**Checkpoint 6 solutions**

**Learning Target 2**: This one can be checked using an online binary calculator.

* **NOTE**: The subtraction problem was flawed because the second number 10100101 is larger than the first one 10010111. I read with whatever work was presented to see if correct subtraction concepts were being used.

**Learning Target 3**

1. It’s Tuesday
2. It’s taco night
3. If it’s taco night, then it’s Tuesday
4. If it’s not taco night, then it’s not Tuesday
5. If it’s not Tuesday, it’s not taco night
6. It’s Tuesday, and (or “but”) it’s not taco night. (🡨 *Please note: There is no “if” in this statement. The sentence “If it’s Tuesday and it’s not taco night” is not a complete statement and therefore isn’t correct*.)

**Learning Target 6**

1. -5, -16, -17, 14.
2. *This part had a typographical error*: The sequence was supposed to be 3, 7, 11, **15, 19, …** Because of the error, no pattern could be clearly established to use in building a recursive definition. Therefore only part 1 was used for determining success.

**Learning Target 7**

1. The predicate is “The number is divisible by 5”. (NOTE: There is no quantifier on this, because if a quantifier is included then it’s no longer a predicate.)
2. The base case is n = 1
3. With n = 1, the predicate is the statement is divisible by 5. But this is just 8 – 3, which equals 5, and that’s certainly divisible by 5. Therefore the base case holds.
4. Assume that the number is divisible by 5 for some value of *k*.
5. Prove that the number is divisible by 5.

**Learning Target 8**

* 1. Incorrect syntax (x % 5 is a formula not a predicate)
  2. {3, 4, 5, 6, …, 20}
  3. {-2, -1, 0, 1, 2, …, 17}

1. More than one possible right answer, here is one:

**Learning Target 9**

1. {1,2,3,5,7,8,9}
2. {2,3,5}
3. {1,8}
4. {0,2,4,6,8,10}
6. {0,1,2,…,10}
7. {, {3}, {8}, {3,8}}
8. {(1,3), (1,8), (3,3), (3,8)}

**Learning Target 10**

1. Is a function. Domain = {k,t,n,y,q}, Codomain = {u,k,o,v,x}, Range = {u,k,v,x}
2. Is a function. Domain = {5,4,7,2,1}, Codomain = {x,w,p,q,s}, Range = {x,w,p,q,s}
3. Is not a function
4. Is a function. Domain = {7,0,6,1,9}, Codomain = {7,0,2,6}, Range = {7,0,2,6}
5. Is not a function
6. Is not a function
7. Is a function. Domain = {p,x,v,o}, Codomain = {8,1,7}, Range = {8,1,7}
8. Is a function. Domain = {p,l,d}, Codomain = {v,g,I,b,j}, Range = {v,b,j}

**Learning Target 11**

(Note: The instructions and success criteria for this item are changing for Checkpoint 7; the responses below are given using the new instructions and success criteria to give you an example of what’s expected.)

1. Injective but not surjective. It is not surjective because nothing maps to “y”.
2. Neither injective nor surjective. It is not injective because, for example, f(0) and f(5) both equal 0. It is not surjective because nothing maps to 6. (The only outputs possible are 0, 1, 2, 3, or 4.)
3. Surjective but not injective. It is not injective because for example, “Philomena Mantella” and “Paul Plotkowski” (who are both real people and US citizens) both map to P.