

Chapter 3 Exercises

1) Is the literal 4 a valid Python expression?

Yes

2) Is the variable x a valid Python expression?

Yes, if the variable x exists, it is

3) Is $x + 4$ a valid Python expression?

If you have x initialised as a numeric datatype, yes otherwise no

~~~~~What affect does the unary + operator have when applied to a numeric  
**when applied to a numeric expression?**

Sum

**5) Sort the following binary operators in order of high to low precedence: +, -, \*, //, /, %, =.**

= , \* , / , // , % , + , -

**6) Given the following assignment:**

**$x = 2$**

**Indicate what each of the following Python statements would print.**

**(a) `print("x")`** ---> x

**(b) `print('x')`** ---> x

**(c) `print(x)`** ---> 2

**(d) `print("x + 1")`** ---> x + 1

**(e) `print('x' + 1)`** ---> EROR : TypeError: can only concatenate str (not "int") to str

(f) `print(x + 1)` ----> 3

**7) Given the following assignments:**

`i1 = 2`

`i2 = 5`

`i3 = -3`

`d1 = 2.0`

`d2 = 5.0`

`d3 = -0.5`

**Evaluate each of the following Python expressions.**

(a) `i1 + i2` ---->  $2 + 5 = 7$

(b) `i1 / i2` ---->  $2 / 5 = 0.4$

(c) `i1 // i2` ---->  $2 // 5 = 0$

(d) `i2 / i1` ---->  $5 / 2 = 2.5$

(e) `i2 // i1` ---->  $5 // 2 = 2$

(f) `i1 * i3` ---->  $2 * -3 = -6$

(g) `d1 + d2` ---->  $2.0 + 5.0 = 7.0$

(h) `d1 / d2` ---->  $2.0 / 5.0 = 0.4$

(i) `d2 / d1` ---->  $5.0 / 2.0 = 2.5$

(

~~j~~ (k) `d1 + i2` ---->  $2.0 + 5 = 7.0$

(l) `i1 / d2` ---->  $2 / 5.0 = 0.4$

~~d~~ (m) `d2 / i1` ---->  $5.0 / 2 = 2.5$

~~3~~ (n) `i2 / d1` ---->  $5 / 2.0 = 2.5$

~~\*~~ (o) `i1/i2*d1` ---->  $2 / 5 * 2.0 = 0.8$

(p) `d1*i1/i2` ---->  $2.0 * 2 / 5 = 0.8$

~~1~~ (q) `d1/d2*i1` ---->  $2.0 / 5.0 * 2 = 0.8$

(r)  $i1 * d1 / d2$  ---->  $2 * 2.0 / 5.0 = 0.8$

(s)  $i2 / i1 * d1$  ---->  $5 / 2 * 2.0 = 5$

t)  $d1 * i2 / i1$  ---->  $2.0 * 5 / 2.0 = 5$

(u)  $d2 / d1 * i1$  ---->  $5.0 / 2.0 * 2 = 5$

(v)  $i1 * d2 / d1$  ---->  $2 * 5.0 / 2.0 = 5$

8) What is printed by the following statement:

`#print(5/3)` ----> 1.6666666666666667

9) Given the following assignment

`1 = 2`

`2 = 5`

`3 = -3`

`1 = 2.0`

`2 = 5.0`

`3 = -0.5`

evaluate each of the following Python expressions.

(a)  $i1 + (i2 * i3)$  ---->  $2 + (5 * (-3)) = 2 + (-15) = -13$

(b)  $i1 * (i2 + i3)$  ---->  $2 * (5 - 3) = 2 * 2 = 4$

(c)  $i1 / (i2 + i3)$  ---->  $2 / (5 - 3) = 2 / 2 = 1.0$

(d)  $i1 // (i2 + i3)$  ---->  $2 // (5 - 3) = 2 // 2 = 1$

(e)  $i1 / i2 + i3$  ---->  $2 / 5 + (-3) = -2.6$

(f)  $i1 // i2 + i3$  ---->  $2 // 5 + (-3) = -3$

(

g)  $3 + 4 + 5 // 3$  ---->  $7 + 1 = 8$

i)  $(3 + 4 + 5) / 3$  ---->  $12 / 3 = 4.0$

3

+

j)  $(3 + 4 + 5) // 3$  ---->  $12 // 3 = 4$   
k)  $d1 + (d2 * d3)$  ---->  $2.0 + (5.0 * (-0.5)) = - 0.5$   
l)  $d1 + d2 * d3$  ---->  $2.0 + 5.0 * - 0.5 = - 0.5$   
m)  $d1 / d2 - d3$  ---->  $2.0 / 5.0 - (-0.5) = 0.9$   
n)  $d1 / (d2 - d3)$  ---->  $2.0 / (5.0 - (-0.5)) = 0.36363636363636365$   
(o)  $d1 + d2 + d3 / 3$  ---->  $2.0 + 5.0 + (-0.5) / 3 = 6.833333333333333$   
(p)  $(d1 + d2 + d3) / 3$  ---->  $(2.0 + 5.0 + (-0.5)) / 3 = 2.1666666666666665$   
(q)  $d1 + d2 + (d3 / 3)$  ---->  $2.0 + 5.0 + ((-0.5)/3) = 6.833333333333333$   
(r)  $3 * (d1 + d2) * (d1 - d3)$  ---->  $3 * (2.0 + 5.0) * (2.0 - (-0.5)) = 52.5$

**10) What symbol signifies the beginning of a comment in Python?**

The symbol used to comment in Python is this symbol: ( # ) --> Sharp

**11) How do Python comments end?**

comments, are line elements, so if the line changes, comment will end.

**12) Which is better, too many comments or too few comments?**

Useful and brief

**13) What is the purpose of comments ?**

We use comments to explain python codes, to make code more readable and with comment we can describe our codes.

**14) Why is human readability such an important consideration?**

humans write code, so it is crucial that they understand the code easier and faster.

**15) What circumstances can cause each of the following run-time errors to arise?**

- **NameError**

Explain: The NameError occurs when you try to use a variable, function, or module that doesn't exist or wasn't used in a valid way.

- **ValueError**

Explain: If Value Not Defined

- **ZeroDivisionError**

Explain: A ZeroDivisionError is raised when you try to divide by 0 .

This is part of the ArithmeticError Exception class.

- **IndentationError**

Explain :The indentation error can occur when the spaces or tabs are not placed properly.

- **ArithmeticError**

Explain :ArithmeticError is simply an error that occurs during numeric calculations.

ArithmeticError types in Python include: OverflowError , ZeroDivisionError , FloatingPointError.

- **OverflowError**

Explain :An OverflowError exception is raised when an arithmetic operation exceeds the limits to be represented.

- **SyntaxError**

Explain : If the interpreter detects an invalid program statement during the translation phase,

it will terminate the program's execution and report an error.

- **TypeError**

Explain :The Python TypeError is an exception that occurs when the data type of an object in an operation is inappropriate.

**16) Consider the following program which contains some errors. You may assume that the comments**

**within the program accurately describe the program's intended behavior.**

```
# Get two numbers from the user
n1 = float(input()) # 1
n2 = float(input()) # 2
# Compute sum of the two numbers
print(n1 + n2) # 3
# Compute average of the two numbers
print(n1+n2/2) # 4
# Assign some variables
d1 = d2 = 0 # 5
# Compute a quotient
print(n1/d1) # 6
# Compute a product
n1*n2 = d1 # 7
# Print result
```

```
print(d1) # 8
```

For each line listed in the comments, indicate whether or not an interpreter error, run-time exception, or logic error is present. Not all lines contain an error.

**17) Write the shortest way to express each of the following statements.**

a)  $x = x + 1$       --->  $x += 1$

b)  $x = x / 2$       --->  $x /= 2$

c)  $x = x - 1$       --->  $x -= 1$

d)  $x = x + y$       --->  $x += y$

e)  $x = x - (y + 7)$       --->  $x -= y + 7$

f)  $x = 2 * x$       --->  $x *= 2$

g)  $\text{number\_of\_closed\_cases} = \text{number\_of\_closed\_cases} + 2 * \text{ncc}$

--->  $\text{number\_of\_closed\_cases} += 2 * \text{ncc}$

**18) What is printed by the following code fragment?**

```
x1 = 2
```

```
x2 = 2
```

```
x1 += 1
```

```
x2 -= 1
```

```
print(x1)      ---> 3
```

```
print(x2)      ---> 2
```

**Why does the output appear as it does?**

Because  $(x1 += 1 == x1 = x1 + 1)$  AND  $(x2 -= 1 == x2 = x2 - 1)$

۱۹) Consider the following program that attempts to compute the circumference of a circle given the radius entered by the user. Given a circle's radius,  $r$ , the circle's circumference,  $C$  is given by the formula:

$$C = 2\pi r$$

$$C = \cdot$$

$$I = 3,14159$$

Formula for the area of a circle given its radius

$$A = \pi r^2$$

=>  $r$  is not defined yet.

# Get the radius from the user

```
r = float(input("Please enter the circle's radius: "))
```

=> should be above  $C = 2\pi r$

# Print the circumference

```
print("Circumference is", C)
```

(a) The program does not produce the intended result. Why?

=> explained above.

(b) How can it be repaired so that it works correctly?

=>

$$\pi = 3,14159$$

```
r = float(input("Please enter the circle's radius: "))
```

$$C = 2 * r * \pi$$

```
print("Circumference is: ", C)
```

20) Write a Python program that add two number with together.

# This program adds two numbers

$$\text{num1} = 1.5$$

$$\text{num2} = 6.3$$



```
# Add two numbers
```

```
sum = num1 + num2
```

```
# Display the sum
```

```
print('The sum of {0} and {1} is {2}'.format(num1, num2, sum))
```

output:

The sum of 1.5 and 6.3 is 7.8

**21) Write a Python program that calculate the area of a triangle.**

$$s = (a+b+c)/2$$
$$\text{area} = \sqrt{s(s-a)(s-b)(s-c)}$$

```
# Python Program to find the area of triangle
```

```
a = 5
```

```
b = 6
```

```
c = 7
```

```
# Uncomment below to take inputs from the user
```

```
# a = float(input('Enter first side: '))
```

```
# b = float(input('Enter second side: '))
```

```
# c = float(input('Enter third side: '))
```

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# calculate the semi-perimeter

$$s = (a + b + c) / 2$$

# calculate the area

$$\text{area} = (s(s-a)(s-b)(s-c))^{0.5}$$

print('The area of the triangle is %0.2f' %area)

output:

The area of the triangle is 14.70