(c) $12.0 = 8.61x + 4.90x^2$

$0 = 4.90x^2 + 8.61x - 12.0$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-8.61 \pm \sqrt{(8.61)^2 - 4(4.90)(-12.0)}}{2(4.90)}$$

$$x = \frac{-8.61 \pm \sqrt{74.1 + 235.2}}{9.80} = \frac{-8.61 \pm \sqrt{309.3}}{9.80}$$

$$x = \frac{-8.61 \pm 17.59}{9.80} \quad : \quad \boxed{x = -2.67 \text{ or } 0.916}$$

9. Given $x = v_0 t + \frac{1}{2}at^2$; $v_0 = 20\ m/s$

$x = 15\ m$

$a = 9.8\ m/s^2$

Want t: (note eq'n is quadratic in t)

$$0 = \underbrace{\tfrac{1}{2}}_{a}at^2 + \underbrace{v_0}_{b}t - \underbrace{x}_{c}$$

so

$$t = \frac{-v_0 \pm \sqrt{v_0^2 - 4(\frac{1}{2}a)(-x)}}{2(\frac{1}{2}a)}$$

$$t = \frac{-v_0 \pm \sqrt{v_0^2 + 2ax}}{a} = \frac{-20\ m/s \pm \sqrt{(20\ m/s)^2 + 2(9.8\ m/s^2)(15\ m)}}{9.8\ m/s^2}$$

$$t = \frac{-20\ m/s \pm \sqrt{694\ m^2/s^2}}{9.8\ m/s^2} = \frac{-20\ m/s \pm 26.3\ m/s}{9.8\ m/s^2}$$

$\boxed{t = 0.65\ s}$ or $-4.7\ s$

↖ not physically meaningful to have -ve time.