

ANSWER KEY

1. (a) $8(((x+1)^2 + 2) + 3)((x+1)^2 + 2)(x+1)$
(b) $4t \sin(t^2) \cos(t^2)$
(c) $-6e^{2x} \sin(3e^{2x})$
2. (a) $\frac{dy}{dx} = \frac{3y^2 - 2x - 6y - 2xy}{6x + 9y + x^2 - 9xy^2}$
(b) $y = -\frac{7}{10}x + \frac{17}{10}$
3. $\frac{1}{2}$
4. (a) $\cos(\theta) = \frac{-2}{\sqrt{5}}$, not perpendicular.
(b) $\cos(\theta) = 0$, perpendicular.
(c) $\cos(\theta) = \frac{-1}{5\sqrt{2}}$, not perpendicular.
5. Average velocity = $\langle 1, 1 \rangle$ m/s. Average speed = $\sqrt{2}$ m/s.
6. $\mathbf{r}(t) = \langle 2\sqrt{3}t, -4.9t^2 + 2t + 1 \rangle$. Time of impact = $\frac{2 + 2\sqrt{5.9}}{9.8}$ seconds.
7. Position is $\langle \sqrt{2}, -\sqrt{2} \rangle$.