Part I

Answer Key

1. A
2. D
3. D
4. D
5. D
6. D
7. C
8. D
9. E
10. B
11. B
12. D
13. C
14. D
15. C
16. C
17. E
18. A
19. B
Part II: Show your work problem.
You should show all your work in neat, clean and organize manner to get full credit. Scribles here and there and cross-out could result in penalty. Use scrap paper to solve the problem and work out the steps. Then copy the relevant material that you want me to grade for this problem. Things to consider are concepts, starting equations, units, final form of the equation and final numerical answer.

A home run is hit in such a way that the baseball just clears a wall 21 m high, located 130m from home plate. The ball is hit at an angle of 35 degrees to the horizontal, and air resistance is negligible. Find
(a) the initial speed of the ball,
(b) the time it takes the ball to reach the wall, and
(c) the velocity components and the speed of the ball when it reaches the wall
(assume the ball is hit at a height of 1.0 m above the ground.)
Please provide the final version of your work for this problem on the other side.

(a) The time to reach the fence is
\[ t = \frac{\Delta x}{v_{ix}} = \frac{130 \text{ m}}{v_i \cos 35^\circ} = \frac{159 \text{ m}}{v_i}. \]

At this time, the ball must be 20 m above its launch position.

\[ \Delta y = v_{iy} t + \frac{1}{2} a_y t^2 \text{ gives} \]
\[ 20 \text{ m} = (v_i \sin 35^\circ) \left( \frac{159 \text{ m}}{v_i} \right) - (4.90 \text{ m/s}^2) \left( \frac{159 \text{ m}}{v_i} \right)^2. \]

From which, \( v_i = 42 \text{ m/s}. \)

(b) From above,
\[ t = \frac{159 \text{ m}}{v_i} = \frac{159 \text{ m}}{42 \text{ m/s}} = 3.8 \text{ s} \]

(c) \( v_x = v_{ix} = (42 \text{ m/s}) \cos 35^\circ = 34 \text{ m/s} \)
\[ v_y = v_{iy} + a_y t = (42 \text{ m/s}) \sin 35^\circ - (9.80 \text{ m/s}^2)(3.8 \text{ s}) = -13 \text{ m/s} \]
\[ v = \sqrt{v_x^2 + v_y^2} = \sqrt{(34.1 \text{ m/s})^2 + (-13.4 \text{ m/s})^2} = 37 \text{ m/s} \]