```
Sum[1 / j^3, {j, 1, Infinity}]
```

```
Zeta[3]
```

```
Sum[1 / j^2, {j, 1, Infinity}]
```

$$\frac{\pi^2}{6}$$

```
Sum[1 / j^4, {j, 1, Infinity}]
```

$$\frac{\pi^4}{90}$$

```
Sum[1 / (2 j - 1)^3, {j, 1, Infinity}]
```

$$\frac{7\,\text{Zeta}[3]}{8}$$

```
Sum[(-1)^(j + 1) 1 / (2 j - 1)^3, {j, 1, Infinity}]
```

$$\frac{\pi^3}{32}$$

```
Sum[(Mod[j, 2] - Mod[j - 1, 2]) / j, {j, 1, Infinity}]
```

$$\sum_{j=1}^{\infty} \frac{-\text{Mod}[-1 + j, 2] + \text{Mod}[j, 2]}{j}$$

```
FullSimplify[Mod[j, a] - Mod[j - 1, a]]
```

```
-Mod[-1 + j, a] + Mod[j, a]
```

```
N[(1 + 1 / 2 - 2 / 3)]
```

```
0.833333
```

```
N[(1 / 4 + 1 / 5 - 2 / 6)]
```

```
0.116667
```

```
N[(1 / 7 + 1 / 8 - 2 / 9)]
```

```
0.0456349
```

```
N[(1 / 10 + 1 / 11 - 2 / 12)]
```

```
0.0242424
```

```
504 / 6
```

```
84
```

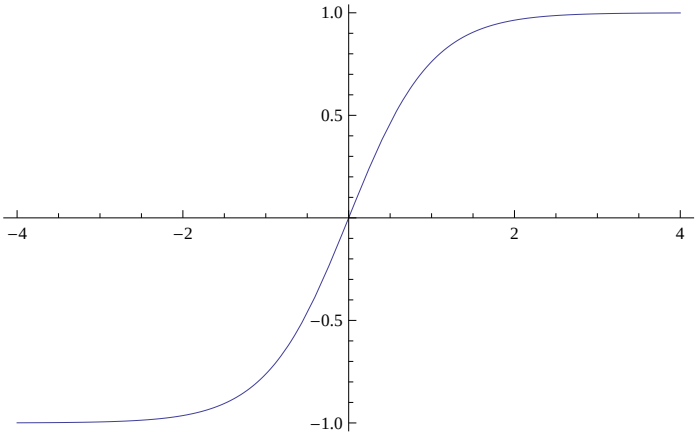
```
504 * 5 / 60
```

```
42
```

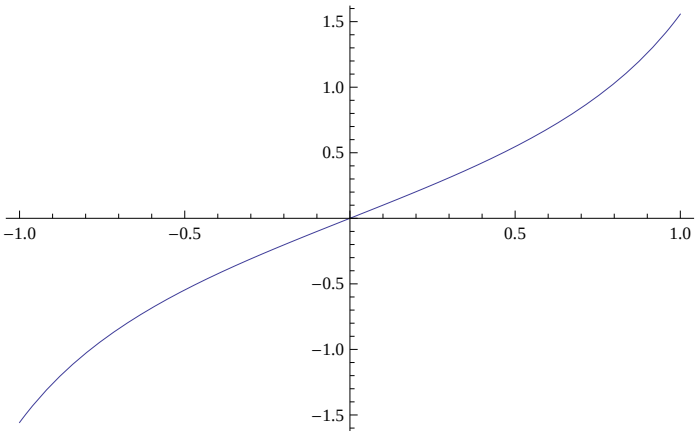
```
504 * 5
```

```
2520
```

```
Plot[Tanh[x], {x, -4, 4}]
```




```
Plot[Tan[x], {x, -1, 1}]
```




```
Tan[Pi / 4]
```

$$1$$

```
Tanh[Pi / 4]
```

$$\text{Tanh}\left[\frac{\pi}{4}\right]$$

```
Tan[Pi / 4]
```

$$1$$

```
Tanh[I Pi / 4]
```

$$i$$

```
ArcTanh[I]
```

$$\frac{i\,\pi}{4}$$

```
Series[ArcTanh[x], {x, 0, 20}]
```

$$x+\frac{x^3}{3}+\frac{x^5}{5}+\frac{x^7}{7}+\frac{x^9}{9}+\frac{x^{11}}{11}+\frac{x^{13}}{13}+\frac{x^{15}}{15}+\frac{x^{17}}{17}+\frac{x^{19}}{19}+O[x]^{21}$$

```
N[i π / 4]
```

```
0. + 0.785398 i
```

```
SS[x_] := x + x^3/3 + x^5/5 + x^7/7 + x^9/9 + x^11/11 + x^13/13 + x^15/15 + x^17/17 + x^19/19
```

```
N[SS[I]]
```

```
0. + 0.76046 i
```

```
ArcTan[1]
```

$$\frac{\pi}{4}$$

```
ArcTanh[I]
```

$$\frac{i\,\pi}{4}$$

```
Series[ArcTan[x], {x, 0, 20}]
```

$$x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \frac{x^9}{9} - \frac{x^{11}}{11} + \frac{x^{13}}{13} - \frac{x^{15}}{15} + \frac{x^{17}}{17} - \frac{x^{19}}{19} + O[x]^{21}$$

```
Limit[HarmonicNumber[x] - HarmonicNumber[x / a], {x → Infinity}]
```

$$\left\{\text{Limit}\left[\text{HarmonicNumber}[x] - \text{HarmonicNumber}\left[\frac{x}{a}\right], x \to \infty\right]\right\}$$

```
CC[x_, a_] := HarmonicNumber[x] - HarmonicNumber[Floor[x / a]]
```

```
N[CC[100 000, 6]]
```

```
1.79177
```

```
N[Log[6]]
```

```
1.79176
```

```
Etx[k_, t_] := Sum[ (Mod[n, k] - Mod[n - 1, k]) / n, {n, 1, t}]
```

```
N[Etx[6, 100 000]]
```

```
1.79177
```

```
Limit[HarmonicNumber[x] - HarmonicNumber[x / 12], {x → Infinity}]
```

```
{Log[12]}
```