1. Show that if $d \neq 0$, then $d \mid (-a)$ and $-d \mid a$.

Solution.

For example:

$$a = 10; d = 5$$

 $\frac{-10}{5} = -2; \frac{10}{-5} = -2$

2.Show that it is false that a > b implies a|b.

Solution.

Let

$$a = b + k$$
; $k - positive$ number

Then

$$\frac{b}{a} = \frac{b}{b+k} < 1$$

3.Is 980637 divisible by 7? Show.

Solution.

980 - 637 = 343 $34 - 2 \cdot 3 = 28$

So 980637 is divisible by 7.

4.Determine whether of the following are divisible by 3, 5, 7, 9, or 11 using the methods described int he text:

A. 1969

Solution.

1 + 9 + 6 + 9 = 25

It is not divisible by 3 or 9.

last digit $9 \neq 0$ or 5

It is not divisible by 5.

 $1 + 6 \neq 9 + 9$

It is not divisible by 11.

 $196 - 2 \cdot 9 = 178$ $17 - 2 \cdot 8 = 1$

It is not divisible by 7.

B. 28350

Solution.

2 + 8 + 3 + 5 = 17

It is not divisible by 3 or 9.

last digit 0

It is divisible by 5.

 $2+3\neq 8+5$

It is not divisible by 11.

2835	- 2	$\cdot 0 =$	2835
283	- 2	· 5 =	273
27	- 2	· 3 =	21

It is divisible by 7.

C. 1421

Solution.

1 + 4 + 2 + 1 = 8It is not divisible by 3 or 9. *last digit* $1 \neq 0$ *or* 5It is not divisible by 5. $1+2 \neq 4+1$ It is not divisible by 11. $142 - 2 \cdot 1 = 140$ It is divisible by 7. 1 + 7 + 3 + 3 = 14It is not divisible by 3 or 9.

last digit $3 \neq 0$ or 5

It is not divisible by 5.

D. 17303

$$1 + 3 + 3 = 7$$

It is divisible by 11.

$$1730 - 2 \cdot 3 = 1724$$
$$172 - 2 \cdot 4 = 164$$
$$16 - 2 \cdot 4 = 8$$

It is not divisible by 7.

E. 116424

Solution.

1 + 1 + 6 + 4 + 2 + 4 = 18

It is divisible by 3 and 9.

last digit $4 \neq 0$ or 5

It is not divisible by 5.

1 + 6 + 2 = 1 + 4 + 4

It is divisible by 11.

424 - 116 = 308; $30 - 2 \cdot 8 = 14$

It is divisible by 7.

F. 1089

$$1 + 8 + 9 = 18$$

It is divisible by 3 and 9.

last digit $9 \neq 0$ or 5

It is not divisible by 5.

1 + 8 = 9

It is divisible by 11.

 $108 - 2 \cdot 9 = 90$

It is not divisible by 7.

5. Classify each of the following as true or false:

A. 6 is a divisor of 24.

Solution.

$$\frac{24}{6} = 4$$
; true

B. 40 is a multiple of 8.

Solution.

$$\frac{40}{8} = 5$$
; true

C. 0 divides 10.

$$\frac{10}{0}$$
; false

D. 13 is a factor of 33.

Solution.

$$\frac{33}{13} = 2 + \frac{7}{13}$$
; false

E. 12 divides 6.

Solution.

$$\frac{6}{12} = \frac{1}{2}$$
; false

6. Show that 23n - 1 is divisible by 7.

Solution.

23n - 1 is not always divisible by 7

For example

$$23 \cdot 1 - 1 = 22$$
 is not divisible by 7

 $23 \cdot 4 - 1 = 91$ is divisible by 7

7.Show that 5n - 1 is divisible by 4

5n-1 is not always divisible by 4

For example

- $5 \cdot 2 1 = 9$ is not divisible by 4
 - $5 \cdot 1 1 = 4$ is divisible by 4

Answer provided by www.AssignmentExpert.com