

In[\*]:= (\* Extra Task From 14.01.2020 \*)

coords = {x, y} /. Solve[x<sup>2</sup> + y<sup>2</sup> ≤ 64, {x, y}, Integers]

Out[\*]:= {{-8, 0}, {-7, -3}, {-7, -2}, {-7, -1}, {-7, 0}, {-7, 1}, {-7, 2}, {-7, 3}, {-6, -5},  
{-6, -4}, {-6, -3}, {-6, -2}, {-6, -1}, {-6, 0}, {-6, 1}, {-6, 2}, {-6, 3},  
{-6, 4}, {-6, 5}, {-5, -6}, {-5, -5}, {-5, -4}, {-5, -3}, {-5, -2}, {-5, -1},  
{-5, 0}, {-5, 1}, {-5, 2}, {-5, 3}, {-5, 4}, {-5, 5}, {-5, 6}, {-4, -6}, {-4, -5},  
{-4, -4}, {-4, -3}, {-4, -2}, {-4, -1}, {-4, 0}, {-4, 1}, {-4, 2}, {-4, 3},  
{-4, 4}, {-4, 5}, {-4, 6}, {-3, -7}, {-3, -6}, {-3, -5}, {-3, -4}, {-3, -3},  
{-3, -2}, {-3, -1}, {-3, 0}, {-3, 1}, {-3, 2}, {-3, 3}, {-3, 4}, {-3, 5},  
{-3, 6}, {-3, 7}, {-2, -7}, {-2, -6}, {-2, -5}, {-2, -4}, {-2, -3}, {-2, -2},  
{-2, -1}, {-2, 0}, {-2, 1}, {-2, 2}, {-2, 3}, {-2, 4}, {-2, 5}, {-2, 6}, {-2, 7},  
{-1, -7}, {-1, -6}, {-1, -5}, {-1, -4}, {-1, -3}, {-1, -2}, {-1, -1}, {-1, 0},  
{-1, 1}, {-1, 2}, {-1, 3}, {-1, 4}, {-1, 5}, {-1, 6}, {-1, 7}, {0, -8}, {0, -7},  
{0, -6}, {0, -5}, {0, -4}, {0, -3}, {0, -2}, {0, -1}, {0, 0}, {0, 1}, {0, 2},  
{0, 3}, {0, 4}, {0, 5}, {0, 6}, {0, 7}, {0, 8}, {1, -7}, {1, -6}, {1, -5}, {1, -4},  
{1, -3}, {1, -2}, {1, -1}, {1, 0}, {1, 1}, {1, 2}, {1, 3}, {1, 4}, {1, 5}, {1, 6},  
{1, 7}, {2, -7}, {2, -6}, {2, -5}, {2, -4}, {2, -3}, {2, -2}, {2, -1}, {2, 0},  
{2, 1}, {2, 2}, {2, 3}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {3, -7}, {3, -6}, {3, -5},  
{3, -4}, {3, -3}, {3, -2}, {3, -1}, {3, 0}, {3, 1}, {3, 2}, {3, 3}, {3, 4},  
{3, 5}, {3, 6}, {3, 7}, {4, -6}, {4, -5}, {4, -4}, {4, -3}, {4, -2}, {4, -1},  
{4, 0}, {4, 1}, {4, 2}, {4, 3}, {4, 4}, {4, 5}, {4, 6}, {5, -6}, {5, -5}, {5, -4},  
{5, -3}, {5, -2}, {5, -1}, {5, 0}, {5, 1}, {5, 2}, {5, 3}, {5, 4}, {5, 5}, {5, 6},  
{6, -5}, {6, -4}, {6, -3}, {6, -2}, {6, -1}, {6, 0}, {6, 1}, {6, 2}, {6, 3},  
{6, 4}, {6, 5}, {7, -3}, {7, -2}, {7, -1}, {7, 0}, {7, 1}, {7, 2}, {7, 3}, {8, 0}}

In[\*]:= (\* a \*)

Solve[x<sup>2</sup> + y<sup>2</sup> ≤ 64 && {x, y} ≥ 0, {x, y}, Integers]

Out[\*]:= {{x → 0, y → 0}, {x → 0, y → 1}, {x → 0, y → 2}, {x → 0, y → 3}, {x → 0, y → 4}, {x → 0, y → 5},  
{x → 0, y → 6}, {x → 0, y → 7}, {x → 0, y → 8}, {x → 1, y → 0}, {x → 1, y → 1}, {x → 1, y → 2},  
{x → 1, y → 3}, {x → 1, y → 4}, {x → 1, y → 5}, {x → 1, y → 6}, {x → 1, y → 7}, {x → 2, y → 0},  
{x → 2, y → 1}, {x → 2, y → 2}, {x → 2, y → 3}, {x → 2, y → 4}, {x → 2, y → 5},  
{x → 2, y → 6}, {x → 2, y → 7}, {x → 3, y → 0}, {x → 3, y → 1}, {x → 3, y → 2},  
{x → 3, y → 3}, {x → 3, y → 4}, {x → 3, y → 5}, {x → 3, y → 6}, {x → 3, y → 7},  
{x → 4, y → 0}, {x → 4, y → 1}, {x → 4, y → 2}, {x → 4, y → 3}, {x → 4, y → 4},  
{x → 4, y → 5}, {x → 4, y → 6}, {x → 5, y → 0}, {x → 5, y → 1}, {x → 5, y → 2},  
{x → 5, y → 3}, {x → 5, y → 4}, {x → 5, y → 5}, {x → 5, y → 6}, {x → 6, y → 0},  
{x → 6, y → 1}, {x → 6, y → 2}, {x → 6, y → 3}, {x → 6, y → 4}, {x → 6, y → 5},  
{x → 7, y → 0}, {x → 7, y → 1}, {x → 7, y → 2}, {x → 7, y → 3}, {x → 8, y → 0}}

In[\*]:= a<sup>2</sup> + 5 /. a → 5

Out[\*]:= 30

In[\*]:= a /. Solve[5 a + 3 == 0, a][[1]]

Out[\*]:=  $-\frac{3}{5}$

In[\*]:= Mod[2, 2]

Out[\*]:= 0

In[\*]:= OddQ[5]

Out[\*]:= True

**(\* b \*)**

**Select[coords, OddQ[#[[1]]] &&OddQ[#[[2]]] &]**

*Out[ ]:=* {{-7, -3}, {-7, -1}, {-7, 1}, {-7, 3}, {-5, -5}, {-5, -3}, {-5, -1}, {-5, 1},  
{-5, 3}, {-5, 5}, {-3, -7}, {-3, -5}, {-3, -3}, {-3, -1}, {-3, 1}, {-3, 3},  
{-3, 5}, {-3, 7}, {-1, -7}, {-1, -5}, {-1, -3}, {-1, -1}, {-1, 1}, {-1, 3},  
{-1, 5}, {-1, 7}, {1, -7}, {1, -5}, {1, -3}, {1, -1}, {1, 1}, {1, 3}, {1, 5},  
{1, 7}, {3, -7}, {3, -5}, {3, -3}, {3, -1}, {3, 1}, {3, 3}, {3, 5}, {3, 7}, {5, -5},  
{5, -3}, {5, -1}, {5, 1}, {5, 3}, {5, 5}, {7, -3}, {7, -1}, {7, 1}, {7, 3}}

**(\*OddQ[coords[[i,1]]]&&OddQ[coords[[i,2]]] for For Cycle\*)**

*In[ ]:=* **(\* c \*)**

**Select[coords, PrimeQ[#[[1]]] &&PrimeQ[#[[2]]] &]**

*Out[ ]:=* {{-7, -3}, {-7, -2}, {-7, 2}, {-7, 3}, {-5, -5}, {-5, -3}, {-5, -2}, {-5, 2},  
{-5, 3}, {-5, 5}, {-3, -7}, {-3, -5}, {-3, -3}, {-3, -2}, {-3, 2}, {-3, 3},  
{-3, 5}, {-3, 7}, {-2, -7}, {-2, -5}, {-2, -3}, {-2, -2}, {-2, 2}, {-2, 3},  
{-2, 5}, {-2, 7}, {2, -7}, {2, -5}, {2, -3}, {2, -2}, {2, 2}, {2, 3}, {2, 5},  
{2, 7}, {3, -7}, {3, -5}, {3, -3}, {3, -2}, {3, 2}, {3, 3}, {3, 5}, {3, 7}, {5, -5},  
{5, -3}, {5, -2}, {5, 2}, {5, 3}, {5, 5}, {7, -3}, {7, -2}, {7, 2}, {7, 3}}