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18. $v_i = 2.0 \text{ m/s}$ a) $v_f = v_i + a \Delta t$

$a = -0.50 \text{ m/s}^2$

$\Delta t = 2.0 \text{ s}$

$v_f = ?$

$= 2.0 + (-0.50)(2.0)$

$\boxed{= 1.0 \text{ m/s}}$

b) $v_f = v_i + a \Delta t$

$= 2.0 + (-0.50)(6)$

$\boxed{= -1.0 \text{ m/s}}$

c) on your own

19. $v_i = 30.0 \text{ km/h} = 8.33 \text{ m/s}$

$a = 3.5 \text{ m/s}^2$

$\Delta t = 6.8 \text{ s}$

$v_f = v_i + a \Delta t$

$= 8.33 + (3.5)(6.8)$

$\boxed{= 32 \text{ m/s} = 120 \text{ km/h}}$

21. $v_i = 22 \text{ m/s}$

$v_f = 3.0 \text{ m/s}$

$a = -2.1 \text{ m/s}^2$

$\Delta t = ?$

$\Delta t = \frac{v_f - v_i}{a}$

$= \frac{3.0 - 22}{-2.1}$

$\boxed{= 9.0 \text{ s}}$

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26. $v_i = 1.75 \text{ m/s}$

$a = -0.20 \text{ m/s}^2$

$v_f = 0$

$\Delta t = ?$

$\Delta t = \frac{v_f - v_i}{a}$

$= \frac{0 - 1.75}{-0.20}$

$\boxed{= 8.8 \text{ s}}$

27. $\Delta d = \bar{v} \Delta t$

$= \left(\frac{v_i + v_f}{2} \right) \Delta t$

$\boxed{= 360 \text{ m}}$

$v_i = 44 \text{ m/s}$

$v_f = 22 \text{ m/s}$

$\Delta t = 11 \text{ s}$

$\Delta d = ?$

29. $v_i = ?$

$v_f = 7.5 \text{ m/s}$

$\Delta t = 4.5 \text{ s}$

$\Delta d = 14 \text{ m}$

$\Delta d = \bar{v} \Delta t$

$\Delta d = \frac{(v_i + v_f)}{2} \Delta t$

$v_i = \frac{2\Delta d}{\Delta t} - v_f$

$\boxed{= 0.9 \text{ m/s}}$

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30. $v_i = 4.5 \text{ m/s}$

$\Delta t = 90.0 \text{ s}$

$\Delta d = \bar{v} \Delta t$

$\Delta d = 4100 \text{ m}$

$v_i = 4.5 \text{ m/s}$

$v_f = 0 \text{ m/s}$

$a = -0.05 \text{ m/s}^2$

$\Delta t = 90.0 \text{ s}$

$\Delta d = v_i \Delta t + \frac{1}{2} a \Delta t^2$

$= (4.5)(90.0) + \frac{1}{2}(-0.05)(90.0)^2$

$= 410 + (-200)$

$= 210 \text{ m}$

$4100 + 210 = \boxed{4300 \text{ m}}$

32. $v_i = 0 \text{ m/s}$

$a = 2.00 \text{ m/s}^2$

$v_f = 18.0 \text{ m/s}$

$\Delta d = \frac{v_f^2 - v_i^2}{2a}$

$= 81.0 \text{ m}$

$\Delta d = \bar{v} \Delta t$

$= (18.0 \text{ m/s})(60 \text{ s})$

$= 1080 \text{ m}$

$1080 \text{ m} + 81.0 \text{ m}$

$= 1.16 \times 10^3 \text{ m}$

33. $\bar{v} = 4.3 \text{ m/s}$
 $\Delta t = 19 \text{ min.}$
 $= 1100 \text{ s}$
 $\Delta d = \bar{v} \Delta t$
 $= 4730 \text{ m}$
 (1st part of race)

$v_i = 4.3 \text{ m/s}$
 $\bar{a} = ?$
 $\Delta d = 5000 - 4730$
 $= 270 \text{ m}$
 $\Delta t = 19.4 \text{ s}$

$$\Delta d = v_i \Delta t + \frac{1}{2} \bar{a} \Delta t^2$$

$$a = \frac{2(\Delta d - v_i \Delta t)}{\Delta t^2}$$

$$= \frac{2(270 - 83)}{19.4^2} = \frac{2(190)}{376}$$

$$\boxed{= 1.01 \text{ m/s}^2}$$

35. on your own.

36. $v_i = 0.0 \text{ m/s}$
 $v_f = 5.0 \text{ m/s}$
 $\Delta t = 4.5 \text{ s}$

$$\bar{v} = \frac{\Delta d}{\Delta t}$$

$$\Delta d = \bar{v} \Delta t$$

$$= \left(\frac{v_i + v_f}{2} \right) (4.5)$$

$$= \left(\frac{5.0 \text{ m/s}}{2} \right) (4.5 \text{ s})$$

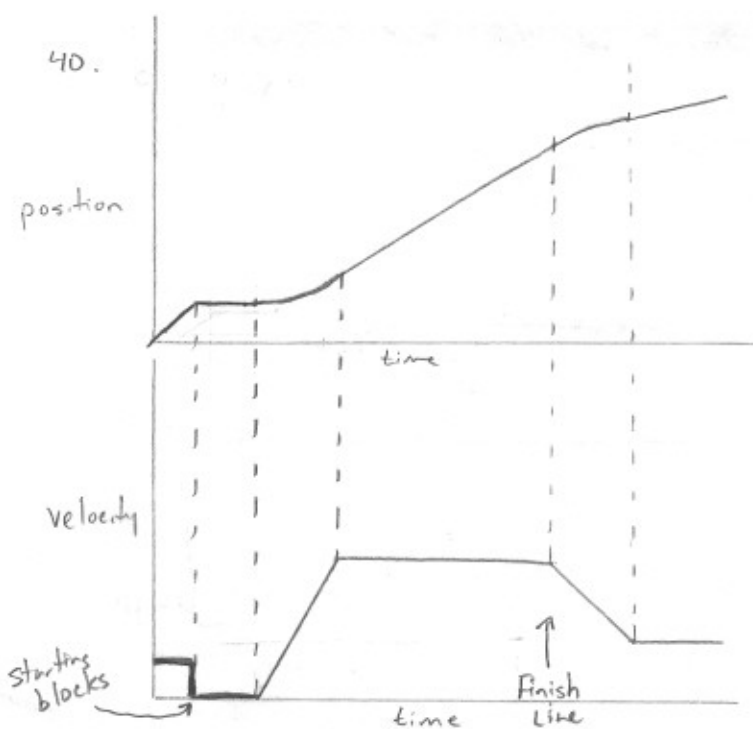
$$= 11 \text{ m}$$

$$\Delta d = \bar{v} \Delta t$$

$$= (5.0 \text{ m/s})(4.5 \text{ s})$$

$$= 23 \text{ m}$$

$$11 \text{ m} + 23 \text{ m} = \boxed{34 \text{ m}}$$



39. $v_i = 23 \text{ m/s}$
 $\Delta d = 210 \text{ m}$
 $v_f = 0 \text{ m/s}$
 $\bar{a} = ?$

$$v_f^2 = v_i^2 + 2\bar{a}\Delta d$$

$$\bar{a} = \frac{v_f^2 - v_i^2}{2\Delta d}$$

$$= \frac{0 - (23)^2}{2(210)}$$

$$= \frac{-530}{420}$$

$$\boxed{= -1.3 \text{ m/s}^2}$$

37. $\Delta d = 5.0 \times 10^2 \text{ m}$
 $v_i = 0 \text{ m/s}$
 $\bar{a} = 5.0 \text{ m/s}^2$
 $v_f = ?$

$$v_f^2 = v_i^2 + 2\bar{a}\Delta d$$

$$= \sqrt{0 + 2(5.0)(5.0 \times 10^2)}$$

$$= 71 \text{ m/s}$$

38. $v_i = 0 \text{ m/s}$
 $\bar{a} = 5.0 \text{ m/s}^2$
 $\Delta t = 14 \text{ s}$

$$v_f = v_i + \bar{a} \Delta t$$

$$= 0 + (5.0)(14)$$

$$= 70. \text{ m/s}$$

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