1) False

True
True
False
True
True
2) a) angle $b=125^{\circ}$
angle $c=55^{\circ}$
b) angle $d=142^{\circ}$
angle $e=38^{\circ}$
c) angle $f=158^{\circ}$
d) angle $g=40^{\circ}$
angle $h=40^{\circ}$
angle $\boldsymbol{j}=37^{\circ}$
angle $k=103^{\circ}$

1) $p=42^{\circ}$
$x=48^{\circ}$
$z=138^{\circ}$
2) Mia's strategy would not work. Angles $a$ and $d$ are equal as they are opposite angles. She could work out angle $e$ as $e+a=180^{\circ}$, however her method would still leave angles $b$ and $c$ unknown.

Surinder's strategy would work. By revealing angle $d$, he would be able to calculate the value of angle $e$ as angles $d+e=180^{\circ}$. By revealing angle $d$, he would also know the value of the equal, opposite angle a. If he then knows angle $c$, he would be able to calculate the value of the only remaining angle, angle $b$.
3) Dara is incorrect. Angle $z$ is not actually vertically opposite the $84^{\circ}$ angle so this strategy will not work.

Conor is correct. By adding the $90^{\circ}$ angle and the $42^{\circ}$ together and then subtracting the result from $180^{\circ}$, we find that angle $z$ measures $48^{\circ}$.

1) angle $x=51^{\circ}$
angle $y=39^{\circ}$
angle $z=95^{\circ}$
2) $a=77^{\circ}$
$b=77^{\circ}$
$c=96^{\circ}$
$d=96^{\circ}$
$e=55^{\circ}$
$f=46^{\circ}$
$g=93^{\circ}$
3) a) The fewest number of angles that would need to be measured with a protractor would be two angles (either the angle between red and yellow or purple and yellow and the angle between black and purple or black and red). The others could then be calculated.
b) As there are four angles that make up a straight line, you would need to measure three angles. Once you know the three angles on a straight line, you could use the fact that opposite angles are the same to work out the rest of the angles around the point.
