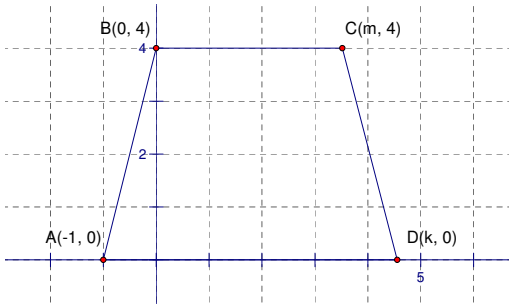
1. $\boxed{5}$

2. $\boxed{25}$

3. When we graph the points A, B, C, D we get the following graph. We don't know exactly where C, D are but we know their y-values and we know that they are to the right of A, B since $k, m > 0$.



We will solve for m, k by coming up with a system of two equations. The first from the information pertaining to the line containing side CD. The slope of this line must be 1 since it is perpendicular to $y = -x + 4$. This gives the following equation:

$$\begin{aligned} \frac{4-0}{m-k} &= 1 \\ m-k &= 4 \end{aligned}$$

The second equation comes from the information that the area of the trapezoid is 34 square units. This gives the following equation:

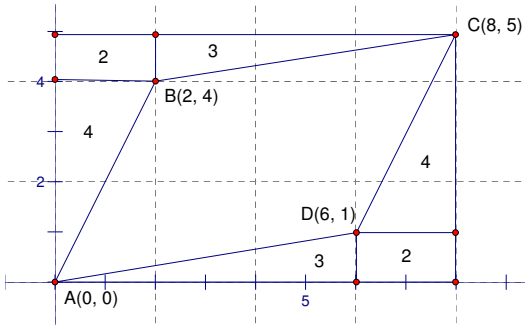
$$\begin{aligned} 4\left(\frac{m+(k+1)}{2}\right) &= 34 \\ m+k+1 &= 17 \\ m+k &= 16 \end{aligned}$$

We can find the difference of the two equations to solve for k:

$$\begin{aligned} 2k &= 12 \\ k &= \boxed{6} \end{aligned}$$

4. $\boxed{20}$

5. The picture of the quadrilateral is shown below.



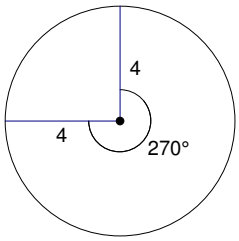
To find the area we will instead find the area of the rectangle that that $ABCD$ is bounded by and subtract the extra areas:

$40 - 2 - 3 - 4 - 2 - 3 - 4 = \boxed{22}$

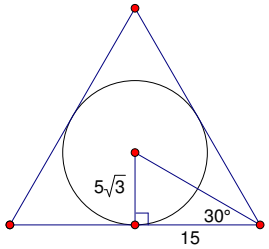
6. $\boxed{17}$

7. $\boxed{28}$

8. If the tip of the second hand travels all the way around the clock it draws a complete circle with radius 4 in as shown. This circle has a circumference of 8π in. The second hand travels $270°$ in 45 seconds, which is $\frac{270}{360} = \frac{3}{4}$ of the circumference. This means the tip of the second hand travels $\frac{3}{4} \cdot 8\pi = 6\pi \approx 18.84$ in. To the nearest inch this is $\boxed{19 \text{ in}}$.



9. The picture is shown below. The radius of the circle is $5\sqrt{3}$. Notice if we connect the center of the circle to the bottom right vertex of the triangle, we get a 30-60-90 triangle. This is because the center of the circle is the intersection of the altitudes of the equilateral triangle (which also happen to be the medians and the angle bisectors). Using this information, the length of one side of the triangle is clearly $\boxed{30}$.



10. $\boxed{75}$