A(a)i. $O(n^6)$

A(a)ii. $O(n)$

A(b)i This claim is true.

A. Let f and g be functions from $Z^+ \to R^+$.
that is positive real-valued functions on the domain of positive integers.

$f(n) \in \Theta(g(n)) \Leftrightarrow \lim\limits_{n\to\infty} \frac{f(n)}{g(n)} = c,\ 0 < c < \infty$

B Let $f(n) = \ln\sqrt{n^3+2n}$ and $g(n) = \ln n$.

C I want to show that $\lim\limits_{n\to\infty} \frac{\ln\sqrt{n^3+2n}}{\ln n} = c,\ 0 < c < \infty$

D. $\lim\limits_{n\to\infty} \frac{\ln\sqrt{n^3+2n}}{\ln n} = \lim\limits_{n\to\infty} \frac{\frac{1}{2}\ln(n^3+2n)}{\ln n} = \lim\limits_{n\to\infty} \frac{\frac{1}{2}(\ln(n^3+2n))'}{(\ln n)'}$

$= \lim\limits_{n\to\infty} \frac{\frac{1}{2}\left(\frac{1}{n^3+2n}\right)\cdot(3n^2+2)}{\frac{1}{n}} = \lim\limits_{n\to\infty} \frac{1}{2}\cdot\frac{3n^3+2n}{n^3+2n} = \lim\limits_{n\to\infty} \frac{1}{2}\cdot\frac{(3n^3+2n)'}{(n^3+2n)'}$

$= \lim\limits_{n\to\infty} \frac{1}{2}\cdot\frac{9n^2+2}{3n^2+2} = \lim\limits_{n\to\infty} \frac{1}{2}\cdot\frac{(9n^2+2)'}{(3n^2+2)'} = \lim\limits_{n\to\infty} \frac{1}{2}\cdot\frac{(18n)}{(6n)}$

$= \lim\limits_{n\to\infty} \frac{1}{2}\cdot 3 = 3/2$

For $c = \frac{3}{2}$, $\lim\limits_{n\to\infty} \frac{f(n)}{g(n)} = c,\ 0 < c < \infty$.

Therefore, $\ln\sqrt{n^3+2n} \in \Theta(\ln n)$

A(b)ii. This claim is false

Nice!!

A. Let f and g be functions from $\mathbb{Z}^+ \to \mathbb{R}^+$ - that is, positive real-valued functions on the domain of positive integers.

$f(n) \in O(g(n)) \Leftrightarrow \lim_{n\to\infty} \frac{f(n)}{g(n)} = c,\ 0 \le c < \infty$

B. Let $f(n) = \sqrt{9^{n+2}}$ and $g(n) = 2^n$.

C. I want to show that $\lim_{n\to\infty} \frac{\sqrt{9^{n+2}}}{2^n} = c,\ 0 \le c < \infty$ is impossib

D. $\lim_{n\to\infty} \frac{\sqrt{9^{n+2}}}{2^n} = \lim_{n\to\infty} \frac{\sqrt{9^n \cdot 9^2}}{2^n} = \lim_{n\to\infty} 9\frac{\sqrt{9^n}}{2^n} = \lim_{n\to\infty} 9 \cdot \frac{(9^n)^{1/2}}{2^n}$

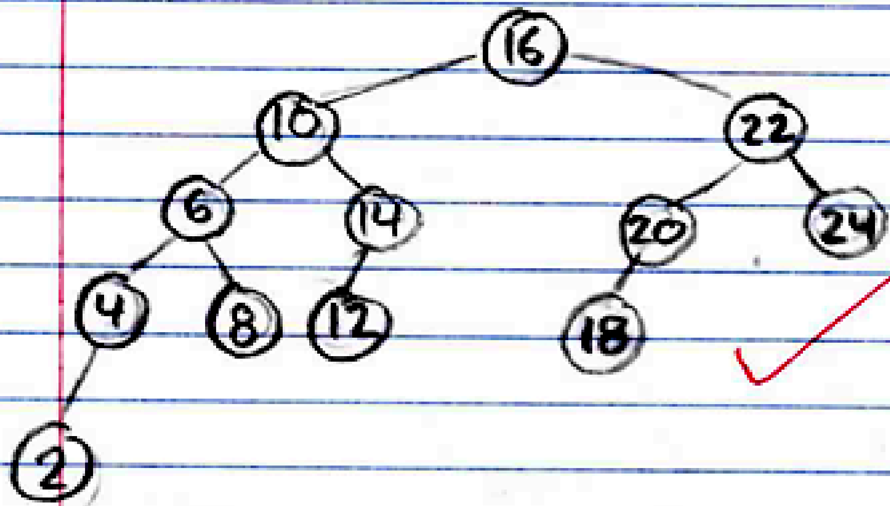
$= \lim_{n\to\infty} 9 \cdot \frac{(3^{2n})^{1/2}}{2^n} = \lim_{n\to\infty} 9 \cdot \frac{3^n}{2^n} = \lim_{n\to\infty} 9 \cdot \left(\frac{3}{2}\right)^n$

$= 9 \cdot \left(\frac{3}{2}\right)^\infty = \infty$

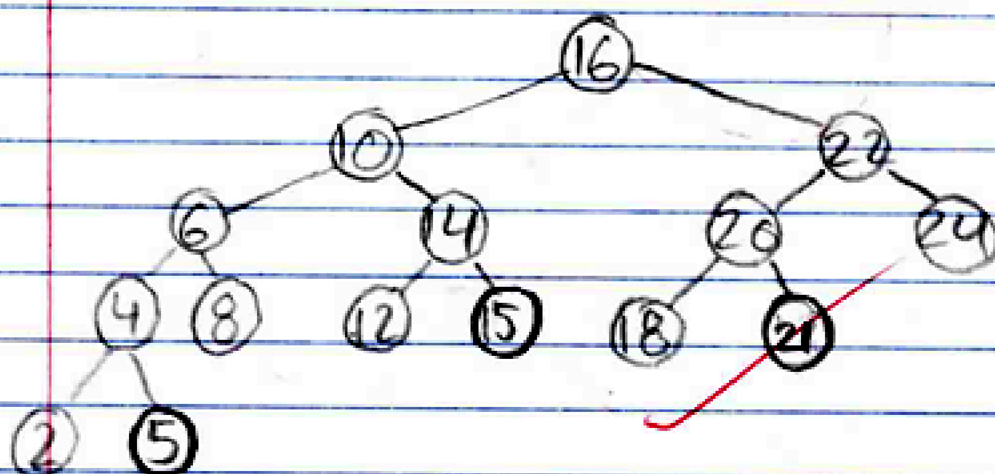
For $c = \infty$, $0 \le c < \infty$ is false.

Therefore, $\sqrt{9^{n+2}} \notin O(2^n)$.

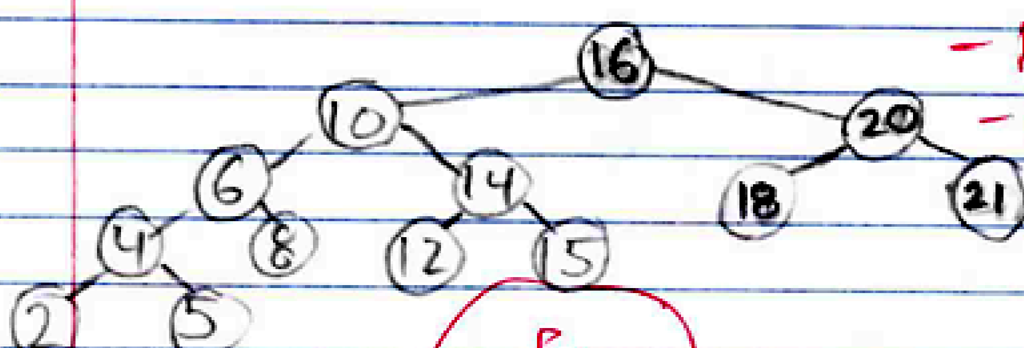
B(a)



B(b)



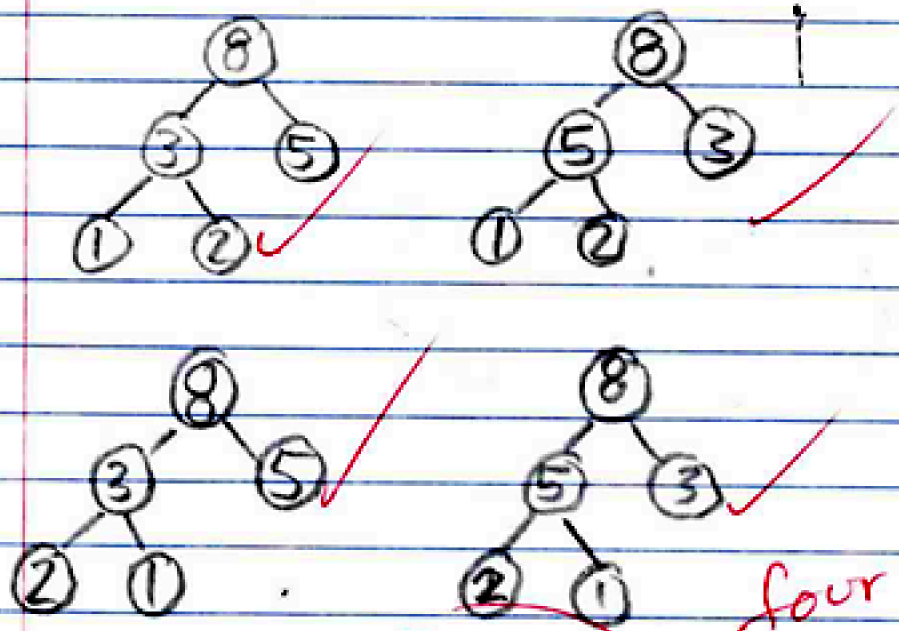
B(c)



- Not balanced
- Needs a left rotation.

-5

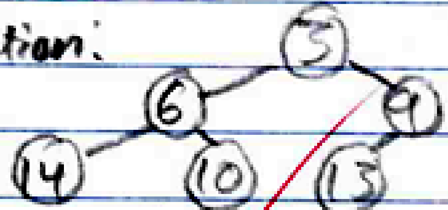
C.(a)



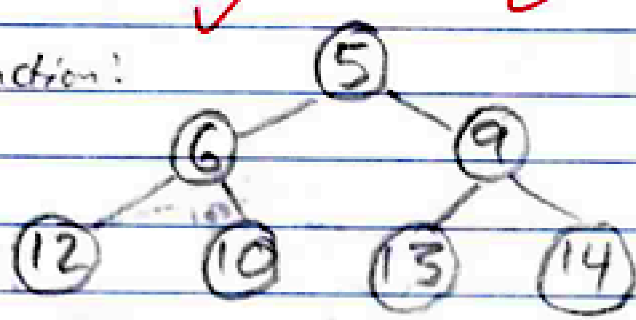
four more

-7

C.(b) after 6th instruction:



after 9th instruction:



D.(a)

fruit	quant.	profit	profit/quant.	
apple	2	3	$\frac{3}{2} = 1.5$	best
avocado	5	6	$\frac{6}{5} = 1.2$	
cherry	4	5	$\frac{5}{4} = 1.25$	3rd best
straw.	3	4	$\frac{4}{3} = 1.33...$	2nd best

The farmer should take 2 tons of apples, 3 tons of strawberries, and 3 tons of cherries to maximize profit.

max total profit: $2(\frac{3}{2}) + 3(\frac{4}{3}) + 3(\frac{5}{4})$
$= 3 + 4 + \frac{15}{4}$
$= 7 + 3.75$
$= \boxed{\$10.75}$

D(b) $10

D.(c) He must select the avocados and strawberries in order to maximize profit.
We filled in Table 3 left to right, top to bottom. For any given V[i,j] if there was not enough weight capacity to add the fruit of the row, V[i,j] would just equal the cell above, or V[i-1,j]. If there is enough weight capacity, you take the maximum of the upper cell, V[i-1,j], and the sum of adding the new fruit to the max of leftover capacity or V[i-1, j-w_i] + V...

-3

fuzzy