

Is it true that  $\log_2 n = O(n^2)$ ?

☒ Yes

☐ No

✓ **Correct**

A logarithmic function grows slower than a polynomial function.

2.  $n \log_2 n = O(n)$

1 / 1 point

☐ Yes

☒ No

3.  $n^2 = O(n^3)$

1 / 1 point

☒ Yes

☐ No

✓ **Correct**

$n^a$  grows slower than  $n^b$  for constants  $a < b$ .

4.  $n = O(\sqrt{n})$

1 / 1 point

☐ Yes

☒ No

5.  $5^{\log_2 n} = O(n^2)$

1 / 1 point

☐ Yes

☒ No

✓ **Correct**

Recall that  $a^{\log_b c} = c^{\log_b a}$  so  $5^{\log_2 n} = n^{\log_2 5}$ . This grows faster than  $n^2$  since  $\log_2 5 = 2.321 \dots > 2$ .

6.  $n^5 = O(2^{3 \log_2 n})$

1 / 1 point

☐ Yes

☒ No

7.  $2^n = O(2^{n+1})$

1 / 1 point

☒ Yes

☐ No

✓ **Correct**

$2^{n+1} = 2 \cdot 2^n$ , that is,  $2^n$  and  $2^{n+1}$  have the same growth rate and hence  $2^n = \Theta(2^{n+1})$ .