**Math in Java**

Reference: Gaddis 2.5-2.7

Topics: Comments, Math in Java, variables in math

**Comments**

What are they?

How do we do them (2 ways)?

When do we use them?

**Operators**

* Only for integers and real numbers:

+ - \* / %

* Calculate from
* Order of operations:

Example calculations:

int answer = 100 – 6 \* 5;

int answer2 = (100 – 6) \* 5;

double final\_answer = answer % 10;

**Memory**

int k, j, m;

double a, b, c;

k = 5;

j = k – 2;

m = k % j;

a = k + 2 \* 7;

b = j / 2.0;

c = j / 2; //careful!

**Integer Division**

Trickiest part of math in Java

* What is 17/2 when we just do it as math?
* What is 17/2 when we do it in Java?

**Let’s Practice Understanding Java Code!**

Draw the steps in memory:

int age = 21;

int decade = 10;

final int WEEKS\_PER\_YEAR = 52;

double num\_decades = age / decade;

int extra\_years = age % decade;

double weeks\_alive = decade \* num\_decades \* WEEKS\_PER\_YEAR;

What is the final value of weeks\_alive?

**Compatible Types**

Any type in right column can be assigned to type in left column. Why?

**Data Type** **Compatible Data Types (can be assigned to type on left)**

* *byte byte*
* *short byte, short*
* *int byte, short, int, char*
* *long byte, short, int, long, char*
* *float float, byte, short, int, long, char*
* *double float, double, byte, short, int, long, char*
* *boolean boolean*
* *char char*

Which option is valid?

* Option 1

*float salesTax = .05f;*

*double taxRate = salesTax;*

* Option 2

*double taxRate = .05;*

*float salesTax = taxRate;*

**Typecasting**

* the programmer “changes” a value to another type

*Implicit type casting* occurs when an operation involves values of two types (see p. 66)

* + *"promotion"*

*int a = 7;*

*double b = a / 2.0;*

* + - 2.0 is assumed to be a
    - The value in *a* is temporarily “promoted” to

*Explicit type casting* occurs when the programmer tells the compiler to convert a value to a different type (p. 66).

A real value converted to an integer type is

*int a = 7;*

*double b =* ***(float)*** *a / 2;*

*double x = a / 2.0;*

*int c =* ***(int)*** *b;*

*char ch = 'A';*

*int d =* ***(int)*** *ch; // what does d hold?*

**Math Class**

Built-in Java class that we can use

* + We use from the Math class
  + Each time we call a it does something and gives us the answer
* A number to the power:
* The square root of a number: