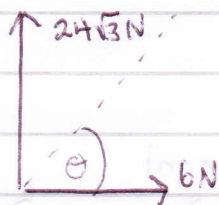


Grymoedd

Gaeaf 2006

6) Llorweddol: $3 + 16 \cos 60^\circ - 10 \cos 60^\circ$
 $= 6 \text{ N}$

Ferligol: $11\sqrt{3} + 16 \sin 60^\circ + 10 \sin 60^\circ$
 $= 24\sqrt{3} \text{ N}$



Grym cyteffwrth: $\text{Maint} = \sqrt{6^2 + (24\sqrt{3})^2}$
 $= 42 \text{ N}$

Cyfeiriad: $\tan \theta = \frac{24\sqrt{3}}{6}$

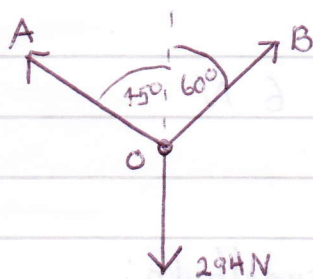
$\theta = 81.8^\circ$: un lle degol

Gaeaf 2007

2) a) $T = 30g$
 $= 294 \text{ N}$

$\left. \begin{array}{l} F = ma \\ \text{yn ferligol} \end{array} \right\}$

b)



c) Llorweddol yn O:
 $A \sin 45^\circ = B \sin 60^\circ$

$$\frac{A}{\sqrt{2}} = \frac{B\sqrt{3}}{2}$$

$$A = \frac{\sqrt{6}}{2} B$$

Ferligol yn O:

$$294 = A \cos 45^\circ + B \cos 60^\circ$$

$$294 = \frac{A}{\sqrt{2}} + \frac{B}{2}$$

$$294 = \frac{\sqrt{6}}{2} \left(\frac{1}{\sqrt{2}} \right) B + \frac{B}{2}$$

$$294 = \left(\frac{1 + \sqrt{3}}{2} \right) B$$

$$B = 215.22 \text{ N} \quad ; \quad 2 \text{ i. d.}$$

$$A = \frac{\sqrt{6}}{2} (215.22)$$

$$A = 263.59 \text{ N} \quad ; \quad 2 \text{ i. d.}$$

Haf 2007

* 3) Cydrannu'n llorweddol:

$$40 + 60 \cos 80^\circ = 50 \cos 60^\circ + T \cos \theta$$

$$25.41889066 = T \cos \theta \quad \text{--- (1)}$$

Cydrannu'n fertigol:

$$60 \sin 80^\circ + 50 \sin 60^\circ = T \sin \theta$$

$$102.3897354 = T \sin \theta \quad \text{--- (2)}$$

$$\textcircled{2} \div \textcircled{1}: \quad \frac{102.3897354}{25.41889066} = \frac{T \sin \theta}{T \cos \theta}$$

$$4.028096141 = \tan \theta$$

$$\theta = 76.1^\circ \text{ i un lle degol}$$

Amnewid i (1): $25.41889066 = T \cos(76.0578281\dots)$

$$T = 105.5 \text{ N i un lle degol}$$

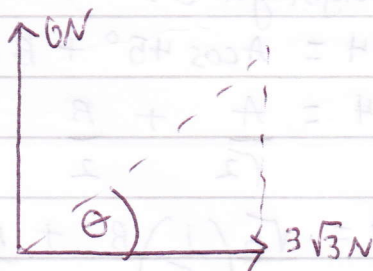
Gaeaf 2008

8) Cydrannu'n llorweddol:

$$15 \cos 30^\circ - 9 \cos 30^\circ = 3\sqrt{3} \text{ N}$$

Cydrannu'n fertigol:

$$18 - 15 \sin 30^\circ - 9 \sin 30^\circ = 6 \text{ N}$$



Gryn cydeffwrth:

$$\text{Maint} = \sqrt{6^2 + (3\sqrt{3})^2}$$

$$= 7.94 \text{ N i 2l.d. } (\sqrt{63})$$

Cyfeiriad: $\tan \theta = \frac{6}{3\sqrt{3}}$

$$\theta = 49.1^\circ \text{ i un ll.d.}$$

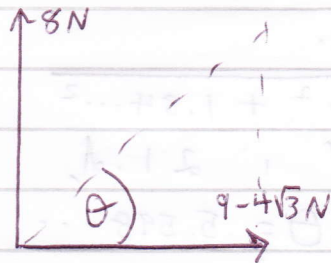
Haf 2008

9) Cydrannu'n fertigol:

$$12 - 8 \cos 60^\circ = 8 \text{ N}$$

Cydrannu'n llorweddol:

$$9 - 8 \sin 60^\circ = 9 - 4\sqrt{3} \text{ N}$$



Gryn cydeffwrth:

$$\text{Maint} = \sqrt{8^2 + (9 - 4\sqrt{3})^2}$$

$$= 8.26 \text{ N} \quad ; \quad 21.4^\circ$$

Cyferiad: $\tan \theta = \frac{8}{9 - 4\sqrt{3}}$

$$\theta = 75.5^\circ \quad ; \quad 11.4^\circ$$

Gaeaf 2009

8) Cydrannu'n fertigol:

$$12g = X \sin 23^\circ + Y \sin 30^\circ$$

$$117.6 = 0.3907 X + 0.5 Y$$

$$235.2 = 0.7815 X + Y \quad \text{--- (1)}$$

Cydrannu'n llorweddol:

$$X \cos 23^\circ = Y \cos 30^\circ$$

$$0.9205 X = 0.8660 Y$$

$$X = 0.9408 Y \quad \text{--- (2)}$$

Amnewid o (2) i (1)

$$235.2 = 0.7815(0.9408 Y) + Y$$

$$235.2 = 1.7352 Y$$

$$Y = 135.5 \text{ N} \quad ; \quad 11.4^\circ$$

$$X = 0.9408(135.5)$$

$$X = 127.5 \text{ N} \quad ; \quad 11.4^\circ$$

Haf 2009

8005907

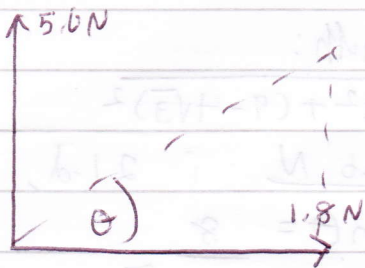
8) Cydrannu'n ferbigol:

$$5 \sin 50^\circ + 7 \sin 30^\circ - 2 \sin 60^\circ = 5.598171408 \text{ N}$$

Cydrannu'n llorweddol:

$$7 \cos 30^\circ - 5 \cos 50^\circ - 2 \cos 60^\circ = 1.848239178 \text{ N}$$

5.6 N



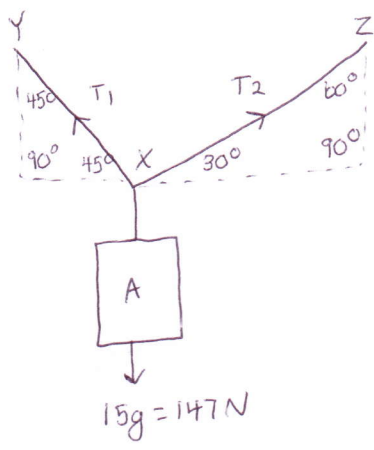
Grym cydeffwrdd:

$$\text{Maint} = \sqrt{5.59...^2 + 1.84...^2} = 5.90 \text{ N} \quad 21.1^\circ$$

$$\text{Cyfeiriad: } \tan \theta = \frac{5.598...}{1.848...}$$

$$\theta = 71.7^\circ \quad 11.1^\circ$$

(4)



Cydrannu'n llorweddol:

$$T_1 \cos 45^\circ = T_2 \cos 30^\circ$$

$$T_1 \left(\frac{1}{\sqrt{2}} \right) = T_2 \left(\frac{\sqrt{3}}{2} \right)$$

$$T_1 = T_2 \left(\frac{\sqrt{6}}{2} \right)$$

Cydrannu'n fertigol:

$$147 = T_1 \sin 45^\circ + T_2 \sin 30^\circ$$

$$147 = T_1 \left(\frac{1}{\sqrt{2}} \right) + T_2 (0.5)$$

$$147 - 0.5 T_2 = \frac{T_1}{\sqrt{2}}$$

$$147\sqrt{2} - 0.5\sqrt{2} T_2 = T_1$$

Felly $T_2 \left(\frac{\sqrt{6}}{2} \right) = 147\sqrt{2} - 0.5\sqrt{2} T_2$

$$T_2 \left(\frac{\sqrt{6}}{2} + \frac{\sqrt{2}}{2} \right) = 147\sqrt{2}$$

$$T_2 = 147\sqrt{2} \left(\frac{2}{\sqrt{6} + \sqrt{2}} \right)$$

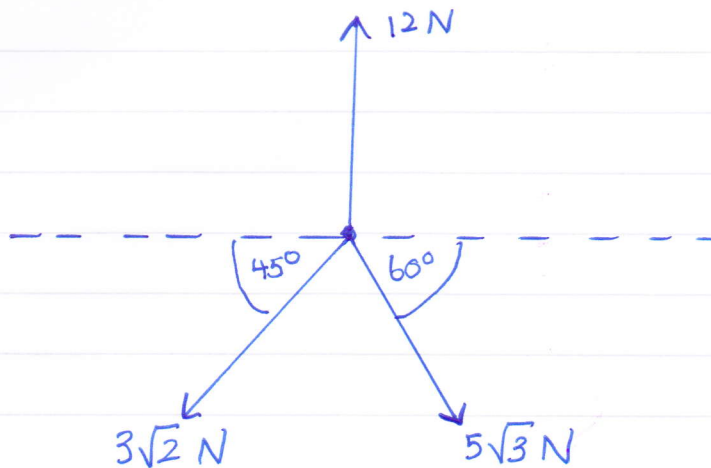
$T_2 \approx 107.61 \text{ N}$ i 2 le degol

$$T_1 = 147\sqrt{2} \left(\frac{2}{\sqrt{6} + \sqrt{2}} \right) \left(\frac{\sqrt{6}}{2} \right)$$

$T_1 \approx 131.80 \text{ N}$ i 2 le degol

Haf 2010

6

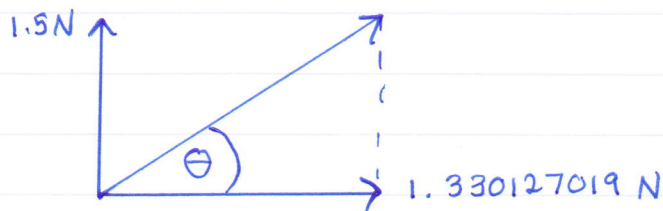


Llorweddol ($\rightarrow$)

$$\begin{aligned} & 5\sqrt{3} \cos 60^\circ - 3\sqrt{2} \cos 45^\circ \\ &= \frac{5\sqrt{3}}{2} - 3 \\ &= 1.330127019 \text{ N} \end{aligned}$$

Fertigol ($\uparrow$)

$$\begin{aligned} & 12 - 3\sqrt{2} \sin 45^\circ - 5\sqrt{3} \sin 60^\circ \\ &= 12 - 3 - 7.5 \\ &= 1.5 \text{ N} \end{aligned}$$



$$\begin{aligned} \text{Maint y grym cydeffai} &= \sqrt{1.5^2 + 1.330127019^2} \\ &= 2.004803703 \\ &= 2.00 \text{ N, yn gywir i 2 le degol.} \end{aligned}$$

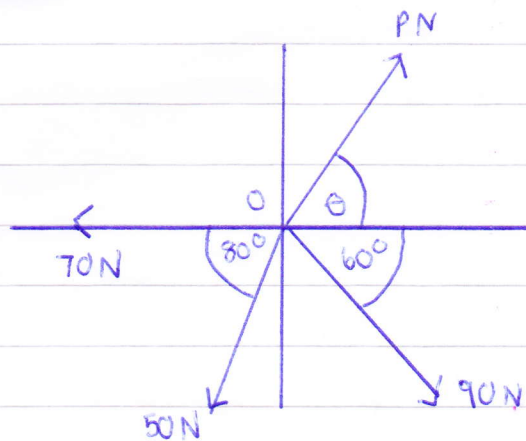
Cyfeiriad y grym cydeffai i'r llorweddol:

$$\tan \theta = \frac{1.5}{1.330127019}$$

$$\theta = 48.43^\circ, \text{ yn gywir i 2 le degol}$$

Gaeaf 2011

⑤



(Mewn cydbwysedd.)

Llorweddol: Grymoedd i'r dwith = Grymoedd i'r dde

$$70 + 50 \cos 80^\circ = 90 \cos 60^\circ + P \cos \theta$$

$$78.6824 = 45 + P \cos \theta$$

$$33.6824 = P \cos \theta \quad \text{--- (1)}$$

Fertigol: Grymoedd i fyny = Grymoedd i lawr

$$P \sin \theta = 50 \sin 80^\circ + 90 \sin 60^\circ$$

$$P \sin \theta = 49.2404 + 77.9423$$

$$P \sin \theta = 127.1827 \quad \text{--- (2)}$$

Yn gwneud (2) $\div$ (1):

$$\frac{P \sin \theta}{P \cos \theta} = \frac{127.1827}{33.6824}$$

$$\tan \theta = 3.7759$$

$$\tan \theta = 3.7759$$

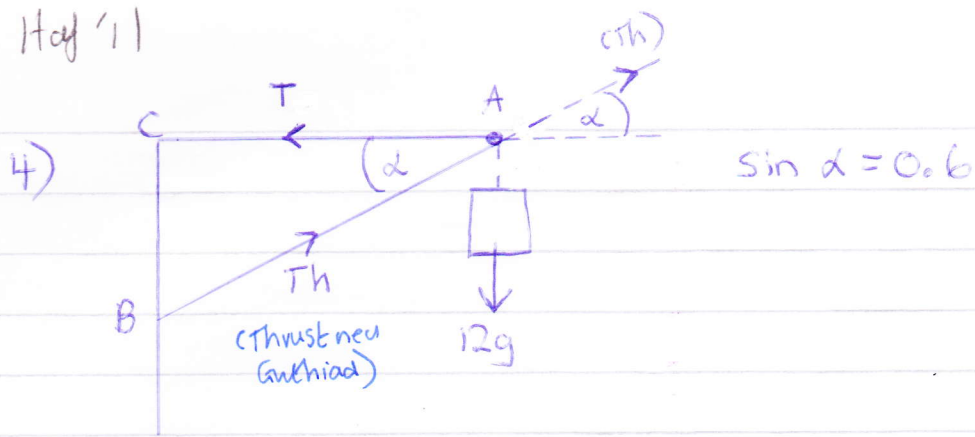
$$\underline{\underline{\theta = 75.2^\circ}} \quad \text{i un lle degol}$$

Felly, yn amnewid yn ôl i (1), $P = \frac{33.6824}{\cos \theta}$

$$P = \frac{33.6824}{\cos(75.166618...)}$$

$$\underline{\underline{P = 131.6 \text{ N}}} \quad \text{i un lle degol}$$

Haf 11



(a) Gyda'r pwynt A, grymoedd i fyny = grymoedd i lawr

$$(Th) \sin \alpha = 12g$$

$$(Th) \times 0.6 = 12 \times 9.8$$

$$\underline{Th = 196 \text{ N}}$$

Y gwrthiad yn y rhoden AB yw 196 N.

(b) Gyda'r pwynt A, grymoedd i'r dde = grymoedd i'r chwith

$$(Th) \cos \alpha = T$$

$$196 \times \cos \alpha = T$$

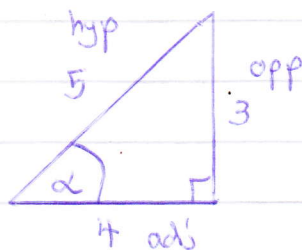
$$196 \times 0.8 = T$$

$$\underline{T = 156.8 \text{ N}}$$

Y tensiwn yn y rhoden AC yw 156.8 N

(Sut i gael $\cos \alpha = 0.8$;

O wybod bod $\sin \alpha = 0.6$ neu $\sin \alpha = \frac{3}{5}$



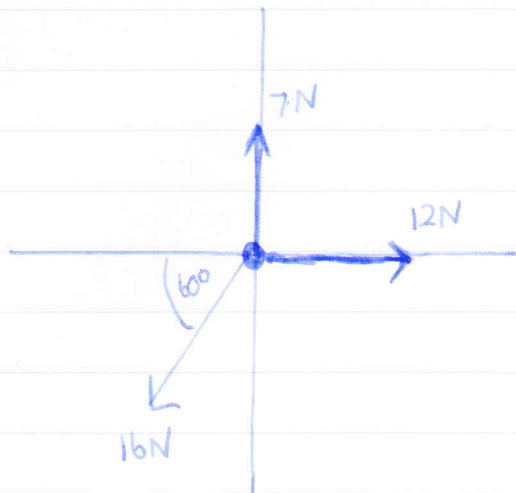
Pythagoras!

$$\sqrt{5^2 - 3^2} = 4$$

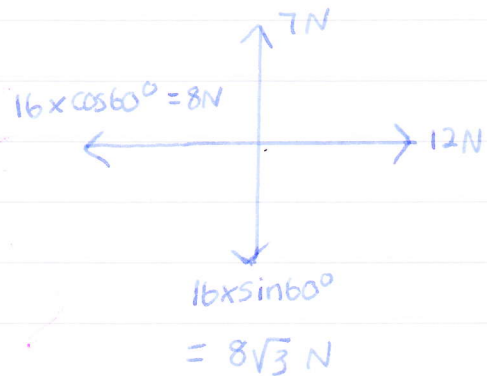
Felly $\cos \alpha = \frac{4}{5}$ neu $\cos \alpha = 0.8$).

Graef '12

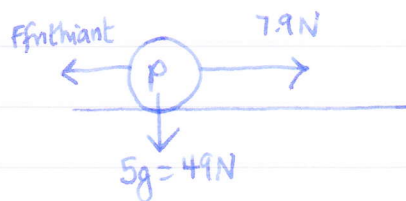
b)



(a) Cydrannu:



(b)

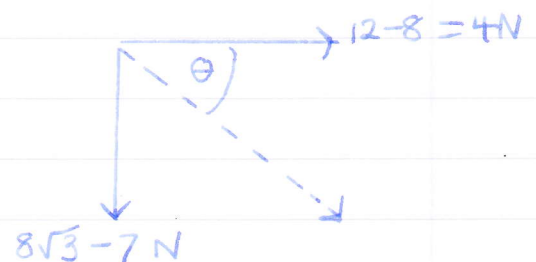


$$\begin{aligned} \text{Ffrithiant} &= \mu R \\ &= 0.1 \times 5g \\ &= 4.9 \text{ N} \end{aligned}$$

$$\begin{aligned} F &= ma \text{ ar } P \\ (\text{i'r dde yn positif}) \end{aligned}$$

$$\begin{aligned} 7.9 - 4.9 &= 5a \\ 3 &= 5a \\ \underline{a = 0.6 \text{ ms}^{-2}} \end{aligned}$$

~~(b)~~ Symleiddio:



Gryn cydeffailh:

$$\begin{aligned} \text{Maint} &= \sqrt{4^2 + (8\sqrt{3} - 7)^2} \\ &= \sqrt{16 + 47.0103} \\ &= 7.9379 \text{ N ; 4 lle degol} \end{aligned}$$

(Felly yn fras 7.9 N ✓)

Cyfeiriad: $\tan \theta = \frac{\text{cyferbyn}}{\text{agos}}$

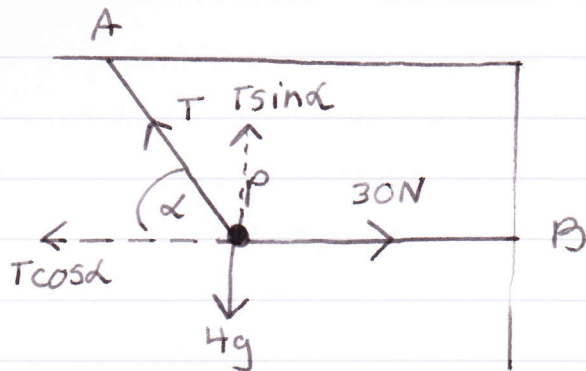
$$\tan \theta = \frac{8\sqrt{3} - 7}{4}$$

$$\theta = \tan^{-1} \left(\frac{8\sqrt{3} - 7}{4} \right)$$

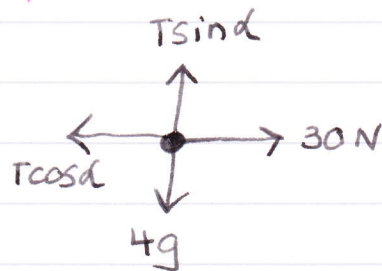
$$\theta = 59.7409^\circ ; 4 \text{ lle degol.}$$

M1 Haf 2012

⑥



Grymoedd yn gweithredu ar P:



Lbrweddol: $T \cos \alpha = 30$ —①

Fertigol: $T \sin \alpha = 4g$ —②

Yn gwneud ② ÷ ①

$$\frac{T \sin \alpha}{T \cos \alpha} = \frac{4g}{30}$$

$$\tan \alpha = \frac{39.2}{30}$$

$$\alpha = \tan^{-1}\left(\frac{39.2}{30}\right)$$

$$\underline{\underline{\alpha = 52.57^\circ}}, \text{ yn gymir i 2 le degol}$$

Yn amnewid yn ôl i ①

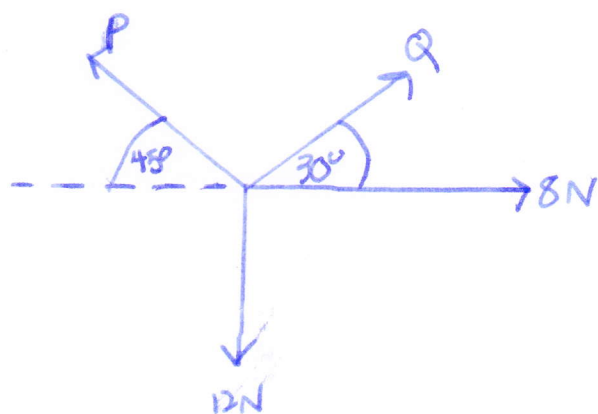
$$T \cos \alpha = 30$$

$$T \cos(52.57294864^\circ) = 30$$

$$T = 30 \div 0.6077508432$$

$$\underline{\underline{T = 49.36 \text{ N}}}, \text{ yn gymir i 2 le degol}$$

(4)



Cydrannu'n llorweddol:

Grymoedd i'r chwith = Grymoedd i'r dde

$$P \cos 45^\circ = Q \cos 30^\circ + 8$$

$$\frac{\sqrt{2} P}{2} = \frac{\sqrt{3} Q}{2} + 8$$

$$\sqrt{2} P = \sqrt{3} Q + 16 \quad \text{--- (1)}$$

Cydrannu'n fertigol:

Grymoedd i fyny = Grymoedd i lawr

$$P \sin 45^\circ + Q \sin 30^\circ = 12$$

$$\frac{\sqrt{2} P}{2} + \frac{Q}{2} = 12$$

$$\sqrt{2} P + Q = 24$$

$$\sqrt{2} P = 24 - Q \quad \text{--- (2)}$$

Gwelun o (1) a (2) bod $\sqrt{3} Q + 16 = 24 - Q$

$$(\sqrt{3} + 1) Q = 24 - 16$$

$$Q = \frac{8}{1 + \sqrt{3}}$$

$$Q = 2.9 \text{ N i un lle degol}$$

Yn amnewid i (2): $\sqrt{2} P = 24 - Q$

$$\sqrt{2} P = 24 - \frac{8}{1 + \sqrt{3}}$$

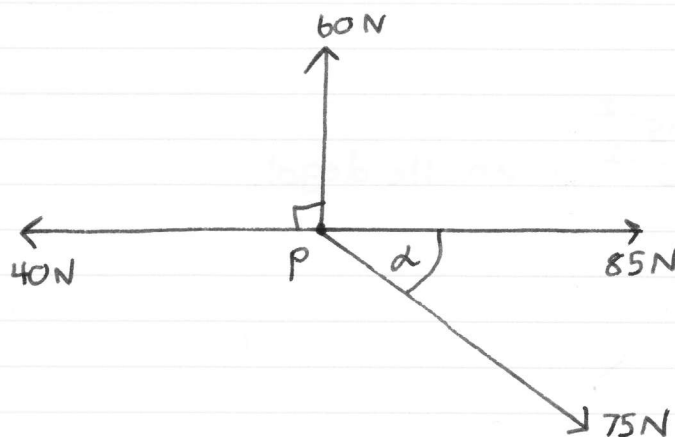
$$P = \frac{24 - \frac{8}{1 + \sqrt{3}}}{\sqrt{2}}$$

$$P = -2\sqrt{6} + 14\sqrt{2}$$

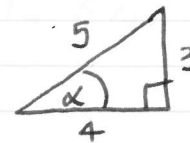
$$P = 14.9 \text{ N i un lle degol}$$

M1 Haf 2013

7)



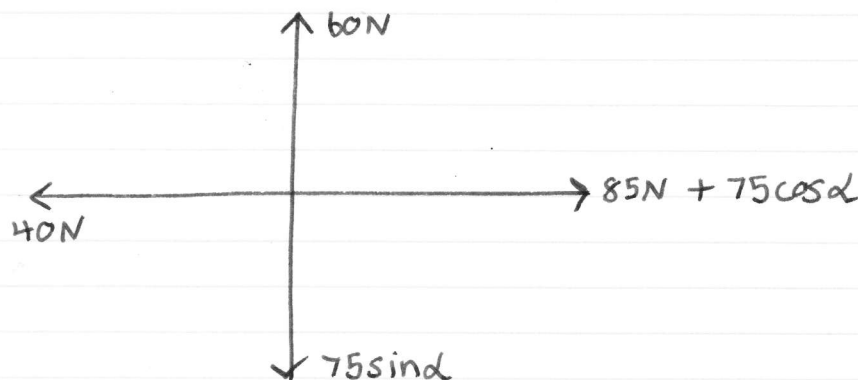
Màs 5Kg
 $\tan \alpha = \frac{3}{4}$



$$\sin \alpha = \frac{3}{5}$$

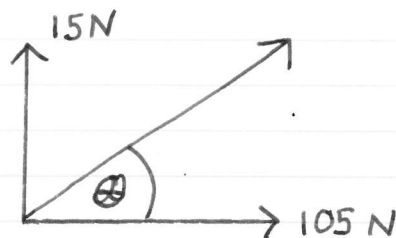
$$\cos \alpha = \frac{4}{5}$$

Cydrannu:



Fertigol: $60 - 75 \sin \alpha = 60 - 75 \times \frac{3}{5}$
 $= 15 \text{ N}$

Llorweddol: $85 + 75 \cos \alpha - 40 = 85 + 75 \times \frac{4}{5} - 40$
 $= 105 \text{ N}$



Grym cydeffai'rh: $\text{Maint} = \sqrt{15^2 + 105^2}$
 $= 75\sqrt{2} \text{ N}$
 $\approx 106.1 \text{ N}$ i un lle degol.

Cyfeiriad = $\tan^{-1}\left(\frac{15}{105}\right)$

$= 8.13^\circ$ i ddau lle degol.

(Hun gywir ongl rhwng y grym cydeffai'rh
 a'r grym 85N.)

$$b) F = ma$$

$$75\sqrt{2} = 5a$$

$$a = \frac{75\sqrt{2}}{5}$$

$$a = 15\sqrt{2} \text{ ms}^{-2}$$

$$a \approx 21.2 \text{ ms}^{-2} \text{ i un lle degol.}$$

M1 Gaeaf 2014

⑤

Cydrannu'n Fertigol:

Grymoedd i fyny = Grymoedd i lawr (meun cydbwysedd)

$$Q = 9 \times \sin 60^\circ$$

$$Q = \frac{9\sqrt{3}}{2} \text{ N}$$

(i 2 le degol, $Q = 7.79 \text{ N}$)

Cydrannu'n Llorweddol:

Grymoedd i'r chwith = Grymoedd i'r Dde (meun cydbwysedd)

$$6 = P + 9 \times \cos 60^\circ$$

$$6 = P + 4.5$$

$$6 - 4.5 = P$$

$$\underline{P = 1.5 \text{ N}}$$

M1 Haf 2014

- ⑤ (a) Nid yw'r gwrthrych yn symud yn fertigol (i fyny/lawr)

Felly grymoedd i fyny = grymoedd i lawr

$$20 \cos 30^\circ + T \sin 30^\circ = 28 \sin 60^\circ$$

$$\frac{20\sqrt{3}}{2} + \frac{T}{2} = \frac{28\sqrt{3}}{2}$$

$$20\sqrt{3} + T = 28\sqrt{3} \quad [\text{lluosio efo 2}]$$

$$T = 28\sqrt{3} - 20\sqrt{3}$$

$$\underline{T = 8\sqrt{3} \text{ N}} \quad \checkmark$$

- (b) $F = ma$ ar y gwrthrych, yn llorweddol, $\rightarrow = +$ i f

$$20 \sin 30^\circ + T \cos 30^\circ + 28 \cos 60^\circ - 16 = 80a$$

$$20\left(\frac{1}{2}\right) + 8\sqrt{3}\left(\frac{\sqrt{3}}{2}\right) + 28\left(\frac{1}{2}\right) - 16 = 80a$$

$$10 + 4 \times 3 + 14 - 16 = 80a$$

$$20 = 80a$$

$$a = 20 \div 80$$

$$\underline{a = 0.25 \text{ ms}^{-2}}$$

- (c) Ar ôl dileu'r grymoedd:

$$F = ma \text{ ar y gwrthrych, yn llorweddol, } \rightarrow = + \text{ i f}$$

$$-16 = 80a$$

$$a = -16 \div 80$$

$$\underline{a = -0.2 \text{ ms}^{-2}}$$

0 ddileu'r grymoedd nes cyrraedd buanedd 4 ms^{-1} :

$$s = ?$$

$$v = u + at$$

$$u = 12 \text{ ms}^{-1}$$

$$4 = 12 + -0.2t$$

$$v = 4 \text{ ms}^{-1}$$

$$0.2t = 12 - 4$$

$$a = -0.2 \text{ ms}^{-2}$$

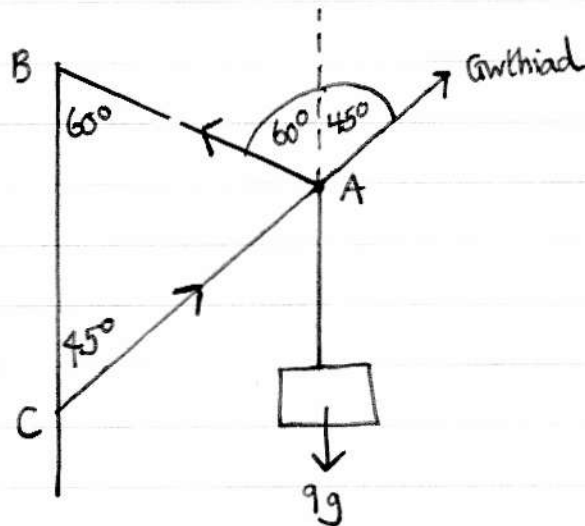
$$t = 8 \div 0.2$$

$$t = ?$$

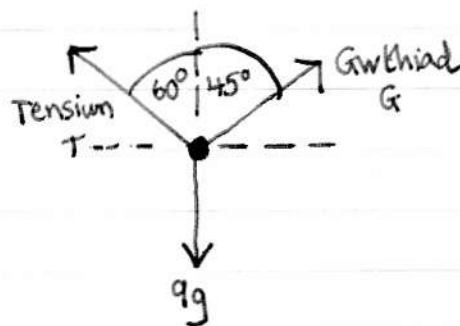
$$\underline{t = 40 \text{ s}}$$

MI Haf 2014

⑦



Grymoedd yn A:



Grymoedd i'r chwith = Grymoedd i'r dde

$$T \sin 60^\circ = G \sin 45^\circ$$

$$\frac{\sqrt{3}}{2} T = \frac{\sqrt{2}}{2} G$$

$$\sqrt{3} T = \sqrt{2} G \quad \text{--- (1)}$$

Grymoedd i fyny = Grymoedd i lawr

$$T \cos 60^\circ + G \cos 45^\circ = 9g$$

$$\frac{T}{2} + \frac{\sqrt{2}}{2} G = 9g$$

$$T + \sqrt{2} G = 18g \quad \text{--- (2)}$$

Yn amnewid am $\sqrt{2} G$ o (1) i (2)

$$T + \sqrt{3} T = 18g$$

$$T(1 + \sqrt{3}) = 18g$$

$$T = \frac{18g}{1 + \sqrt{3}}$$

$$\rightarrow \underline{T = 64.57 \text{ N}}$$

i 2 le degol

Yn amnewid yn ôl i (1):

$$\frac{\sqrt{3}}{\sqrt{2}} T = G$$

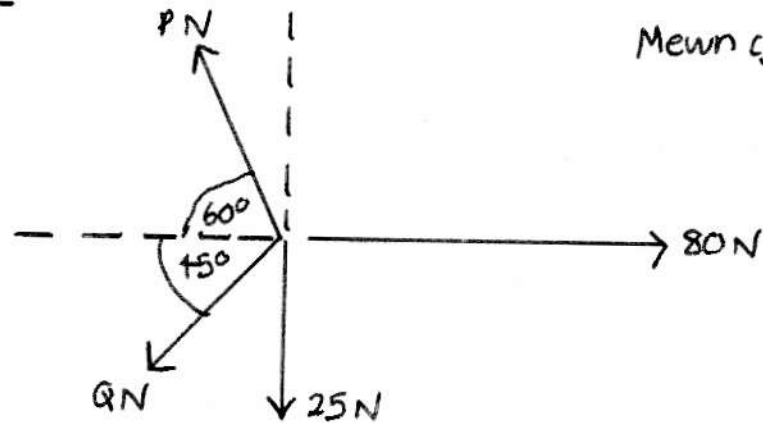
$$\frac{\sqrt{3}}{\sqrt{2}} \times 64.566... = G$$

$$\underline{G = 79.08 \text{ N}}$$

i 2 le degol

M1 Haf 2015

7)



Grymoedd llorweddol:

Grymoedd i'r chwith = Grymoedd i'r dde

$$P \cos 60^\circ + Q \cos 45^\circ = 80$$

$$\frac{P}{2} + \frac{\sqrt{2}}{2} Q = 80$$

$$P + \sqrt{2} Q = 160$$

$$P = 160 - \sqrt{2} Q$$

①

Grymoedd fertigol:

Grymoedd i fyny = Grymoedd i lawr

$$P \sin 60^\circ = Q \sin 45^\circ + 25$$

$$\frac{\sqrt{3}}{2} P = \frac{\sqrt{2}}{2} Q + 25$$

$$\sqrt{3} P = \sqrt{2} Q + 50$$

Yn amnewid o ① am P:

$$\sqrt{3}(160 - \sqrt{2} Q) = \sqrt{2} Q + 50$$

$$160\sqrt{3} - \sqrt{6} Q = \sqrt{2} Q + 50$$

$$160\sqrt{3} - 50 = \sqrt{2} Q + \sqrt{6} Q$$

$$160\sqrt{3} - 50 = Q(\sqrt{2} + \sqrt{6})$$

$$\frac{160\sqrt{3} - 50}{\sqrt{2} + \sqrt{6}} = Q$$

$$Q = 58.78508552$$

$$Q = 58.8 \text{ N}$$

i un lle degol

Yn amnewid yn ① i ①:

$$P = 160 - \sqrt{2} \left(\frac{160\sqrt{3} - 50}{\sqrt{2} + \sqrt{6}} \right)$$

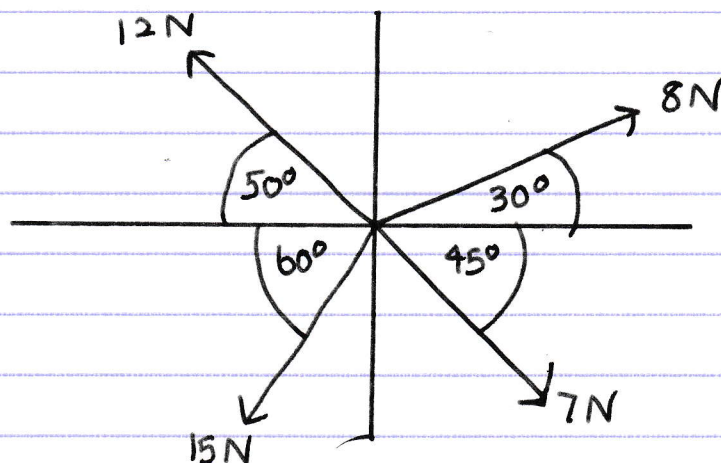
$$P = 76.86533479$$

$$P = 76.9 \text{ N}$$

i un lle degol

M1 Haf 2016

⑤



Grymoedd llorweddol:

$12 \cos 50^\circ \approx 7.7 \text{ N}$	←
$8 \cos 30^\circ \approx 6.9 \text{ N}$	→
$15 \cos 60^\circ = 7.5 \text{ N}$	←
$7 \cos 45^\circ \approx 4.9 \text{ N}$	→

Grymoedd fertigol:

$12 \sin 50^\circ \approx 9.2 \text{ N}$	↑
$8 \sin 30^\circ = 4$	↑
$15 \sin 60^\circ \approx 12.99 \text{ N}$	↓
$7 \sin 45^\circ \approx 4.9 \text{ N}$	↓

Grym cydeffwrth:

$$12 \cos 50^\circ + 15 \cos 60^\circ - 8 \cos 30^\circ - 7 \cos 45^\circ = 3.335500618 \text{ N}$$

$$15 \sin 60^\circ + 7 \sin 45^\circ - 12 \sin 50^\circ - 8 \sin 30^\circ = 4.747595208 \text{ N}$$

Maint y grym cydeffwrth: $\sqrt{3.335500618^2 + 4.747595208^2}$

$$= 5.802174129 \text{ N}$$
$$= 5.8 \text{ N i un lle degol}$$

Beth yw cyflymiad P?

Yn defnyddio $F = ma$

$$5.802174129 = 4a$$

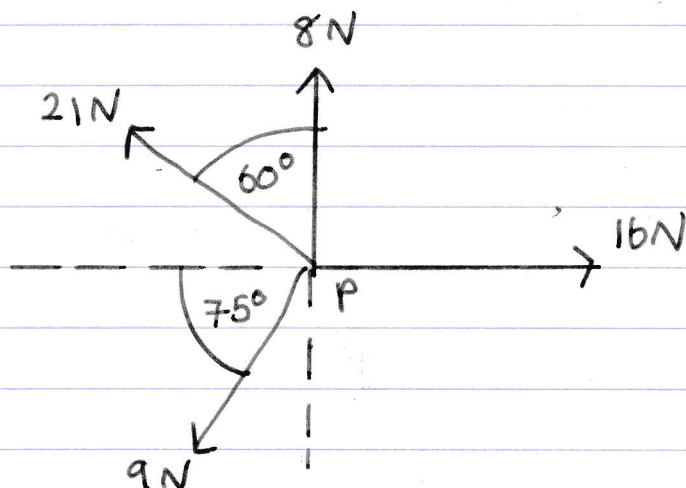
$$a = \frac{5.802174129}{4}$$

$$a = 1.450543532$$

$$\underline{a = 1.45 \text{ ms}^{-2}} \text{ ; 2 le degol}$$

M1 Haf 2018

2)



Grymoedd i fyny: $8 + 21 \cos 60^\circ = 18.5 \text{ N}$

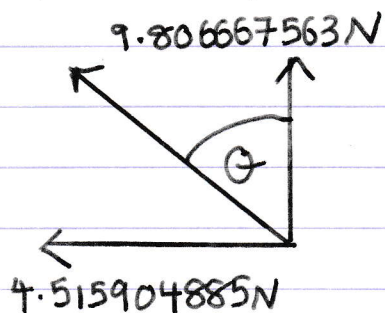
Grymoedd i lawr: $9 \sin 75^\circ = 8.693332437 \text{ N}$

Grym cyd-effaith fertigol: $18.5 - 8.693332437$
 $= 9.806667563 \text{ N}$

Grymoedd i'r dde: 16 N

Grymoedd i'r chwith: $21 \sin 60^\circ + 9 \cos 75^\circ = 20.51590489 \text{ N}$

Grym cyd-effaith llorweddol: $20.51590489 - 16$
 $= 4.515904885 \text{ N}$



Grym cyd-effaith:

$$\sqrt{9.806667563^2 + 4.515904885^2}$$

$$= 10.79648673$$

$$= \underline{10.8 \text{ N}} \text{ i un lle degol.}$$

Ongl e fôr grym 8 N: $\tan \theta = \frac{4.515904885}{9.806667563}$

$$\theta = \tan^{-1} \left(\frac{4.515904885}{9.806667563} \right)$$

$$\theta = 24.72575455$$

$$\underline{\underline{\theta = 24.7^\circ}} \text{ i un lle degol}$$