NAME_____

MILLER INDICES AND ZONE AXES KEY

SHOW ALL WORK. Calculate Miller Indices, given the following intercepts:

1. $a' = 2$ $b' = 3$ $c' = 1$

Answer ____(326)_____

2. $a' = \infty$ $b' = 0.5$ $c' = -2$

Answer _____$(04\overline{1})$_____

3. $a' = 2$ $b' = 3$ $c' = 4$

Answer _____(643)_____

1

4.   a' = 0.5   b' = 0.3$\overline{3}$ c' = 1

Answer ____(231)_____

5. a' = 0.5   b' = - 0.25   c' = 0.3$\overline{3}$

Answer ____(2$\overline{4}$3)_____

6. a' = ∞   b' = 3   c' = ∞

Answer ____(010)_____

7. a' = 1   b' = 5   c' = 2

Answer __(10,2,5)__

8. a' = 6   b' = 4   c' = 2

Answer __(236)__

9. a' = -2   b' = 1   c' = 3

Answer __($\bar{3}$62)__

Calculate Miller Indices from the following X-ray data:

Maladonite **a** = 0.797 nm, Au_2Bi, isometric

10.   x' = 0.397 nm
        y' = 1.198 nm
        z' = ∞

Answer __(3 1 0)__

Polarite **a** = 0.719 nm **b** = 0.869 nm **c** = 1.068 nm, Pd(Bi,Pb), orthorhombic

11. x' = -0.715 nm
    y' = 1.739 nm
    z' = 0.358 nm

Answer ___($\bar{2}$ 1 6)___

12. x' = 1.434 nm
    y' = 0.289 nm
    z' = 1.072 nm

Answer ___(1 6 2)___

13. x' = 4.295 nm
    y' = ∞
    z' = 1.603 nm

Answer ___(1 0 4)___

Chalcopyrite **a** = 0.525 nm **c** = 1.032 nm, $CuFeS_2$, tetragonal

14. x' = 1.049 nm
    y' = 0.524 nm
    z' = -2.062 nm

Answer ___(1 2 $\bar{1}$)___

15. x' = 0.525 nm
     y' = -1.312 nm
     z' = 1.032 nm

Answer ___(5 $\overline{2}$ 5)___

Calculate the zone axis of each of the following pairs of planes. Reduce the axis if a common denominator for the three numbers exists:

16. (321), (13$\overline{2}$)

Answer ___[$\overline{7}$77] = [$\overline{1}$11]___

17. (210), (02$\overline{1}$)

Answer ___[$\overline{1}$24]___

18. ($\overline{4}$2 $\overline{4}$), (4$\overline{2}$4)

Answer ___[0 0 0]___

Note: These planes are parallel, and the [000] result indicates they do not intersect.

19. (201), (012)

Answer ___[$\overline{1}42$]_____

20. (002), (010)

Answer ___[$\overline{2}00$] = [$\overline{1}00$]_____