

arithmetic expressions:
 combinations of numbers,
 arithmetic operators,
 parentheses, calls to
 methods returning numbers.

topic: modulus (%) operator

$a \% b$

returns the remainder
 after division $\frac{a}{b}$

a & b both int

<u>expr</u>	<u>value</u>	<u>expr</u>	<u>value</u>
$8\%3$	2	$5\%2$	1
$9\%3$	0	$6\%2$	0
$10\%3$	1	$7\%2$	1
$11\%3$	2	$\%2$ to	

$\%3$ detect
 "divisible by 3"

detect
 even/odd

<u>expr</u>	<u>value</u>
23 % 6	5
29 % 10	9

if you mix double and int in a single operation, the int will be "promoted" to double

<u>expr</u>	<u>value</u>
7 / 3	2
7 / 3.0	2.333...

7 / 3 * 3.0	2.3.0 = 6.0
7.0 / 3 * 3.0	2.333... * 3.0 = 7.0

int a = 3;	
→ 7 / a * 3.0	6.0
7 / (double) a * 3.0	7.0
<u>cast</u>	

on test.

What is value of...

$$\begin{array}{ll} \text{Q: } 8 / 3 & \text{A: } 2 \\ & 3 \\ & 9 / 3 & 3 \end{array}$$

p.151 Ex 6.

(a) 0

(b) 0

(c) 5.0

$$1.0 / 2 * 10$$

promotion $1.0 / 2.0 * 10$

$$0.5 * 10$$

promotion $.5 * 10.0$

$$5.0$$

(d) 5.0

(e) 3

Extra-credit on Wed:
modulus question.

Example 23 % 5 3

(a) p. 151 Exercise 7
 double rate = 1.058;
 int balance0 = 100,
 balance = (int)(balance0 * rate);
 (int)(100 * 1.058);
 (int)(100.0 * 1.058);
 (int) is a cast; tries
 to represent 105.8
 operand following the cast as
 an int

(b) int miles = 98,
 gallons = 5;
 double gasMileage =
 miles / gallons;
 98 / 5
 19
 gasMileage: (double) 19
 19.0

Topic: (compound assignments)
(shorthand)

$$a += b \quad a = a + b$$

$$a -= b \quad a = a - b$$

$$a *= b \quad \text{etc.}$$

$$a /= b$$

$$a \% = b$$

increment \dagger decrement

$a++$ adds 1
(increment)

$a--$ subtracts 1
(decrement)