1. Solve the system of equations for x and y.

$$3x - y = 13$$

$$x + y = 7$$

Solution:

$$x + y = 7 \Rightarrow y = 7 - x$$
$$3x - y = 3x - (7 - x) = 4x - 7 = 13 \Rightarrow 4x = 20 \Rightarrow x = 5$$
$$y = 7 - x = 7 - 5 = 2$$

So the solution is $x = 5, y = 2$ (check that it works!)

2. (a) Line A goes through the points $(3, 1)$ and $(4, 3)$. What is the equation of line A?
Solution: Slope $= m = \frac{3-1}{4-3} = 2$. Using point-slope form (with either point is fine), $y - 1 = 2(x - 3) \Rightarrow y = 2x - 5$. Or plug either point into $y = mx + b$ and solve for b.

(b) If line B is $y = 3 + x$, where do lines A and B intersect?
Solution: $2x - 5 = 3 + x \Rightarrow x = 8 \Rightarrow y = 3 + x = 3 + 8 = 11$. The lines intersect at the point $(8, 11)$.

3. If $f(x) = 4x + 6$, find $f^{-1}(x)$.
Solution:

1. Rewrite as $y = 4x + 6$

2. Switch x and y: $x = 4y + 6$

3. Solve for y: $y = \frac{x-6}{4}$.

4. Rewrite as $f^{-1}(x) = \frac{x-6}{4}$.

5. You can check your work by checking that $f(f^{-1}(x)) = x$:
$$f(f^{-1}(x)) = f(\tfrac{x-6}{4}) = 4\left(\tfrac{x-6}{4}\right) + 6 = x - 6 + 6 = x.$$

4. Write $5 + 7 + 9 + 11 + 13 = 45$ using summation notation.
Solution: Some possibilities: $\sum_{k=2}^{6}(2k + 1) = 45$ or $\sum_{k=0}^{4}(2k + 5) = 45$