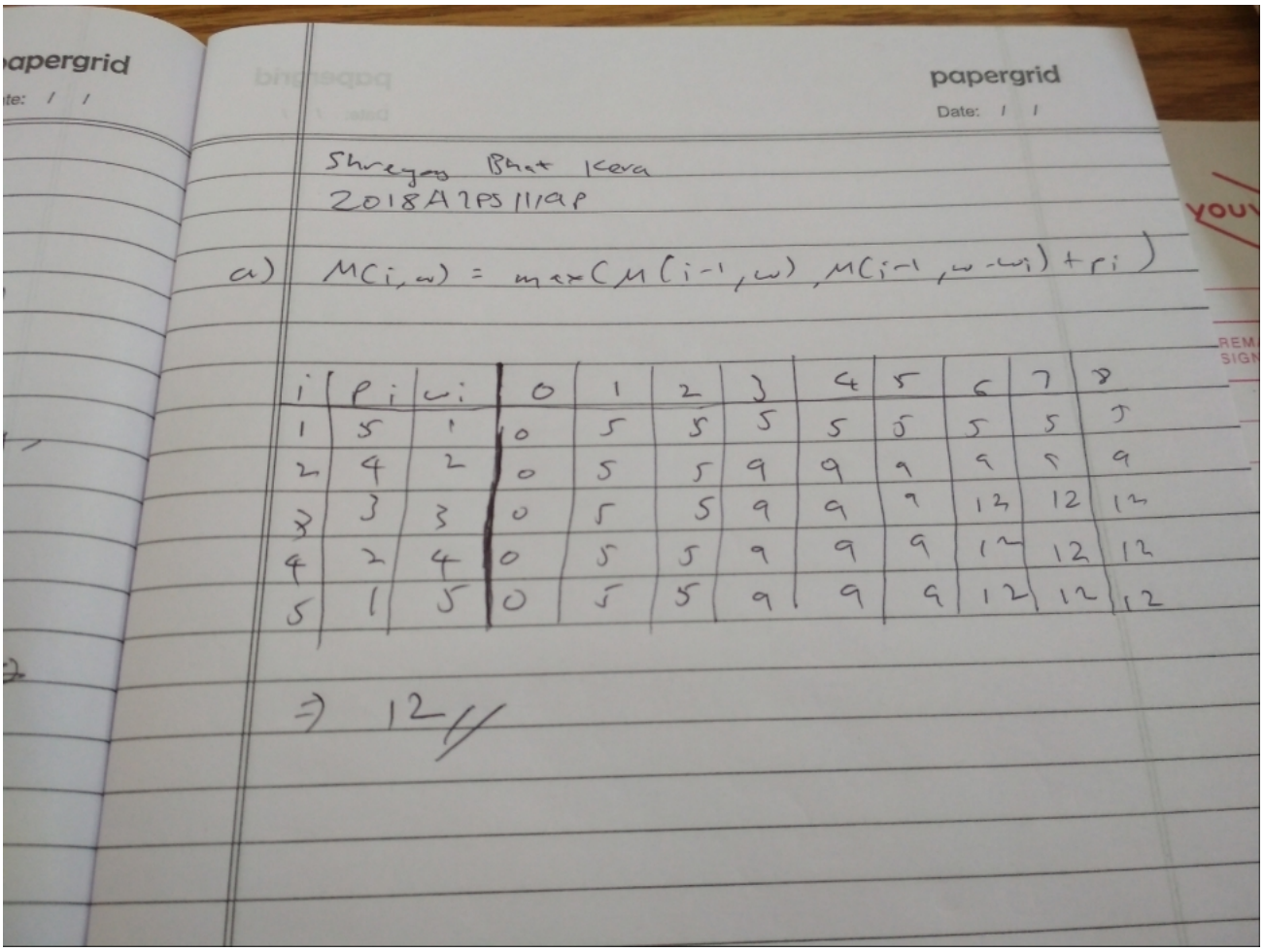

papergrid
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a) $M(i,w) = \max(M(i-1,w), M(i-1,w-w_i)+p_i)$

| i | $p_i$ | $w_i$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 1 | 0 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 2 | 4 | 2 | 0 | 5 | 5 | 9 | 9 | 9 | 9 | 9 | 9 |
| 3 | 3 | 3 | 0 | 5 | 5 | 9 | 9 | 9 | 12 | 12 | 12 |
| 4 | 2 | 4 | 0 | 5 | 5 | 9 | 9 | 9 | 12 | 12 | 12 |
| 5 | 1 | 5 | 0 | 5 | 5 | 9 | 9 | 9 | 12 | 12 | 12 |

⇒ 12 //

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b) The item with the greatest value should always be picked
If there did exist an item x with more value than some other item y, y could simply replace it with x and it would fit and increase the value.

~~We can choose the items~~ ~~complexity is~~

1) Sort the weights in ascending order
time complexity $O(n \log n)$

2) Set $x, i, p$ to 0
while $(x \leq w \; \& \; i \leq n)$
if $(w_i < w - x)$
$p = p + p_i$, $x = x + w_i$
else
exit
solution is p

∴ Algorithm take $O(n \log n)$ time to sort + $O(n)$ to find solution
⇒ complexity is $O(n \log n)$