

73. $(x+(-1)) \cdot (3x) + (-1) = (x+(-1)) \cdot x + (1 \cdot x + (-1))$ (Transitivity of eq on 72, 71)
74. $(x+(-1)) \cdot x + (1 \cdot x + (-1)) = (x^2 + (-1) \cdot (3x)) + (-1)$ (Symmetry of eq 73)
75. $(x+(-1)) \cdot (x+1) = (x^2 + (-1) \cdot (3x)) + (-1)$ (Transitivity of eq on 70, 74)
76. $(x+(-1)) \cdot (x+1) = (x^2 + (-3x)) + (-1)$ (Transitivity of eq on 75, 11)
77. $(x^2 + (-3x)) + (-1) = (x+(-1)) \cdot (x+1)$ (Symmetry of eq 76)
78. $(x^2 - 3x) + (-1) = (x+(-1)) \cdot (x+1)$ (Transitivity of eq 6, 77)
79. $(x+(-1)) \cdot (x+1) > 0$ (Substitute eq 78 in 4)
80. By Thm 2.1.10, either both $(x+(-1)) > 0$ and $(x+1) > 0$ or $(x+(-1)) < 0$ and $(x+1) < 0$.
81. Let, $(x+(-1)) > 0$ and $x+1 > 0$
82. $(x+(-1)) + 4 > 0 + 4$ (Thm 2.1.7(b))
83. $0 + 4 = 4$ (A9)
84. $(x+(-1)) + 4 > 4$ (Substitute eq 83 in 82)
85. $(x+(-1)) + 4 = x + ((-1) + 4)$ (A2)
86. $(-1) + 4 = 0$ (A4)
87. $x + ((-1) + 4) = x + 0$ (Substitute eq 86)
88. $x + 0 = x$
89. $x + ((-1) + 4) = x$ (Transitivity of eq 87, 88)
90. $(x+(-1)) + 4 = x$ (Transitivity of eq 85, 89)
91. $x > 4$ (Substitute eq 90 in 84)
92. $(x+1) + (-1) > 0 + (-1)$ (Thm 2.1.7(b))
93. $0 + (-1) = (-1)$ (A3)
94. $(x+1) + (-1) > (-1)$ (Substitute eq 93 in 92)
95. $(x+1) + (-1) = x + (1 + (-1))$ (A2)
96. $1 + (-1) = 0$ (A4)
97. $x + (1 + (-1)) = x + 0$ (Substitute eq 96)
98. $x + (1 + (-1)) = x$ (Transitivity of eq on 97, 88)
99. $(x+1) + (-1) = x$ (Transitivity of eq on 95, 98)
100. $x > (-1)$ (Substitute eq 99 in 94)
101. $x > 4$ and $x > (-1) \Rightarrow x > 4$ (Prove it rigorously)
102. Let $x+(-1) < 0$ and $x+1 < 0$. By a similar proof as 82-100, we get: $x < 4$ and $x < -1$. Taking intersection, $x < -1$ (Prove it rigorously)