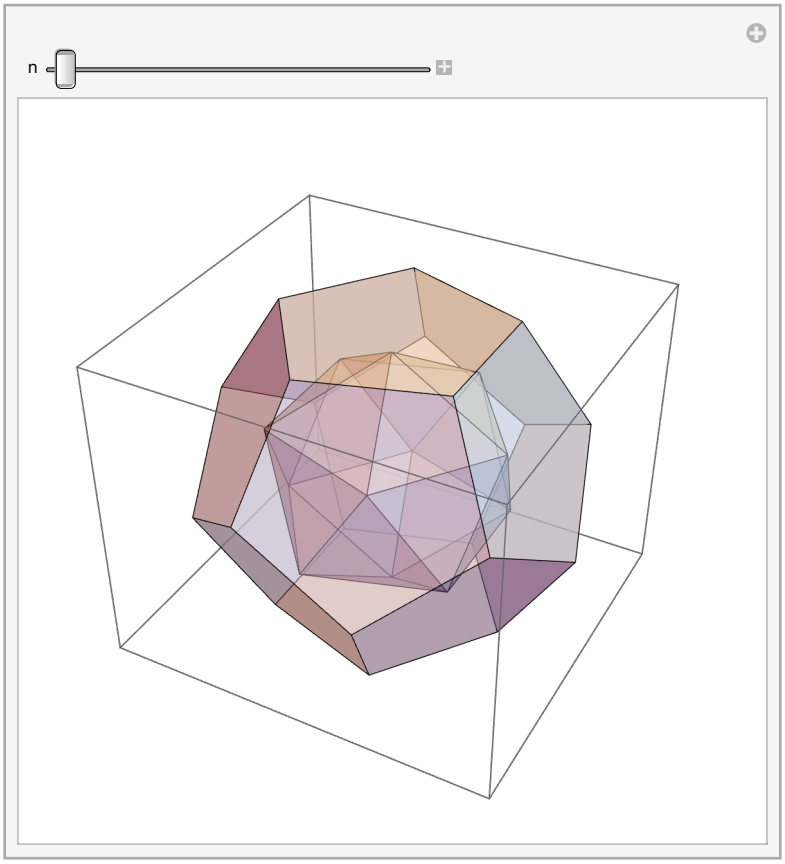


Section 17 Problems

```
(*17.1 4.5 lbs (pounds) to kilograms*)
UnitConvert[ 4.5 lb , "kilograms"]
(*17.2 60.25 mph to kilometers per hour*)
UnitConvert[ 60.25 mi/h , km/h ]
(*17.3 The height of the Eiffel Tower in miles*)
UnitConvert[ Eiffel Tower BUILDING ["Height"], "Miles"]
(*17.4 The height of Mount Everest divided by the height of the Eiffel Tower *)
Mount Everest MOUNTAIN ["Elevation"]
-------------------------------------
Eiffel Tower BUILDING ["Height"]
(*17.5 The mass of the Earth divided by the mass of the Moon*)
Earth PLANET ["Mass"]
-------------------------------------
Moon PLANETARY MOON ["Mass"]
(*17.6 2500 Japanese yen to US dollars*)
CurrencyConvert[ ¥2500. , $ ]
(*17.7 The total of 35 ounces,1/4 ton,45 lbs and 9 stone in kilograms*)
UnitConvert[ 35 oz + 0.25 sh tn + 45 lb + 9 stone , "Kilograms" ]
(*17.8 Planets distance in light years*)
UnitConvert[EntityClass["Planet", { average radius → TakeLargest[5]}][
  distance from Earth ], "LightYears"]
(*17.9 Rotate the string "hello" by 180 degrees*)
Rotate["hello", 180 °]
(*17.10 A table of a size-100 “A” rotated by 0° through 360° in steps of 30°*)
Table[Style[Rotate["A", x ° ], 100], {x, 0, 360, 30}]
(*17.11 Manipulate to rotate an image of a cat between 0° and 180°*)
Manipulate[Rotate[ domestic cat SPECIES SPECIFICATION ["Image"], x ° ], {x, 0, 180, 10}]
(*17.12 Generate graphics for a path obtained by turning 0°,1°,2°,...,180°*)
Graphics[Line[AnglePath[Table[n ° , {n, 0, 180, 1}]]]]
(*17.13 Graphics of the path obtained by turning a constant angle 100 times,
controlling the angle from 0° to 360° with a Manipulate*)
Manipulate[Graphics[Line[AnglePath[Table[n Degree, 100]]]], {n, 0, 360}]
(*17.14 Graphics of the path obtained by successively
 turning by the digits of 2^10000 multiplied by 30 degrees *)
Graphics[Line[AnglePath[IntegerDigits[2^10000] * 30 Degree]]]
```

Out[62]=

2.04117 kg

Out[63]=
96.963 km/h

Out[64]=
0.205052 mi

Out[65]=
26.8147

Out[66]=
81.3

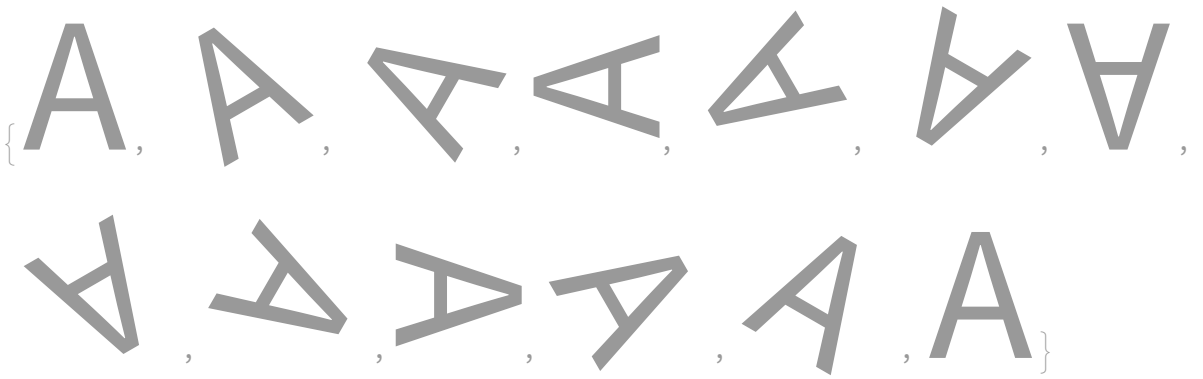
Out[67]=
$16.44

Out[68]=
305.353 kg

He was actually looking for light-minutes, rather than light-years.

Out[69]=
{0.0000746015 ly, 0.000166137 ly, 0.00030893 ly, 0.000485532 ly, 0. ly}

Out[70]=
ollǝɥ

Out[71]=


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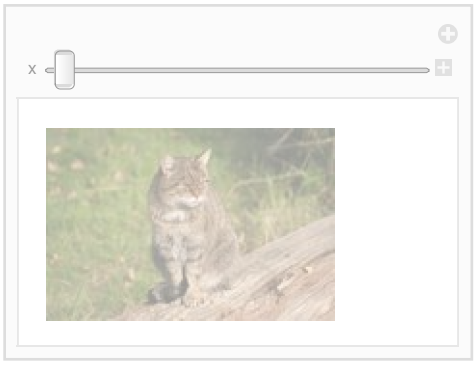

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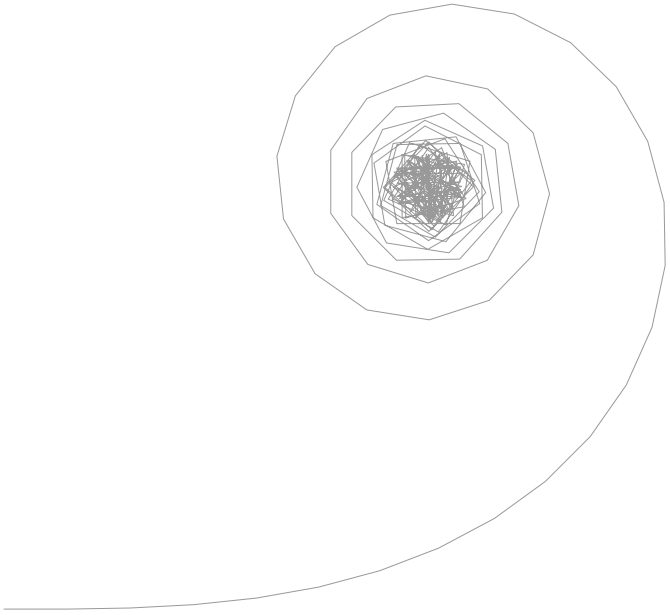
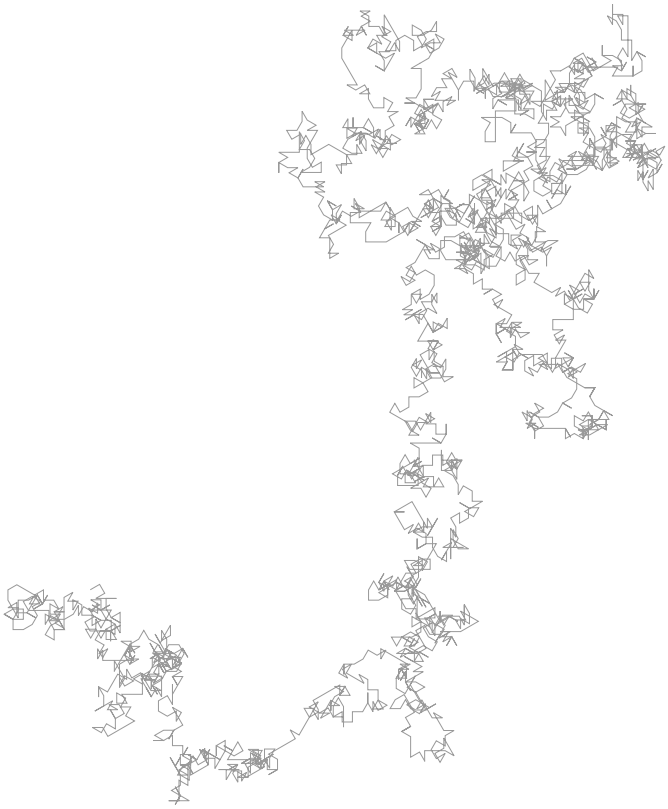


Out[74]=

Out[75]=



In[76]:=