3C8 2012 Answers

1   (a)   35 m/s

       (b) $G = 6/\sqrt{7}$ maximum speed 52.9 m/s

       (c)   49.4 s

       (d)   approximately 33 m/s

2   (b)   (ii) $P = 2F_1$

             (iv)   1.3% reduction

3   (b)   (ii) $\theta = \pi/2$ for bearing A, $\theta = 3\pi/2$ for bearing B.

             (iii) $C = 1029$ N

4   (a)   (i) $P' = \dfrac{T}{4rw\cos\phi}$ at all eight pressure lines

            (ii) $p_0 = 1.35\sqrt{\dfrac{TE^*}{wr^2}}$ at a single contact on the sun/planet pressure line at
the addendum circle.

       (b)   (i) $T_a = 3T$ $T_c = -4T$

            (ii) $T_a = 2.85T$ $T_c = -3.85T$

            (iii) $T_a = 2.81T$ $T_c = -3.81T$