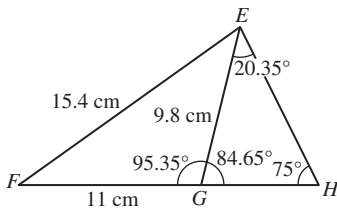# Penyelesaian Lengkap

Kertas 2

Bahagian C

1 (a) kos $\angle FGE = \dfrac{11^2 + 9.8^2 - 15.4^2}{2 \times 11 \times 9.8}$

  cos $\angle FGE = \dfrac{11^2 + 9.8^2 - 15.4^2}{2 \times 11 \times 9.8}$

  $= -0.09332$

  $\angle FGE = 95.35°$

(b)

$\angle GEH = 180° - 75° - 84.65°$

  $= 20.35°$

$\dfrac{GH}{\sin 20.35°} = \dfrac{9.8}{\sin 75°}$

  $GH = \dfrac{9.8}{\sin 75°} \times \sin 20.35°$

  $= 3.528$ cm

(c) Luas ΔEFH = Luas ΔFGE + Luas ΔEGH
  Area of ΔEFH = Area of ΔFGE + Area of ΔEGH

  $= \dfrac{1}{2} \times 11 \times 9.8 \times \sin 95.35° +$

  $\dfrac{1}{2} \times 9.8 \times 3.528 \times \sin 84.65°$

  $= 53.665 + 17.212$

  $= 70.877$ cm^2

2 (a) $\angle PSR = 180° - 78° = 102°$

  $PR^2 = 13.4^2 + 9.5^2 - 2(13.4)(9.5)$ kos $102°$
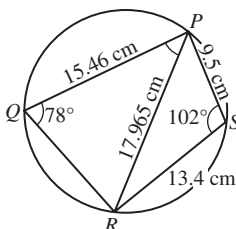
  $PR^2 = 13.4^2 + 9.5^2 - 2(13.4)(9.5)$ cos $102°$

  $= 322.744$

  $PR = \sqrt{322.744}$

  $= 17.965$ cm

(b)

$\dfrac{\sin \angle PRQ}{15.46} = \dfrac{\sin 78°}{17.965}$

$\sin \angle PRQ = \dfrac{\sin 78°}{17.965} \times 15.46$

  $= 0.8418$

$\angle PRQ = 57.33°$

$\therefore \angle QPR = 180° - 78° - 57.33°$

  $= 44.67°$

(c) Luas/*Area of* ΔQPR

  $= \dfrac{1}{2} \times 15.46 \times 17.965 \times \sin 44.67°$

  $= 97.628$ cm^2

  Luas/*Area of* ΔPSR

  $= \dfrac{1}{2} \times 9.5 \times 13.4 \times \sin 102°$

  $= 62.259$ cm^2

  Luas sisi empat $PQRS$
  Area of quadrilateral PQRS
  $= 97.628$ cm^2 + 62.259 cm^2
  $= 159.887$ cm^2

3 (a) (i) $GK^2 = 10^2 + 7.5^2 - 2 \times 10 \times 7.5 \times$ kos $122°$

  $GK^2 = 10^2 + 7.5^2 - 2 \times 10 \times 7.5 \times$ cos $122°$

  $= 235.738$

  $GK = 15.354$ cm

(ii) $\dfrac{\sin GKH}{10} = \dfrac{\sin 122°}{15.354}$

  $\sin \angle GKH = \dfrac{\sin 122°}{15.354} \times 10$

  $= 0.5523$

  $\angle GKH = 33.52°$

(iii) $\angle FGH = 180° - 2 \times 58°$

  $= 64°$

  Luas ΔFGK = Luas ΔFGH + Luas ΔGHK
  Area of ΔFGK = Area of ΔFGH + Area of ΔGHK
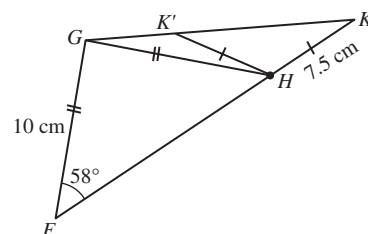
  $= \dfrac{1}{2} \times 10 \times 10 \times \sin 64° + \dfrac{1}{2} \times 10 \times 7.5 \times$

  sin $122°$

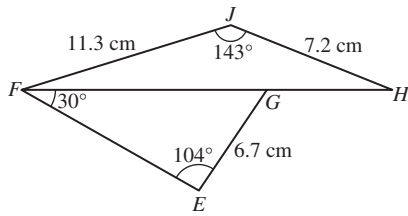 $= 44.940 + 31.802$

  $= 76.742$ cm^2

(b)

4

(a) (i) $\dfrac{FG}{\sin 104°} = \dfrac{6.7}{\sin 30°}$

$FG = \dfrac{6.7}{\sin 30°} \times \sin 104°$

$= 13.0$ cm

(ii) $FH^2 = 11.3^2 + 7.2^2 - 2(11.3)(7.2)$ kos $143°$

$FH^2 = 11.3^2 + 7.2^2 - 2(11.3)(7.2)$ cos $143°$

$= 309.484$

$FH = 17.592$ cm

$\therefore GH = 17.592 - 13.0$

$= 4.592$ cm

(b)

$s = \dfrac{1}{2} \times$ Perimeter

$= \dfrac{1}{2} \times (6.7 + 4.592 + 11.03)$

$= 11.161$

Luas/*Area of* ΔEGH
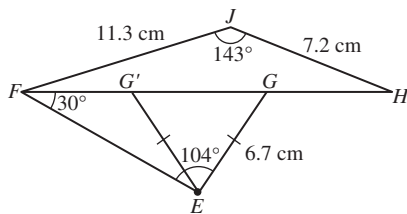
$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{11.161(11.161 - 6.7)(11.161 - 4.592)(11.161 - 11.03)}$

$= \sqrt{42.846}$

$= 6.546$ cm^2

(c)

$\angle EG'F = \angle EGH$

$= 104° + 30°$

$= 134°$

5 (a) (i) $\dfrac{\sin FGH}{14.5} = \dfrac{\sin 32.6°}{10.8}$

$\sin \angle FGH = \dfrac{\sin 32.6°}{10.8} \times 14.5$

$= 0.7233$

$\angle FGH = 46.33°$

(ii) kos $\angle KFH = \dfrac{12^2 + 14.5^2 - 7.4^2}{2(12)(14.5)}$

cos $\angle KFH = \dfrac{12^2 + 14.5^2 - 7.4^2}{2(12)(14.5)}$

$= 0.8606$

$\angle KFH = 30.62°$

(iii) $\angle FHG = 180° - 32.6° - 46.33° = 101.07°$

Luas sisi empat $FGHK$

$=$ Luas $\Delta KFH +$ Luas ΔFHG

Area of quadrilateral FGHK

$=$ *Area of* $\Delta KFH +$ *Area of* ΔFHG
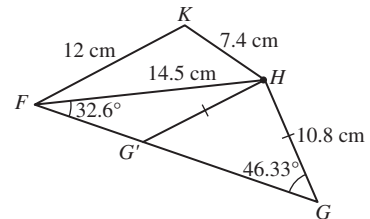
$= \dfrac{1}{2} \times 12 \times 14.5 \times \sin 30.62°$

$+ \dfrac{1}{2} \times 14.5 \times 10.8 \times \sin 101.07°$

$= 44.313 + 76.843$

$= 121.156$ cm^2

(b) (i)

(ii) $\angle FHG' = 46.33° - 32.6°$

$= 13.73°$

Luas sisi empat $FG'HK$

$=$ Luas $\Delta FHK +$ Luas $\Delta FG'H$

Area of quadrilateral FG'HK

$=$ *Area of* $\Delta FHK +$ *Area of* $\Delta FG'H$
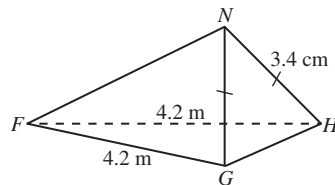
$= \dfrac{1}{2} \times 12 \times 14.5 \times \sin 30.62°$

$+ \dfrac{1}{2} \times 14.5 \times 10.8 \times \sin 13.73°$

$= 44.313 + 18.584$

$= 62.897$ cm^2

6

(a) $\dfrac{1}{2} \times FG \times FH \times \sin \angle GFH = 7.8$

$\dfrac{1}{2} \times 4.2 \times 4.2 \times \sin \angle GFH = 7.8$

$\sin \angle GFH = \dfrac{7.8}{8.82}$
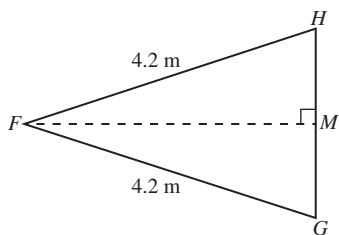
$\sin \angle GFH = 0.8844$

$\angle GFH = 62.17°$

$GH^2 = 4.2^2 + 4.2^2 - 2(4.2)(4.2)$ kos $62.17°$

$GH^2 = 4.2^2 + 4.2^2 - 2(4.2)(4.2)$ cos $62.17°$

$= 18.810$

$GH = 4.337$ m

(b)

Katakan M ialah titik tengah GH.
Let M be the midpoint of GH.

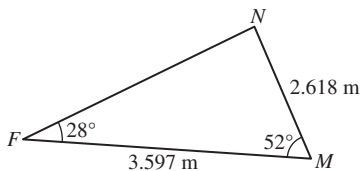$MH = MG = \dfrac{1}{2}(4.337) = 2.169$ m

$NM^2 = NH^2 - MH^2$
$\quad\quad = 3.4^2 - (2.169)^2$
$\quad\quad = 6.855$
$NM = 2.618$ m

$FM^2 = FG^2 - MG^2$
$\quad\quad = 4.2^2 - (2.169)^2$
$\quad\quad = 12.935$
$FM = 3.597$ m

$\dfrac{FN}{\sin 52°} = \dfrac{2.618}{\sin 28°}$

$FN = \dfrac{2.618 \times \sin 52°}{\sin 28°}$
$\quad\quad = 4.394$ m

(c)

$s = \dfrac{1}{2} \times \text{perimeter}$

$\quad = \dfrac{1}{2}(4.394 + 4.2 + 3.4)$

$\quad = 5.997$

Luas/*Area of* ΔNFG
$= \sqrt{s(s-a)(s-b)(s-c)}$
$= \sqrt{5.997(5.997 - 4.394)(5.997 - 4.2)(5.997 - 3.4)}$
$= \sqrt{44.863}$
$= 6.698$ m^2

Kaedah alternatif
Alternative method

$\text{kos } \angle NFG = \dfrac{4.394^2 + 4.2^2 - 3.4^2}{2(4.394)(4.2)}$
$\quad\quad\quad\quad = 0.6878$
$\angle NFG = 46.54°$

Luas/*Area of* $\Delta NFG = \dfrac{1}{2} \times 4.396 \times 4.2 \times \sin 46.54°$
$\quad\quad\quad\quad\quad\quad = 6.698$ m^2