$$\text{units} = \frac{\text{more} + \text{less}}{\text{distribution difference}}.$$

1. $\boxed{10}$
2. $\boxed{138}$
3. $\boxed{5}$
4. $\boxed{30}$
5. In order to better understand the problem, we will rewrite the information given in the problem like this:

   If 28 students are assigned to each bus, there will be 13 students left out. $28 \cdot bus + 13$

   If 32 students are assigned to each bus, there will be three more seats available. $32 \cdot bus - 3$.

   In other words, we take how many students assigned per bus, plus or minus the remainder. Now we apply the formula. The "more" is 13, the "less" is 3, and the "distribution difference is $32 - 28 = 4$.

   $bus = \frac{\text{more+less}}{\text{distribution difference}} = \frac{13+3}{4} = \frac{16}{4} = 4$

   So the equation tells us there are 4 buses. We need to find how many students will be on the trip. So we take our first equation, and replace "bus" with 4: $28 \times bus + 13 = 28 \times 4 + 13 =$ $\boxed{125 \text{ students}}$.
6. To do this problem, write the information given in the problem as $7 \times rooms$ with no remainder, and $8 \times two\ less\ rooms$ with no remainder. Let's replace "rooms" with r for short, and since there is the same number of students, we can set the two quantities equal to each other: $7 \times r = 8 \times (r - 2)$. Now we just need to guess and check an r that will work for this equation. Guessing and checking, we find $r = 16$, because $7 \times 16 = 112 = 8 \times 14$. Now we need to know how many students are on the trip, so we take our first equation $7 \times r$ and plug in 16 for r: $7 \times 16 =$ $\boxed{112}$
7. This problem is kind of confusing, because there is not one row, there are multiple rows. So write the information in the problem in equation form:

   $14 \cdot row + 5$, $17 \cdot row - 4$.

   So now we have more is 5, less is 4, and distribution difference is $17 - 14 = 3$. Apply the formula: $row = \frac{5+4}{3} = \frac{9}{3} = 3$. So there are $\boxed{3}$ rows.
8. Let's take each pear and replace it with 2 apples. Then the information in the problem becomes: "If SIX apples (instead of 3 pears) are distributed to each student, there will be FOUR apples (instead of 2 pears) left over." Now we can use the standard formula.

   Rewrite the information in the problem in equation form:

   $6 \cdot student + 4$, $7 \cdot student - 6$.

   So more is 4, less is 6, and distribution difference is $7 - 6 = 1$. Apply the formula: $students = \frac{4+6}{1} = 10$. So there are 10 students. Now we need to find the number of apples and pears. For

apples, apply the first equation but replace "student" with 10: $6 \times 10 + 4 = 64$ apples. Since there are twice the number of apples as pears, then there are 32 pears. $\boxed{\text{32 pears, 64 apples}}$

9. Rewrite the information in the problem in equation form:

   $10 \cdot class + 6$, $12 \cdot class - 4$.

   So more is 6, less is 4, and distribution difference is 2. Apply the formula: $class = \frac{6+4}{2} = \frac{10}{2} = 5$. So there are 5 classes. To find how many trees are planted, replace "class" in the first equation with 5: $10 \times 5 + 6 = 50 + 6 = \boxed{56}$

10. Rewrite the information in the problem in equation form:

    $8 \cdot row + 50$, $12 \cdot row - 10$.

    So more is 50, less is 10, and distribution difference is $12 - 8 = 4$. Apply the formula: $row = \frac{50+10}{4} = \frac{60}{4} = 15$. So there are 15 rows. Now we can find the number of students by replacing "rows" in the first equation with 15: $8 \times 15 + 50 = 170$. If there are 15 rows, with 7 chairs, then there are $15 \times 7 = 105$ available seats. But there are 170 students. So there will be $170 - 105 = \boxed{65}$ students with no chair.