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Quiz Q&A

Q: Suppose an algorithm requires *cn*2 operations when performed with an input of size *n* (where *c* is a constant).

1. How many operations will be required when the input size is increased from *m* to 2*m* (where *m* is a positive integer)?
2. By what factor will the number of operations increase when the input size is doubled?
3. By what factor will the number of operations increase when the input size is increased by a factor of ten?

**A:**

1. When the input size is increased from *m* to 2*m*, the number of operations increases from *cm*2 to *c*(2*m*)2 = 4*cm*2.
2. By part (a), the number of operations increases by a factor of (4*cm*2) / *cm*2 = 4.
3. When the input size is increases by a factor of 10 (from *m* to 10*m*), the number of operations increases by a factor of (*c*(10*m*)2) / (*cm*2) = (100*cm*2) / *cm*2 = 100.