

## USING ANGLE RELATIONSHIPS TO SOLVE PROBLEMS WORKSHEET

**Directions:** Solve for all the variables in the diagrams below. Do your work on a separate sheet of paper. Make sure you include your equations, your work, the answer and the reasoning behind the setup of your equation. Reasons may include:

1. When the lines are parallel, alternate interior angles are equal. ( $// \rightarrow AIA =$ )
2. When the lines are parallel, alternate exterior angles are equal. ( $// \rightarrow AEA =$ )
3. When the lines are parallel, corresponding angles are equal. ( $// \rightarrow CA =$ )
4. When the lines are parallel, same side interior angles add up to  $180^\circ$ . ( $// \rightarrow SSI = 180^\circ$ )
5. Vertical angles are equal. ( $VA \rightarrow =$ )
6. Supplementary angles add up to  $180^\circ$ . ( $SA = 180^\circ$ )

Line $l$ is parallel to line $m$ .	
<p>1. <math>// \rightarrow SSI = 180^\circ</math>      <math>VA \rightarrow =</math></p> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> <math display="block">(3x+8) + 112 = 180^\circ</math> <math display="block">\underline{-112 \quad -112}</math> <math display="block">3x+8 = 68</math> <math display="block">\underline{-8 \quad -8}</math> <math display="block">3x = 60</math> <math display="block">\underline{\quad \quad \quad 3}</math> <math display="block">x = 20</math> </div> <div style="flex: 1; text-align: center;"> </div> </div>	<p>2. <math>// \rightarrow SSI = 180^\circ</math></p> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> <math display="block">(2x+4) + (-x+45) = 180</math> <math display="block">x + 49 = 180</math> <math display="block">\underline{-49 \quad -49}</math> <math display="block">x = 131</math> </div> <div style="flex: 1; text-align: center;"> </div> <div style="flex: 1;"> <p><math>VA \rightarrow =</math></p> <math display="block">-x + 45 = y</math> <math display="block">-(131) + 45 = y</math> <math display="block">y = -86</math> </div> </div>
<p>3. <math>SA = 180^\circ</math>      <math>// \rightarrow AEA =</math></p> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> <math display="block">65 + (z + 45) = 180</math> <math display="block">z + 110 = 180</math> <math display="block">\underline{-110 \quad -110}</math> <math display="block">z = 70</math> </div> <div style="flex: 1; text-align: center;"> </div> <div style="flex: 1;"> <math display="block">z + 45 = x</math> <math display="block">70 + 45 = x</math> <math display="block">x = 115</math> </div> </div>	<p>4. <math>// \rightarrow AIA =</math>      <math>VA \rightarrow =</math></p> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> <math display="block">5x + 7 = x + 47</math> <math display="block">\underline{-x \quad -x}</math> <math display="block">4x + 7 = 47</math> <math display="block">\underline{-7 \quad -7}</math> <math display="block">4x = 40</math> <math display="block">\underline{\quad \quad \quad 4}</math> <math display="block">x = 10</math> </div> <div style="flex: 1; text-align: center;"> </div> <div style="flex: 1;"> <p><math>VA \rightarrow =</math></p> <math display="block">y = x + 47</math> <math display="block">y = 10 + 47</math> <math display="block">y = 57</math> </div> </div>
<p>5. <math>SA = 180^\circ</math>      <math>// \rightarrow SSI = 180^\circ</math></p> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> <math display="block">-x + 12 = y</math> <math display="block">-117 + 12 = y</math> <math display="block">y = -105</math> </div> <div style="flex: 1; text-align: center;"> </div> <div style="flex: 1;"> <p><math>\Delta \rightarrow 180^\circ</math></p> <math display="block">(2x+1) + (-x+12) + 50 = 180</math> <math display="block">x + 13 + 50 = 180</math> <math display="block">x + 63 = 180</math> <math display="block">\underline{-63 \quad -63}</math> <math display="block">x = 117</math> </div> </div>	