```
# 1. Addition
a = 5
b = 3
print("Addition:", a + b)

# 2. Subtraction
print("Subtraction:", a - b)

# 3. Multiplication
print("Multiplication:", a * b)

# 4. Division
print("Division:", a / b)

# 5. Modulus
print("Modulus:", a % b)

# 6. Floor Division
print("Floor Division:", a // b)

# 7. Exponentiation
print("Exponentiation:", a ** b)

# 8. Arithmetic with float
x = 7.5
y = 2.5
print("Float Addition:", x + y)

# 9. Arithmetic with negative numbers
print("Negative Multiplication:", -a * b)

# 10. Combining operators
result = (a + b) * (a - b)
print("Combined Arithmetic:", result)



# 11. Basic assignment
x = 10
print("Initial value:", x)

# 12. Add and assign
x += 5
print("After += 5:", x)

# 13. Subtract and assign
x -= 3
print("After -= 3:", x)

# 14. Multiply and assign
x *= 2
print("After *= 2:", x)

# 15. Divide and assign
x /= 4
print("After /= 4:", x)

# 16. Modulus and assign
x %= 3
print("After %= 3:", x)

# 17. Floor division and assign
x = 10
x //= 3
print("After //= 3:", x)

# 18. Exponentiation and assign
x = 2
x **= 3
print("After **= 3:", x)

# 19. Using assignment with strings
s = "Hello"
s += " World"
print("String Concatenation:", s)
```

```
# 20. Chain assignment
a = b = c = 20
print("Chain Assignment:", a, b, c)



# 21. Equal to
print(10 == 10)

# 22. Not equal to
print(10 != 5)

# 23. Greater than
print(7 > 3)

# 24. Less than
print(2 < 9)

# 25. Greater than or equal to
print(5 >= 5)

# 26. Less than or equal to
print(4 <= 6)

# 27. Comparing strings
print("apple" == "apple")

# 28. Comparing different types
print(5 == "5")  # False

# 29. Using in conditions
a = 8
b = 8
if a == b:
    print("Both numbers are equal.")

# 30. Nested comparison
x = 10
print(5 < x <= 15)



# 31. and operator
print(True and True)

# 32. or operator
print(True or False)

# 33. not operator
print(not False)

# 34. Logical in condition
x = 10
y = 20
if x > 5 and y < 25:
    print("Both conditions are true.")

# 35. Combining logical and comparison
if not(x < 5 or y < 15):
    print("Negated OR result is true.")



# 36. Bitwise AND
print(5 & 3)  # 101 & 011 = 001

# 37. Bitwise OR
print(5 | 3)  # 101 | 011 = 111

# 38. Bitwise XOR
print(5 ^ 3)  # 101 ^ 011 = 110

# 39. Bitwise NOT
print(~5)     # ~0101 = -0110

# 40. Left shift
print(5 << 1)  # 101 becomes 1010 (10)
```

```
# 41. Right shift
print(5 >> 1)  # 101 becomes 10 (2)

# 42. Bitwise AND with 0
print(8 & 0)

# 43. Bitwise OR with 0
print(8 | 0)

# 44. Mixing with arithmetic
print((5 << 2) + 1)

# 45. Combining bitwise and logical
print((5 & 3) > 0 and True)



# 46. in operator
fruits = ["apple", "banana", "cherry"]
print("apple" in fruits)

# 47. not in operator
print("grape" not in fruits)

# 48. in with strings
s = "Hello, world!"
print("world" in s)

# 49. Membership with tuples
t = (1, 2, 3, 4)
print(3 in t)

# 50. Membership in sets
my_set = {10, 20, 30}
print(25 not in my_set)
```