Form A: 2. C 3. C 4. A 5. A 6. D

Form B: 2. D 3. A 4. A 5. C 6. C

Form C: 2. A 3. D 4. C 5. A 6. C

Form D: 2. C 3. A 4. C 5. D 6. A

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7. Solve for x or y (5 pts.), substitute into other equation (5 pts.), do algebra (5 pts.), use quadratic formula, etc. to get the two answers for x or y (5 pts.), substitute back to get the other variable (5 pts.).

$x = y+1 \qquad (y+1)^2 + y^2 = 13 \qquad y^2+2y+1+y^2 = 13$

$2y^2+2y+1 = 13 \qquad 2y^2+2y-12 = 0 \qquad \frac{1}{2}y^2+\frac{1}{2}y-3 = 0$

$y = \frac{\pm(1/2) \pm \sqrt{(1/2)^2-(4)(1/2)(-3)}}{2(1/2)} = (-1/2) \pm \sqrt{25/4} = \underline{2, -3}$

$x = y+1 = \underline{3, -2}.$

8. Translate (8 pts.), Equate (8 pts.), Solve (8 pts.), Significant Digits (1 pt.)

$v_{0x} = 10\ m/s \qquad a_x = 0 \qquad t = 5s$

$v_{0y} = 0 \qquad a_y = -2\ m/s^2 \qquad t = 5s$

$v_x = v_{0x} + a_x t = 10 \qquad v_y = v_{0y} + a_y t = -10$

(A) $v = \sqrt{v_x^2+v_y^2} = 10\sqrt{2} = 14.1\ m/sec$

(B) $\theta = \tan^{-1}\left(\frac{v_y}{v_x}\right) = \tan^{-1}\left(\frac{-10}{10}\right) = \underline{315^\circ} = \underline{\text{Southeast}}.$

9. Same as 8.

$\tan\theta = \frac{opp}{adj} = \frac{h}{R} \qquad R = \frac{v_0^2 \sin 2\theta}{g}$

$h = R\tan\theta \qquad \theta = \frac{\left(\sin^{-1}\left(\frac{gR}{v_0^2}\right)\right)}{2}$

$h = R\tan\left[\frac{\left(\sin^{-1}\left(\frac{gR}{v_0^2}\right)\right)}{2}\right] = (25)\tan\left[\frac{\left(\sin^{-1}\left(\frac{(9.8)(25)}{(120)^2}\right)\right)}{2}\right]$

$h = 0.21\ \text{meters} = \underline{21\ cm}.$