Acceleration due to Gravity at the surface of the Earth

```
G = UnitConvert[Quantity[1, "GravitationalConstant"], "SIBase"]
```

$6.67 \times 10^{-11}\ \mathrm{m^3/(kg\,s^2)}$

```
ME = PlanetData["Earth", "Mass"]
```

$5.9721986 \times 10^{24}\ \mathrm{kg}$

The Earth is not precisely spherical. Mathematica reports the Polar Radius, the Equatorial Radius, and the average Radius.

```
REpole = UnitConvert[PlanetData["Earth", "PolarRadius"], "SI"]
```

6356.7523142 km

```
gpole = G ME / REp^2
```

$9.86\ \mathrm{m/s^2}$

```
REeq = UnitConvert[PlanetData["Earth", "EquatorialRadius"], "SI"]
```

6378.1370 km

```
geq = G ME / REeq^2
```

$9.80\ \mathrm{m/s^2}$

```
RE = UnitConvert[PlanetData["Earth", "Radius"], "SI"]
 (* This is the same as (Polar + Equator)/2. *)
```

6367.4447 km

```
g = G ME / RE^2
```

$9.83\ \mathrm{m/s^2}$

```
v = UnitConvert[2 π REeq / Quantity[1, "SiderealDays"], "SI"]
```

465.10114 m/s

```
arad = v^2 / REeq
```

$0.03391571\ \mathrm{m/s^2}$

```
geff = geq - arad
```

$9.76\ \mathrm{m/s^2}$