Euler Problem #12

Create a list of {n, nth triangle number} until n=30000, and show the first 10 terms of the list

In[2]:=
```
triangleNumbers = Table[{i, Total[Range[i]]}, {i, 1, 30 000}];
```

In[10]:=
```
triangleNumbers[[1 ;; 10]]
```

Out[10]=
```
{{1, 1}, {2, 3}, {3, 6}, {4, 10}, {5, 15}, {6, 21}, {7, 28}, {8, 36}, {9, 45}, {10, 55}}
```

List of {n, divisors of the nth triangle number} until n=30000, and show the first 10 terms of the list

In[4]:=
```
divisors = {#[[1]], Divisors[#[[2]]]} & /@ triangleNumbers;
```

In[198]:=
```
divisors[[1 ;; 10]]
```

Out[198]=
```
{{1, {1}}, {2, {1, 3}}, {3, {1, 2, 3, 6}}, {4, {1, 2, 5, 10}},
 {5, {1, 3, 5, 15}}, {6, {1, 3, 7, 21}}, {7, {1, 2, 4, 7, 14, 28}},
 {8, {1, 2, 3, 4, 6, 9, 12, 18, 36}}, {9, {1, 3, 5, 9, 15, 45}}, {10, {1, 5, 11, 55}}}
```

List of {n, number of divisors of the nth triangle number} until n=30000, and show the first 10 terms of the list

In[6]:=
```
howmanydivisors = {#[[1]], Length[#[[2]]]} & /@ divisors;
```

In[199]:=
```
howmanydivisors[[1 ;; 10]]
```

Out[199]=
```
{{1, 1}, {2, 2}, {3, 4}, {4, 4}, {5, 4}, {6, 4}, {7, 6}, {8, 9}, {9, 6}, {10, 4}}
```

Select the smallest n for which the nth triangle numbere has more than 500 divisors

In[7]:=
```
sortedNumDivisors = SortBy[howmanydivisors, #[[2]] &];
```

In[201]:=
```
Select[sortedNumDivisors, #[[2]] > 500 &]
```

Out[201]=
```
{{22 400, 504}, {18 095, 512}, {23 919, 512}, {25 584, 512}, {27 404, 512}, {25 920, 540},
 {12 375, 576}, {16 575, 576}, {17 199, 576}, {21 384, 576}, {25 024, 576}, {25 200, 576},
 {26 999, 576}, {27 455, 576}, {28 160, 576}, {20 735, 640}, {21 504, 640},
 {25 839, 640}, {27 999, 640}, {14 399, 648}, {29 600, 720}, {21 735, 768}}
```

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n is 22400, so compute the 22400th triangle number, which turns out to be 250,891,200

In[9]:=
```
Total[Range[22 400]]
```

Out[9]=
```
250 891 200
```