```
zt4[l_] := Product[(1 - 1 / (ZetaZero[r] + 2)) (1 - 1 / (ZetaZero[-r] + 2)), {r, 1, l}]
N[zt4[1, 800]]
```

$$1. - 3.33067 \times 10^{-16}\, i$$

```
F1[b_, c_] := (1 + (1 - 2 (1 / 2 - c)) / ((1 / 2 - c)^2 + b^2))
F2[b_, c_] := (1 + (1 - 2 (1 / 2 + c)) / ((1 / 2 + c)^2 + b^2))
F1[1, 1 / 7]
```

$$\frac{277}{221}$$

```
F2[1, 1 / 7]
```

$$\frac{221}{277}$$

```
FullSimplify[(1 - 1 / (a + b I)) (1 - 1 / (a - b I))]
```

$$1 + \frac{1 - 2\,a}{a^2 + b^2}$$

```
FullSimplify[(1 - 2 / (a + b I)) (1 - 2 / (a - b I))]
```

$$1 + \frac{4 - 4\,a}{a^2 + b^2}$$

$$\left(1 + \frac{4 - 4\,(1/2 - c)}{(1/2 - c)^2 + b^2}\right)\left(1 + \frac{4 - 4\,(1/2 + c)}{(1/2 + c)^2 + b^2}\right)$$

```
Expand[(1 + (4 - 4 (1/2 - c)) / (b^2 + (1/2 - c)^2)) (1 + (4 - 4 (1/2 + c)) / (b^2 + (1/2 + c)^2))]
```

```
FullSimplify[1 + 2 / (b^2 + (1/2 - c)^2) + 4 c / (b^2 + (1/2 - c)^2) + 2 / (b^2 + (1/2 + c)^2) +
  4 / ((b^2 + (1/2 - c)^2) (b^2 + (1/2 + c)^2)) - 4 c / (b^2 + (1/2 + c)^2) - 16 c^2 / ((b^2 + (1/2 - c)^2) (b^2 + (1/2 + c)^2))]
```

```
ff[b_, c_] := (16 b^4 + (9 - 4 c^2)^2 + 8 b^2 (9 + 4 c^2)) / ((1 + 4 b^2)^2 + 8 (-1 + 4 b^2) c^2 + 16 c^4)
ff[0, c]
```

$$\frac{(9 - 4\,c^2)^2}{1 - 8\,c^2 + 16\,c^4}$$

```
ff[1 / 4, c]
```

$$\frac{\frac{1}{16} + (9 - 4\,c^2)^2 + \frac{1}{2}(9 + 4\,c^2)}{\frac{25}{16} - 6\,c^2 + 16\,c^4}$$

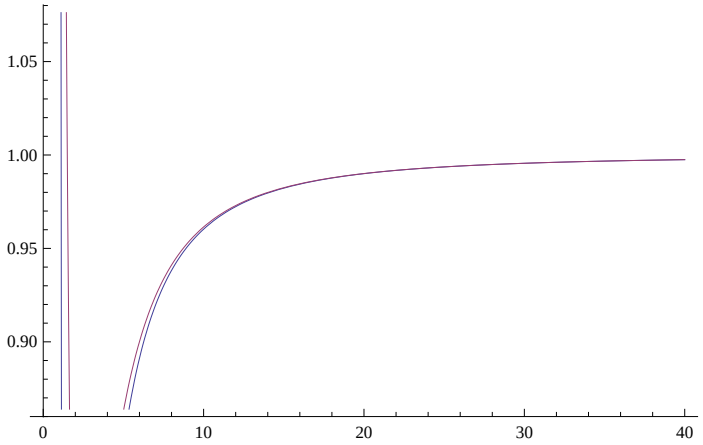
```
ff[1 / 2, c]
```

$$\frac{1 + \left(9 - 4\,c^2\right)^2 + 2\,\left(9 + 4\,c^2\right)}{4 + 16\,c^4}$$

```
N[Table[{n, ff[s, 15]}, {s, 0, 1 / 2, 1 / 20}] // TableForm]
```

```
n    0.982282
n    0.982282
n    0.982284
n    0.982287
n    0.982291
n    0.982296
n    0.982303
n    0.982311
n    0.98232
n    0.98233
n    0.982341
```

```
Plot[{ff[0, c], ff[1, c]}, {c, 0, 40}]
```




```
zt4[l_] := Product[(1 - 1 / ZetaZero[r]) (1 - 1 / ZetaZero[-r]), {r, 1, l}]
N[zt4[1, 800]]
```

```
0.9999999999999956` - 3.3306690738754696`*^-16 i
```

```
zt4a[l_] := Sum[Log[1 - 1 / ZetaZero[r]] + Log[1 - 1 / ZetaZero[-r]], {r, 1, l}]
N[zt4a[100]]
```

$-8.81897 \times 10^{-17} + 0.\,i$

```
N[Log[1 - 1 / ZetaZero[1]] + Log[1 - 1 / ZetaZero[-1]]]
```

$-4.42354 \times 10^{-17} + 0.\,i$

```
N[Log[1 - 1 / (.5 + 3 I)] + Log[1 - 1 / (.5 - 3 I)]]
```

$0. + 0.\,i$

```
N[Log[1 - 1 / (.5 + 3 I)]]
```

$0. + 0.330297\,i$

```
N[Log[1 - 1 / (.3 + 3 I)] + Log[1 - 1 / (.3 - 3 I)]]
```

```
0.0430637 + 0. i
```

```
N[Log[1 - 1 / (.7 + 3 I)] + Log[1 - 1 / (.7 - 3 I)]]
```

```
-0.0430637 + 0. i
```

```
FullSimplify[(1 + 1 / (a + b I)) (1 + 1 / (a - b I))]
```

$$\left(1+\frac{1+2\,(1/2-c)}{(1/2-c)^2+b^2}\right)\left(1+\frac{1+2\,(1/2+c)}{(1/2+c)^2+b^2}\right)$$

```
FullSimplify[Expand[(1 + (1 + 2 (1/2 - c)) / (b^2 + (1/2 - c)^2)) (1 + (1 + 2 (1/2 + c)) / (b^2 + (1/2 + c)^2))]]
```

$$\frac{16\,b^4+\left(9-4\,c^2\right)^2+8\,b^2\,\left(9+4\,c^2\right)}{\left(1+4\,b^2\right)^2+8\,\left(-1+4\,b^2\right)\,c^2+16\,c^4}$$

```
FullSimplify[(1 - (1 / 2) / (a + b I)) (1 - (1 / 2) / (a - b I))]
```

$$1+\frac{1-4\,a}{4\,\left(a^2+b^2\right)}$$

$$\left(1+\frac{1-4\,(1/2-c)}{4\,\left((1/2-c)^2+b^2\right)}\right)\left(1+\frac{1-4\,(1/2+c)}{4\,\left((1/2+c)^2+b^2\right)}\right)$$

```
FullSimplify[Expand[(1 + (1 - 4 (1/2 - c)) / (4 (b^2 + (1/2 - c)^2))) (1 + (1 - 4 (1/2 + c)) / (4 (b^2 + (1/2 + c)^2)))]]
```

```
ff[b_, c_] := 16 (b^2 + c^2)^2 / ((1 + 4 b^2)^2 + 8 (-1 + 4 b^2) c^2 + 16 c^4)
```

```
N[ff[0, 25]]
```

```
1.0008
```

```
N[ff[1 / 4, 25]]
```

```
1.0008
```

```
1.0008004802561281`
```

```
1.0008002399439064`
```

```
zz[n_, k_] := (1 - k / ZetaZero[n]) (1 - k / ZetaZero[-n])
```

```
N[zz[1, 1 / 2]]
```

```
0.99875 + 0. i
```

```
1.0099979776674461`
```

```
FullSimplify[Expand[(1 - 1 / (a - c I)) (-1 + 1 / (a + c I))]]
```

$$-1+\frac{-1+2\,a}{a^2+c^2}$$

$$-1+\frac{-1+2\,(1/2-a)}{(1/2-a)^2+c^2}$$

```
FullSimplify[(-1 + (-1 + 2 (1 / 2 - a)) / ((1 / 2 - a)^2 + c^2)) (-1 + (-1 + 2 (1 / 2 + a)) / ((1 / 2 + a)^2 + c^2))]
```

```
1
```