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| **Type POS Math descriptor here** | **=** | | **Apply geometric concepts to model and solve real world problems** |
| **Program Task:** Enter POS task here. | | **PA Core Standard:** CC.2.3.HS.A.14  **Description**: Apply geometric concepts to model and solve real world problems. | |
| **Program Associated Vocabulary:**  ENTER PROGRAM VOCABULARY HERE | | **Math Associated Vocabulary:**  angle, degrees, interior angles, exterior angles, vertical angles, CORRESPONDING ANGLES, PARALLEL, TRANSVERSAL | |
| **Program Formulas and Procedures:**  Display program example of math concept by entering text, graphic, and formulas in this column. | | **Formulas and Procedures:**  Read angle measurement here. Make sure you read the number that started from zero where the angle begins.  **Reading a protractor:**    Start here, where the angle begins.  Line up angle vertex here  **Two parallel lines cut by a transversal:**  Angles **1&4, 2&3, 5&8, 6&7** are **vertical angles**.  Angles **1&5, 2&6, 3&7, 4&8** are **corresponding angles**.  If lines m and n are parallel then **corresponding angles** are congruent, **Alternate Interior** angles are congruent, and **Alternate Exterior** angles are congruent.  **Vertical angles** are always congruent.  1  2  3  4  5  7  8  6  m  n  **Example 1:** If angle 1 = 40°, what is the measure of angle 8?  Angle 8 must measure 40°, since 1 and 8 are alternate exterior angles.  **Example 2:** If m2 = 3x + 4, and m3 = x + 8, solve for x.  (Vertical angles are equal.)  3x + 4 = x + 8 (subtract x from both sides)  2x + 4 = 8 (subtract 4 from both sides)  2x = 4 (divide both sides by 2)  x = 2 | |

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| **Instructor's Script – Comparing and Contrasting**  The Math or program area instructor should fill in this area by comparing academic math problems to lab area problems. The teacher should describe ways that trade math is similar to or different from the academic math that occurs in the PA Core Math standard or on Keystone related exams. |

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| **Common Mistakes Made By Students**   * Not aligning the index line (line along the bottom of the protractor) with one side of the angle in question * Not placing the vertex of the angle at the hole or point at the bottom-center of the protractor * Not clearly specifying a reference or starting point for an angle * Reading the wrong indicator on the protractor (bottom number versus top number, or vice-versa).   Example of how to read correctly:  Read the upper set of numbers from this direction. (60⁰)    Read the lower set of numbers from this direction. (120⁰) |

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| **CTE Instructor's Extended Discussion**  The CTE instructor may add comments here describing the importance of this math skill in relationship to the program task, or note common problems which students have when making the computations. |

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| **Problems Career and Technical Math Concepts Solutions** | |
| 1. Program relevant problem | Allow work space here |
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| **Problems Related, Generic Math Concepts Solutions** | |
| 1. [Image:Bobby pin.jpg](http://upload.wikimedia.org/wikipedia/commons/f/f2/Bobby_pin.jpg)Which angle would you estimate to be the interior angle of the hairpin shown here? How would you describe a “hairpin turn” in the road?   a) 10o b) 30o c) 45o d) 90 o |  |
| 1. Your GPS indicates that you are traveling in a direction (bearing) that is determined to be 270o. If 90o is east, in which direction are you traveling? |  |
| 1. To be wheelchair accessible, the grade of a ramp must not exceed 1 foot of rise per 12 feet of run. This equates approximately to a 5° angle. Use the protractor provided to draw this angle measure. |  |
| **Problems PA Core Math Look Solutions** | |
| 1. What is the angle measure of ∠XYZ?   a) 57°  b) 63°  c) 123°  d) 137° |  |
| 1. Which of the angles on the right is closest to 76°? | A  B  C  D |
| 1. Given: a║b, c║d   If m1 = 2x + 16 and m2 = x + 18, then what is the value of x? | *c*  *d*  *a*  *b*  1  2 |

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| **Problems Career and Technical Math Concepts Solutions** | |
| 1. Program relevant problem | Provide answer here |
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| **Problems Related, Generic Math Concepts Solutions** | |
| 1. [Image:Bobby pin.jpg](http://upload.wikimedia.org/wikipedia/commons/f/f2/Bobby_pin.jpg)Which angle would you estimate to be the interior angle of the hairpin shown here? How would you describe a “hairpin turn” in the road?   a) 10o b) 30o c) 45o d) 90 o | The correct answer is “a” because a 10o interior angle turn would very nearly turn a driver back in the direction from which s/he came. Hairpin turns get their name because they have interior angles similar to a real hairpin. |
| 1. Your GPS indicates that you are traveling in a direction (bearing) that is determined to be 270o. If 90o is east, in which direction are you traveling? | You are traveling west when your bearing is 270o. 90o is east, 180o is south, and 360o is north. |
| 1. To be wheelchair accessible, the grade of a ramp must not exceed 1 foot of rise per 12 feet of run. This equates approximately to a 5° angle. Use the protractor provided to draw this angle measure. | This is what the angle should resemble if drawn by a protractor. |
| **Problems PA Core Math Look Solutions** | |
| 1. What is the angle measure of ∠ XYZ?   a) 57°  b) 63°  c) 123°  d) 137° | c) 123° |
| 1. Which of the angles on the right is closest to 76°? | A  B  C  D |
| 1. Given: a║b, c║d   If m1 = 2x + 16 and m2 = x + 18, then what is the value of x? | Angles 1 and 2 are congruent angles so,    (Subtract x from each side, then subtract 16 from each side.) |