1. $\boxed{x - \$30,000}$

2. $\boxed{\$47.20}$

3. $\boxed{31}$

4. Michelle Lee orders twice as many burgers and twice as many sodas as Michelle Choi so we would expect her to pay a total of \$8.26. However, she adds cheese to each of her burgers for 15 cents more each, which is $4 \cdot \$0.15 = \$0.60$ more. Thus she pays a total of $\$8.26 + \$0.60 = \boxed{\$8.86}$.

5. $\boxed{10\text{ s}}$

6. Let w be the number of weeks they work total. We want their total earnings plus their savings to equal \$316. Emily makes a total of $\$4(4+3) = \$28$ per week while Ranjana makes a total of $\$3(6) = \$18$ per week. This gives us the following equation:

$$\begin{aligned} 18 + 28w + 22 + 18w &= 316 \\ 40 + 46w &= 316 \\ 46w &= 276 \\ w &= \boxed{6} \end{aligned}$$

7. $\boxed{9}$

8. $\boxed{42\text{ mph}}$

9. If we let the squares have sides $a < b < c < d$, then since we know the total of the areas is 23 in^2, this tells us that $a^2 + b^2 + c^2 + d^2 = 23$. This means we need to find four integers such that when we total their squares we get 23. Since $5^2 = 25 > 23$, we know that $a, b, c, d \leq 4$. If one of the integers is 4, for example $d = 4$, then $a^2 + b^2 + c^2 = 7$ which is impossible. If all of the integers are 2, then $a^2 + b^2 + c^2 + d^2 = 16 < 23$ so we know that at least one of the integers is 3. Let $d = 3$. Now $a^2 + b^2 + c^2 = 14$. If $a, b, c, = 2$, then $a^2 + b^2 + c^2 = 12 < 16$ so we know at least another of the integers is 3. Let $c, d = 3$. Now $a^2 + b^2 = 5$. Clearly $a = 1, b = 2$ so our four squares have sides 1, 2, 3, 3. The perimeters of the largest and smallest square are $4(3) = 12$ and $4(1) = 4$ respectively, so their difference is $12 - 4 = \boxed{8}$.

10. Since the final exam is worth 20% of his total grade, the rest of his scores are worth 80% of his grade. Letting x be the minimum percent he needs to achieve on his final, we get the following:

$$\begin{aligned} 0.8(0.86) + 0.2x &\geq 0.88 \\ 0.688 + 0.2x &\geq 0.88 \\ 0.2x &\geq 0.192 \\ x &\geq 0.96 \end{aligned}$$

This shows that Jack needs to achieve at least a 96% on his final exam in order to get 88% in the class. 96% of 55 points possible is $0.96 \cdot 55 = 52.8$ so Jack needs at least $\boxed{53}$ points.