Practise, Apply, Solve 4.2, page 314

1. **(a)** $\left(\frac{5}{2}, \frac{-57}{4}\right)$, minimum **(b)** (4, 15), maximum
(c) $\left(\frac{-3}{4}, \frac{-11}{4}\right)$, maximum **(d)** (2, −7), maximum

2. **(a)** parabola, opens up, zeros at 3, 8; y-intercept: 24; $\left(\frac{11}{2}, \frac{-25}{4}\right)$
(b) parabola, opens down, zeros at −2, 1; y-intercept: 4; $\left(\frac{-1}{2}, \frac{9}{2}\right)$
(c) parabola, opens up, zeros at −3.2, 1.1; y-intercept: −2.464; (−1.05, −3.24)
(d) parabola, opens down, zeros at $\frac{-1}{6}, \frac{2}{3}$; y-intercept: $\frac{5}{54}$; $\left(\frac{1}{4}, \frac{125}{864}\right)$

3. **(a)** $\left(\frac{3}{2}, \frac{-9}{2}\right)$, minimum **(b)** $\left(\frac{3}{2}, \frac{45}{4}\right)$, maximum
(c) (2, 41.6), maximum **(d)** (3, −46.5), minimum

4. **(a)** $R(x) = -x^2 + 7x$, \$12.25
(b) $R(x) = -3x^2 + 11x$, \$10.08
(c) $R(x) = -0.05x^2 + 12x$, \$720

5. **(a)** $P(x) = -x^2 + 12x - 28$, $x = 6$
(b) $P(x) = -2x^2 + 18x - 45$, $x = 4.5$
(c) $P(x) = -3x^2 + 18x - 18$, $x = 3$
(d) $P(x) = -2x^2 + 22x - 17$, $x = 5.5$

6. **(a)** $R(x) = -5x^2 + 21x$
(b) $P(x) = -5x^2 + 17x - 14$
(c) $x = 1.7$ **(d)** 1400 items, 2000 items
(e) parabola, opens down, vertex (1.7, 0.45); zeros at 1.4, 2; y-intercept: −14

7. 1250 items/h

8. Ball reaches max height at 0.61 s; max height is 2.44 m.

9. 25

12. **(a)** 37 or 38 trees **(b)** 37

14. **(a)** 44 200 kg/ha **(b)** $y(x) \doteq -343.9x^2 + 965.5x - 243.2$
(c) 1.404 ha•m

15. rectangle 6 m × 12 m

16. 52 days

18. **(a)** factored form, vertex form, standard form
(b) Answers will vary.
(c) Factored form identifies x-intercepts of parabola; vertex form identifies vertex of parabola and maximum or minimum value of function; standard form identifies y-intercept.
(d) Answers will vary.

19. $t = \frac{v_0}{9.8}$

20. rectangle 7.03 m × 4.46 m, triangle: 7.03 m × 7.03 m × 7.03 m

21. **(a)** 79.58 m
(b) Yes, the straight part of the track is 125 m long.