─────────────────────── MODULE $malgtd1ex10$ ───────────────────────

EXTENDS $Naturals$, $Integers$
CONSTANTS $x0$, $y0$, $z0$
VARIABLES x, y, z, pc

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Interpretation: w assume that the precondition can hold and we have to find possible values for $x0,y0$, $z0$ to validate or not

ASSUME $\land x0 \in Int \land y0 \in Int \land z0 \in Int$
$\qquad \land\ x0 = 3 \land y0 = z0 + x0 \land z0 = 2 * x0$

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Auxiliary definitions
$typeInt(u) \triangleq u \in Int$
$pre \triangleq \land x0 \in Int \land y0 \in Int \land z0 \in Int$
$\qquad\quad\ \land\ x0 = 3 \land y0 = z0 + x0 \land z0 = 2 * x0$

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Action for transitioon of the algorithm
$al1l2 \triangleq$
$\qquad \land pc = \text{"l1"}$
$\qquad \land pc' = \text{"l2"}$
$\qquad \land y' = z + x$
$\qquad \land z' = z \land x' = x$

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Computations
$Next \triangleq al1l2 \lor$ UNCHANGED $\langle x, y, z, pc \rangle$
$Init \triangleq pc = \text{"l0"} \land x = x0 \land y = y0 \land z = z0 \land pre$

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Checking the annotation by checking the invariant i derived from the annotation
$i \triangleq$
$\qquad \land typeInt(x) \land typeInt(y) \qquad \land typeInt(z)$
$\qquad \land pc = \text{"l1"} \Rightarrow x = x0 \land y = y0 \land z = z0 \land pre$
$\qquad \land pc = \text{"l2"} \Rightarrow x = 3 \land y = x + 6 \land pre$

$safe \triangleq i$

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