Chapter 7.1, Problem 26E

Problem

Observe that *mod* and *div* can be defined as functions from **Z***nonneg* × **Z+** to **Z.** For each ordered pair (*n, d*) consisting of a nonnegative integer *n* and a positive integer *d*, let

mod(n, d) = *n mod d* (the nonnegative remainder obtained when *n* is divided by *d).*

div(n, d) = *n div d* (the integer quotient obtained when *n* is divided by *d).*

Find each of the following:

a. *mod* (67, 10) and *div* (67, 10)

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b. *mod* (59, 8) and *div* (59, 8)

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c. *mod* (30, 5) and *div* (30, 5)

Step-by-step solution

Step 1 of 4

We define the functions from $Z^+ \cup \{0\} XZ^+ \to Z$

$\mathrm{mod}(n,d) = n \bmod d$ and

$\mathrm{div}(n,d) = n \,\mathrm{div}\, d \;\forall\; (n,d) \in Z^+ \cup \{0\} XZ^+$

Step 2 of 4

(a) $\mathrm{mod}(67,10) = 67 \bmod 10 = 7$

$\mathrm{div}(67,10) = 67 \mathrm{div} 10 = 6$

Step 3 of 4

(b) $\mathrm{mod}(59,8) = 59 \bmod 8 = 3$

$\mathrm{div}(59,8) = 50 \mathrm{div} 8 = 7$

Step 4 of 4

(c) $\mathrm{mod}(30,5) = 30 \bmod 5 = 0$

$\mathrm{div}(30,5) = 30 \mathrm{div} 5 = 6$