

Operators and Expressions

Problem 1. Odd or Even

- Write an expression that checks if given integer is odd or even.

Examples:

n	Odd?
3	true
2	false
-2	false
-1	true
0	false

Problem 2. Divisible by 7 and 5

- Write a boolean expression that checks for given integer if it can be divided (without remainder) by 7 and 5 in the same time.

Examples:

n	Divided by 7 and 5?
3	false
0	true

n	Divided by 7 and 5?
5	false
7	false
35	true
140	true

Problem 3. Rectangle area

- Write an expression that calculates rectangle's area by given width and height.

Examples:

width	height	area
3	4	12
2.5	3	7.5
5	5	25

Problem 4. Third digit

- Write an expression that checks for given integer if its third digit (right-to-left) is 7.

Examples:

n	Third digit 7?
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n	Third digit 7?
5	false
701	true
1732	true
9703	true
877	false
777877	false
9999799	true

Problem 5. Third bit

- Write a boolean expression for finding if the bit #3 (counting from 0) of a given integer.
- The bits are counted from right to left, starting from bit #0.
- The result of the expression should be either 1 or 0.

Examples:

n	binary representation	bit #3
5	00000000 00000101	0
8	00000000 00001000	1

n	binary representation	bit #3
0	00000000 00000000	0
15	00000000 00001111	1
5343	00010100 11011111	1
62241	11110011 00100001	0

Problem 6. Point in Circle

- Write an expression that checks if given point $P(x, y)$ is within a circle $K(0, 5)$.

Examples:

x	y	inside
0	1	true
-2	0	true
-1	2	false
1.5	-1	true
-1.5	-1.5	false
100	-30	false
0	0	true

x	y	inside
0.2	-0.8	true
0.9	-1.93	false
1	1.655	true

Problem 7. Is prime

- Write an expression that checks if given positive integer number n ($n \leq 100$) is prime.

Examples:

n	Prime?
1	false
2	true
3	true
4	false
9	false
37	true
97	true

n	Prime?
51	false
-3	false
0	false

Problem 8. Trapezoid area

- Write an expression that calculates trapezoid's area by given sides a and b and height h.

Examples:

a	b	h	area
5	7	12	72
2	1	33	49.5
8.5	4.3	2.7	17.28
100	200	300	45000
0.222	0.333	0.555	0.1540125

Problem 9. Point in Circle and outside Rectangle

- Write an expression that checks for given point $P(x, y)$ if it is within the circle $K((1,1), 3)$ and out of the rectangle $R(\text{top}=1, \text{left}=-1, \text{width}=6, \text{height}=2)$.

Examples:

x	y	inside K & outside of R
1	2	yes
2.5	2	no
0	1	no
2.5	1	no
2	0	no
4	0	no
2.5	1.5	no
2	1.5	yes
1	2.5	yes
-100	-100	no