Chapter 2: Data Types and Arithmetic Expressions

TRUE/FALSE

1. Data can take many forms, including numbers, individual alphabetic characters, strings of alphabetic characters, and numbers with specific decimal precision.

   ANS: T   PTS: 1   REF: 16

2. `NSLog` provides an extended set of functionality for outputting information such as the option to format data.

   ANS: T   PTS: 1   REF: 16

3. `NSLog` takes at least two string parameters.

   ANS: F   PTS: 1   REF: 16

4. The `\n` in the `NSLog` statement:
   ```
   NSLog(@"Please enter a number\n");
   ```
   is a number specifier.

   ANS: F   PTS: 1   REF: 17

5. In the Objective-C statement:
   ```
   scanf("%d", &num);
   ```
   `&num` is the name of a variable in which a number will be stored.

   ANS: T   PTS: 1   REF: 17

6. The Objective-C `int` data type is used to store a whole number that does not have a decimal point.

   ANS: T   PTS: 1   REF: 18

7. The Objective-C `char` data type is used to store strings of characters.

   ANS: F   PTS: 1   REF: 19

8. The Objective-C `float` data type is used to store real numbers.

   ANS: T   PTS: 1   REF: 20

9. In the expression:
   ```
   int *prtValue = &value;
   ```
   the `&` symbol before the variable named `value` gives its address location.

   ANS: T   PTS: 1   REF: 21

10. The Objective-C `id` data type is typically used to point to an object of an unknown data type.

    ANS: T   PTS: 1   REF: 23

11. The `struct` functionality in Objective-C allows a programmer to define a new data type with enumerations.

ANS: F   PTS: 1   REF: 24

12. In Objective-C, the values assigned to enumerations are of integer type.

ANS: T   PTS: 1   REF: 25

13. In the Objective-C statement:
     `typedef enum {Jan, Feb, March, April, May} Month;`
    the value of April is 4.

ANS: F   PTS: 1   REF: 25

14. The `#define` statement in Objective-C is an example of a preprocessor.

ANS: T   PTS: 1   REF: 26

15. An advantage of using constants in a program is that, if the value of the constant needs to be changed, the programmer only needs to change it in one location rather than searching the entire program and modifying every instance.

ANS: T   PTS: 1   REF: 26

16. Expressions that contain operands and operators are called arithmetic expressions.

ANS: T   PTS: 1   REF: 26

17. If the Objective-C operator `div` is used with integers and there is a nonzero remainder, it will round up or down to the nearest integer.

ANS: F   PTS: 1   REF: 27

18. You can use either pre or post increment notation for increment operations since the results are always the same.

ANS: F   PTS: 1   REF: 30

19. The Objective-C pre increment operator will first evaluate the expression and then perform the increment after the expression is evaluated.

ANS: F   PTS: 1   REF: 30

20. The Objective-C subtract and assign operator, `-=`, first subtracts a value from a variable and then assigns this new value to the variable.

ANS: T   PTS: 1   REF: 32

MULTIPLE CHOICE

1. To store data, a program requires placeholders. A ____ placeholder holds data that changes as the program runs.

a. constant   c. string
b. variable   d. concatenated

ANS: B   PTS: 1   REF: 16

2. Data types help the Objective-C language _____ allocate memory for storage.
   a. compiler   c. memory manager
   b. interpreter   d. programmer

ANS: A   PTS: 1   REF: 16

3. In Objective-C, concatenation is the process of combining multiple _____ into a single element.
   a. addresses   c. variables
   b. numbers   d. strings

ANS: D   PTS: 1   REF: 16

4. _____ is identified by Apple as an error log mechanism used to output data to the console.
   a. `Scanf`   c. `NSLog`
   b. `NSError`   d. `NSOutput`

ANS: C   PTS: 1   REF: 16

5. The NSLog function uses _____ specifiers which are tokens that start with the symbol %, followed by a character that specifies a data type.
   a. data-type   c. foundation
   b. format   d. parameter

ANS: B   PTS: 1   REF: 16

6. `NSLog` takes one or more parameters in the form of a string with format specifiers. The string with the format specifier starts with the _____ symbol.
   a. %   c. &
   b. @   d. #

ANS: B   PTS: 1   REF: 16

7. _____ reads input typed by the user.
   a. `Read`   c. `Getf`
   b. `Readline`   d. `Scanf`

ANS: D   PTS: 1   REF: 17

8. In the Objective-C statement:
       `scanf("%f, &num);`
   the variable `num` has a type of _____.
   a. decimal   c. integer
   b. real   d. float

ANS: D   PTS: 1   REF: 17

9. When using the `scanf` method in code that requires the user to enter data that will be stored as a double, you should use the format specifier _____.
   a. `%n`   c. `%f`
   b. `%ld`   d. `%lf`

ANS: D   PTS: 1   REF: 18

10. The data type _____ is used to store a whole number that does not have a decimal point.
    a. `char`   c. `float`
    b. `int`   d. `double`

    ANS: B   PTS: 1   REF: 18

11. The _____ data type is used to store a single character.
    a. `int`   c. character
    b. `char`   d. `string`

    ANS: B   PTS: 1   REF: 19

12. The storage space utilized by an Objective-C `float` is _____ bits.
    a. 8   c. 64
    b. 32   d. 128

    ANS: B   PTS: 1   REF: 20

13. The storage space utilized by an Objective-C `double` is _____ bits.
    a. 8   c. 64
    b. 32   d. 128

    ANS: C   PTS: 1   REF: 20

14. Various combinations of basic data types can be used to create more complex data types. What are these data types called?
    a. complex   c. derived
    b. combined   d. double

    ANS: C   PTS: 1   REF: 21

15. The _____ type holds a memory location where data is stored.
    a. `pointer`   c. `main`
    b. `id`   d. `struct`

    ANS: A   PTS: 1   REF: 21

16. In Objective-C code, a variable of type _____ is created by using the * symbol.
    a. `char`   c. `pointer`
    b. `struct`   d. `id`

    ANS: C   PTS: 1   REF: 21

17. _____ a pointer means extracting the value the pointer is pointing to.
    a. Dereferencing   c. Releasing
    b. Extracting   d. Deriving

    ANS: A   PTS: 1   REF: 21

18. The Objective-C `NSLog` format specifier for a pointer variable is _____.
    a. %d   c. %n
    b. %v   d. %p
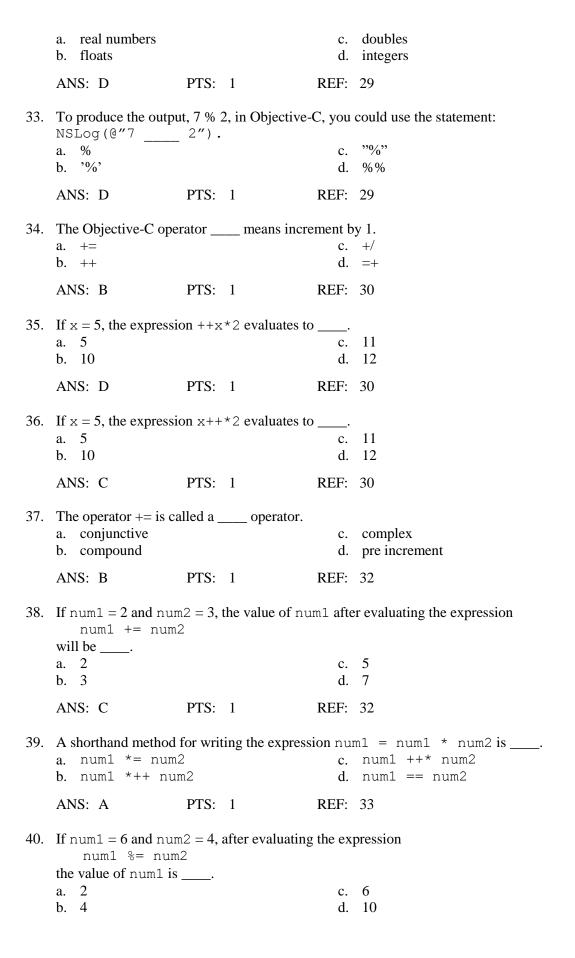
    ANS: D   PTS: 1   REF: 22

19. Given the following code segment:

```
int num = 5;
int * ptrValue;
ptrValue = &num;
```

where the memory address holding `num` is 0x7fff6506989c, the output from the statement
`NSLog(@"%d",*ptrValue)` is ____.

a.   5   c.   num
b.   0x7fff6506989c   d.   5 0x7ff6506989c

ANS: A   PTS: 1   REF: 22

20. The ____ type is a generic data type that stores data of any type.
a.   `id`   c.   `pointer`
b.   `struct`   d.   `gen`

ANS: A   PTS: 1   REF: 23

21. The ____ type is a combination of several data types that creates a new custom data type. It is a
remnant of the original C language, before object oriented programming was introduced.
a.   `id`   c.   `pointer`
b.   `struct`   d.   `gen`

ANS: B   PTS: 1   REF: 23

22. Given the following Objective-C code segment:

```
struct ball
   {
     int num;
     float size;
     char color;
   };
struct ball b;
```

which of the following statements would set the value of the property `num` of the newly created
variable to 5?
a.   `ball.num = 5;`   c.   `struct.ball = 5;`
b.   `b.num = 5;`   d.   `struct.b = 5;`

ANS: B   PTS: 1   REF: 23

23. ____ notation is used to populate and retrieve the values of variables in a structure.
a.   Char   c.   Dot
b.   Struct   d.   #

ANS: C   PTS: 1   REF: 24

24. In Objective-C, the term ____ means a defined range of values for a variable.
a.   itemization   c.   list
b.   enumeration   d.   inventory

ANS: B   PTS: 1   REF: 24

25. In the following section of code, the programmer did not specify the value that should be associated
with each month.

```
typedef enum {
  Jan,
  Feb,
  March,
  April,
  May,
  } Month;
```

By default, the first month, `Jan`, will be assigned the value _____.

a. 0   c. %undefined
b. 1   d. %error

ANS: A   PTS: 1   REF: 25

26. The _____ in Objective-C is a special tool that helps you create custom statements.
a. debugger   c. importer
b. compiler   d. preprocessor

ANS: D   PTS: 1   REF: 26

27. The Objective-C _____ statement is used to define constants and associate them with unique names.
a. #const   c. #define
b. #preprocess   d. #customize

ANS: C   PTS: 1   REF: 26

28. Objective-C arithmetic operators can be divided into basic and _____ assignment operators.
a. compound   c. modulus
b. complex   d. enumerated

ANS: A   PTS: 1   REF: 26

29. The character % represents the Objective-C basic assignment operator _____.
a. percent   c. assign
b. modulus   d. divide

ANS: B   PTS: 1   REF: 26

30. Given that the integer `num1 = 24` and the integer `num2 = 15`, the value of the variable `div` in the expression:
```
    div = num1 / num2
```
is _____.
a. 0   c. 1
b. .625   d. 1.6

ANS: C   PTS: 1   REF: 27

31. The modulus operator returns the _____ after division.
a. divisor   c. remainder
b. dividend   d. quotient

ANS: C   PTS: 1   REF: 28

32. The Objective-C modulus operator only works on _____.

a. real numbers
b. floats

c. doubles
d. integers

ANS: D   PTS: 1   REF: 29

33. To produce the output, 7 % 2, in Objective-C, you could use the statement:
NSLog(@"7 _____ 2").
a. %
b. '%'

c. "%"
d. %%

ANS: D   PTS: 1   REF: 29

34. The Objective-C operator _____ means increment by 1.
a. +=
b. ++

c. +/
d. =+

ANS: B   PTS: 1   REF: 30

35. If x = 5, the expression ++x*2 evaluates to _____.
a. 5
b. 10

c. 11
d. 12

ANS: D   PTS: 1   REF: 30

36. If x = 5, the expression x++*2 evaluates to _____.
a. 5
b. 10

c. 11
d. 12

ANS: C   PTS: 1   REF: 30

37. The operator += is called a _____ operator.
a. conjunctive
b. compound

c. complex
d. pre increment

ANS: B   PTS: 1   REF: 32

38. If num1 = 2 and num2 = 3, the value of num1 after evaluating the expression
num1 += num2
will be _____.
a. 2
b. 3

c. 5
d. 7

ANS: C   PTS: 1   REF: 32

39. A shorthand method for writing the expression num1 = num1 * num2 is _____.
a. num1 *= num2
b. num1 *++ num2

c. num1 ++* num2
d. num1 == num2

ANS: A   PTS: 1   REF: 33

40. If num1 = 6 and num2 = 4, after evaluating the expression
num1 %= num2
the value of num1 is _____.
a. 2
b. 4

c. 6
d. 10

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ANS: A   PTS: 1   REF: 34

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ANS: A   PTS: 1   REF: 34