Question 1

Not yet answered

Marked out of 1.00

Consider the pair of functions $f, g\colon \mathbf{N} \to \mathbf{R}$ given by

$f(n) = 1/n$

and

$g(n) = 0\,.$

Which claims are true?

Select one or more:

- [x] a. $f \sim g$
- [ ] b. $f \leq g$
- [x] c. $g \leq f$
- [ ] d. $f \in O(g)$
- [x] e. $g \in O(f)$

Question 2

Not yet answered

Marked out of 1.00

True or false: For every pair of functions $f, g\colon \mathbf{N} \to \mathbf{R}$, if $f \in O(g)$ then $f \sim g$.

Select one:

- ○ a. true
- ◉ b. false

Clear my choice

Question 3

Not yet answered

Marked out of 1.00

True or false: $N \in O(N^2)$ for $N \geq 1$.

Select one:

- ○ a. false
- ◉ b. true

Clear my choice

Question **4**

Not yet answered

Marked out of 1.00

True or false: $N \in O(N)$ for $N > 1$.

Select one:

- a. true
- b. false

Clear my choice

Question **5**

Not yet answered

Marked out of 1.00

True or false: $N + \log_2 N \in O(N)$ for $N \geq 1$.

Select one:

- a. false
- b. true

Clear my choice

Question **6**

Not yet answered

Marked out of 1.00

True or false: $N \log_2 N \in O(N)$ for $N \geq 1$.

Select one:

- a. true
- b. false

Clear my choice

Question 7

Not yet answered

Marked out of 1.00

Consider $f(N) = \log_2(N^2 + 1)$ and $g(N) = \log_2 N$ for $N > 1$. Which function is linearly dominated by the other?

Select one:

- a. Neither.
- b. Both.
- c. $f \in O(g)$
- d. $g \in O(f)$

Clear my choice

Question 8

Not yet answered

Marked out of 1.00

Which pair of functions satisfy $f(N) \sim g(N)$?

Select one:

- a. $f(N) = N \log N + N$ and $g(N) = 2N \log N + N$
- b. $f(N) = 2\sqrt{N} + N$ and $g(N) = \sqrt{N} + N$
- c. $f(N) = N$ and $g(N) = N + N^2$
- d. $f(N) = 2N$ and $g(N) = \sqrt{N}$

Clear my choice

Question 9

Not yet answered

Marked out of 1.00

Which pair of functions $f, g\colon \mathbf{N} \to \mathbf{R}$ satisfy $f \in O(g)$?

Select one:

- a. $f(N) = N^3$ and $g(N) = 3N$ for $N \geq 1$
- b. $f(N) = N + N + N$ and $g(N) = N$ for $N \geq 1$
- c. $f(N) = (N+1) \cdot (N+1) \cdot (N+1)$ and $g(N) = N + 1$ for $N \geq 1$
- d. $f(N) = (\log_2 N) \cdot (\log_2 N) \cdot (\log_2 N)$ and $g(N) = \log_2 N$ for $N \geq 1$

Clear my choice

Question **10**

Not yet answered

Marked out of 1.00

What is the running time of the following piece of code? (Choose the smallest correct estimate.)

```
//java
if (N < 1000)
    for (int i = 0; i < N*N; i = i+1) A[i] = 0;
else
    for (int i = 0; i <   N; i = i+1) A[i] = i*i*i;
```

```
#python
if N < 1000:
    for i in range(N*N): A[i] = 0
else:
    for i in range(N): A[i] = i*i*i
```

Select one:

- a. linearithmic in N
- b. linear in N
- c. quadratic in N
- d. cubic N

Clear my choice

Question **11**

Not yet answered

Marked out of 1.00

How many stars are printed?

```
for (int i = N; i > 1; i = i/2) StdOut.print("*");
```

```
#python
i = N
while (i > 1):
    print ('*')
    i = i // 2
```

Select one:

- a. $\sim N$
- b. $\sim \frac{1}{2}N^2$
- c. $\sim \log N$
- d. $\sim N \log N$

Clear my choice

Question **12**

Not yet answered

Marked out of 1.00

How many stars are printed?

```
#python3
i = 1
while i < N:
    i = i+2
    stdio.write("*")
```

```
// java
for (int i = 1 ; i < N; i = i+2)
    StdOut.print("*");
```

Select one:

- a. $\sim \frac{1}{2}N^2$
- b. $\sim N$
- c. $\sim \log_2 N$
- d. $\sim N/2$

Clear my choice

Question **13**

Not yet answered

Marked out of 1.00

How many array accesses does the following piece of code perform?

Python:

```
for i in range(N):
    for j in range(N):
        A[i] = j;
```

Java:

```
for (int i = 0; i < N; ++i)
    for (int j = 0; j < N; ++j)
        A[i] = j;
```

Select one:

- a. $\sim \frac{1}{2}N^2$
- b. $\sim N^2$
- c. $\sim N^{1/2}$
- d. $\sim 2N^2$

Clear my choice

Question **14**

Not yet answered

Marked out of 1.00

Let $f(n) = n^3 + n$ and $g(n) = 2n^2$ for $n \in \mathbf{Z}$. What is

$$\lim_{n\to\infty} \frac{f(n)}{g(n)}$$

Select one:

- a. 1
- b. The limit does not exist.
- c. 2
- d. $-\infty$
- e. $+\infty$
- f. $\frac{1}{2}$

Clear my choice

Question **15**

Not yet answered

Marked out of 1.00

What is the limit of the sequence $x_1, x_2, \cdots$
given by $x_i = 5 - (1/i)$ for $i \to \infty$?

Select one:

- a. $-\infty$
- b. The limit does not exist.
- c. $+\infty$
- d. 0
- e. 5
- f. $\frac{1}{2}$
- g. 1

Clear my choice

Question **16**

Not yet answered

Marked out of 1.00

Define $f(n) = 2n + 5$ and $g(n) = n^2 + 1$ for $n \geq 1$. Which statements are true?

Select one or more:

- a. $f \leq g$
- b. $g \leq f$
- c. $f \sim g$
- d. $f \in O(g)$
- e. $g \in O(f)$