

## FE 208 Homework 2

### Compass Bearing Conversions

1. What magnetic bearing is needed to retrace a line for the conditions below

	1875 Magnetic Bearing	1875 Declination	Present Declination
a	N 65 <sup>0</sup> 35' E	3 <sup>0</sup> 30' W	2 <sup>0</sup> 30' E
b	S 73 <sup>0</sup> 10' W	2 <sup>0</sup> 20' E	1 <sup>0</sup> 15' W
c	N 89 <sup>0</sup> 55' W	0 <sup>0</sup> 30' W	4 <sup>0</sup> 15' E
d	S 45 <sup>0</sup> 30' E	7 <sup>0</sup> 15' E	5 <sup>0</sup> 20' W

(See Attached)

2. Calculate the true bearing in 1870 based on the following

	1870 Magnetic Bearing	Present Magnetic Bearing	Present Declination
a	S 00 <sup>0</sup> 15' E	S 4 <sup>0</sup> 45' E	5 <sup>0</sup> 30' E
b	S 50 <sup>0</sup> 30' W	S 62 <sup>0</sup> 15' W	15 <sup>0</sup> 40' E
c	N 02 <sup>0</sup> 30' W	N 02 <sup>0</sup> 15' E	3 <sup>0</sup> 15' E
d	N 24 <sup>0</sup> 30' E	N 21 <sup>0</sup> 10' E	4 <sup>0</sup> 45' E

(See Attached)

3. Describe the procedure to locate and correct a set of bearings affected by local attraction  
Identify local attraction by FS and BS. Where BS matches previous FS, use the new FS from that station to sight ahead. Where a BS matches a new FS, use the BS as correct to the previous station

4. Does local attraction affect the size of the angle computed from magnetic bearings read at that point? Explain

No because the size of the angle is unaffected by local attraction, only the bearing is affected

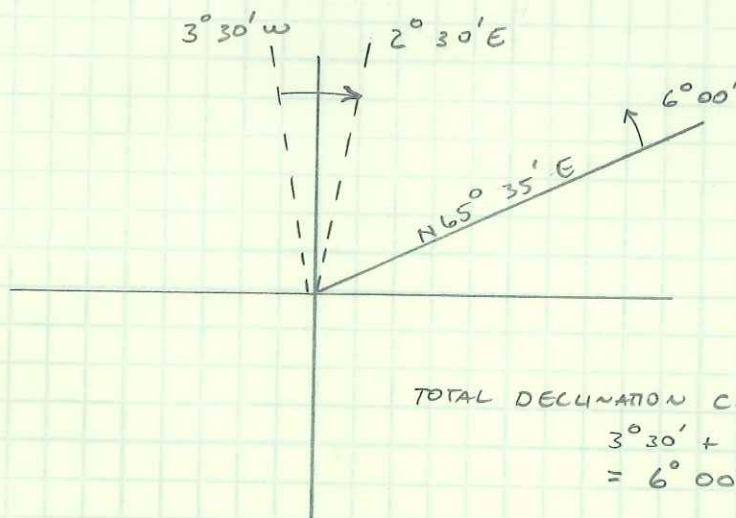
5. Classify the following as either an error (E) or a mistake (M)

E	Compass out of level	E	Local attraction from overhead power lines
M	Setting the declination on the wrong side of north	E	Bent compass needle
M	Failing to check forward and back sightings	E	Staff compass not lined up carefully on the survey point
E	Weak magnetized compass needle	M	Reading wrong end of the needle
E	Magnetic variation	E	Pivot point of needle off center
M	Setting the wrong declination		

1. What magnetic bearing is needed to retrace a line for the conditions below

	1875 Magnetic Bearing	1875 Declination	Present Declination
a	N $65^{\circ} 35'$ E	$3^{\circ} 30'$ W	$2^{\circ} 30'$ E
b	S $73^{\circ} 10'$ W	$2^{\circ} 20'$ E	$1^{\circ} 15'$ W
c	N $89^{\circ} 55'$ W	$0^{\circ} 30'$ W	$4^{\circ} 15'$ E
d	S $45^{\circ} 30'$ E	$7^{\circ} 15'$ E	$5^{\circ} 20'$ W

a.



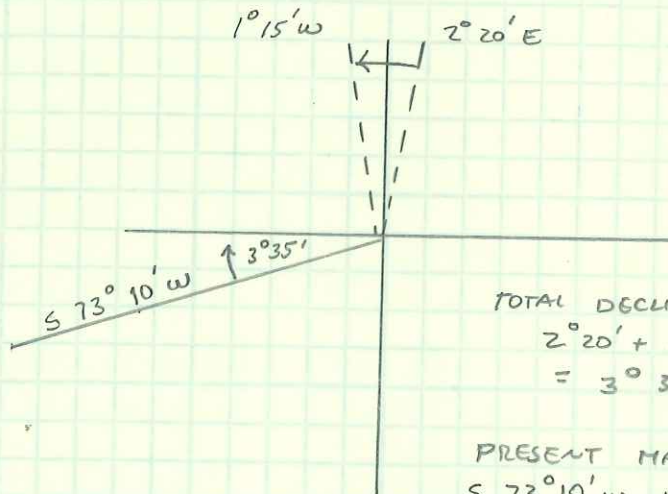
TOTAL DECLINATION CHANGE =

$$3^{\circ} 30' + 2^{\circ} 30' \text{ EASTWARD} \\ = 6^{\circ} 00'$$

$$\text{PRESENT MAG BEARING} = \text{N } 65^{\circ} 35' \text{ E} - 6^{\circ} 00'$$

$$= \underline{\text{N } 59^{\circ} 35' \text{ E}}$$

b



TOTAL DECLINATION CHANGE =

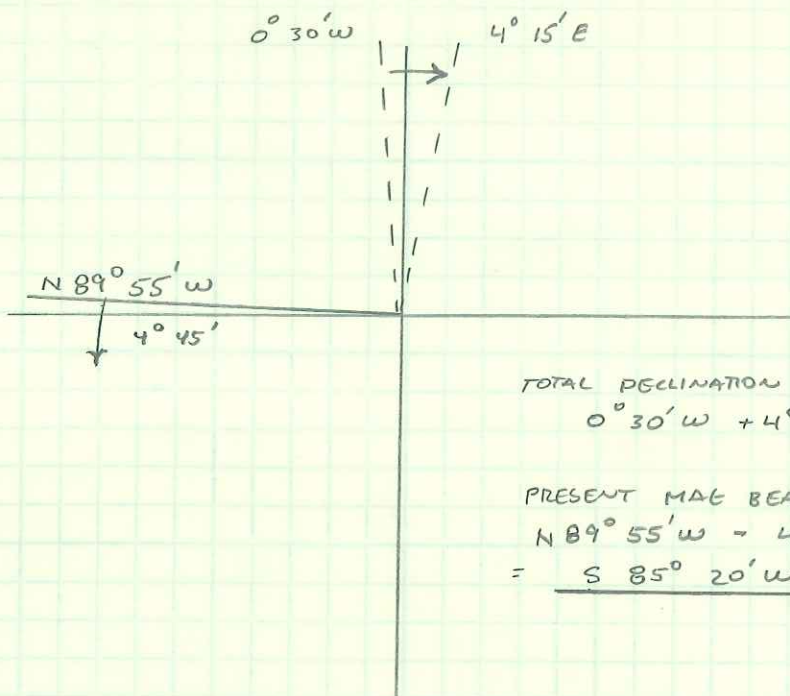
$$2^{\circ} 20' + 1^{\circ} 15' \text{ WESTWARD} \\ = 3^{\circ} 35'$$

PRESENT MAG BEARING =

$$\text{S } 73^{\circ} 10' \text{ W} + 3^{\circ} 35'$$

$$= \underline{\text{S } 76^{\circ} 45' \text{ W}}$$

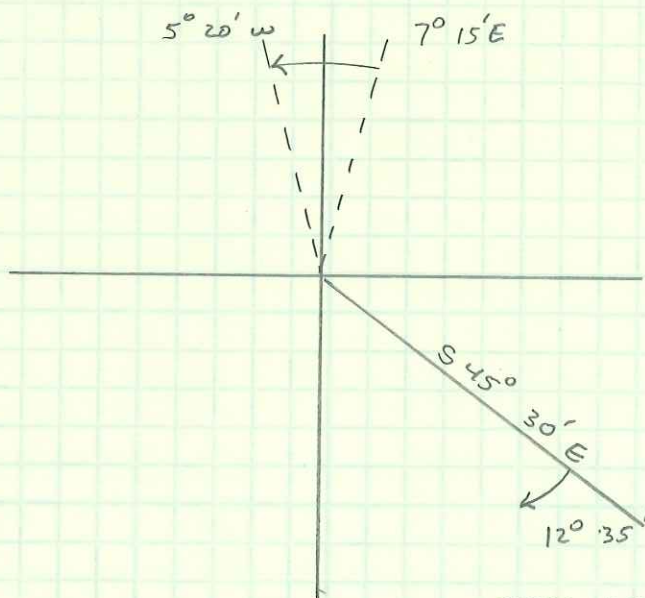
c.



$$\text{TOTAL DECLINATION CHANGE} = \\ 0^{\circ} 30' W + 4^{\circ} 15' = 4^{\circ} 45' \text{ EASTWARD}$$

$$\begin{aligned} \text{PRESENT MAG BEARING} &= \\ N 89^{\circ} 55' W - 4^{\circ} 45' &= \\ \underline{S 85^{\circ} 20' W} \end{aligned}$$

d.



$$\begin{aligned} \text{TOTAL DECLINATION CHANGE} &= \\ 5^{\circ} 20' + 7^{\circ} 15' &= \\ = 12^{\circ} 35' \text{ WESTWARD} \end{aligned}$$

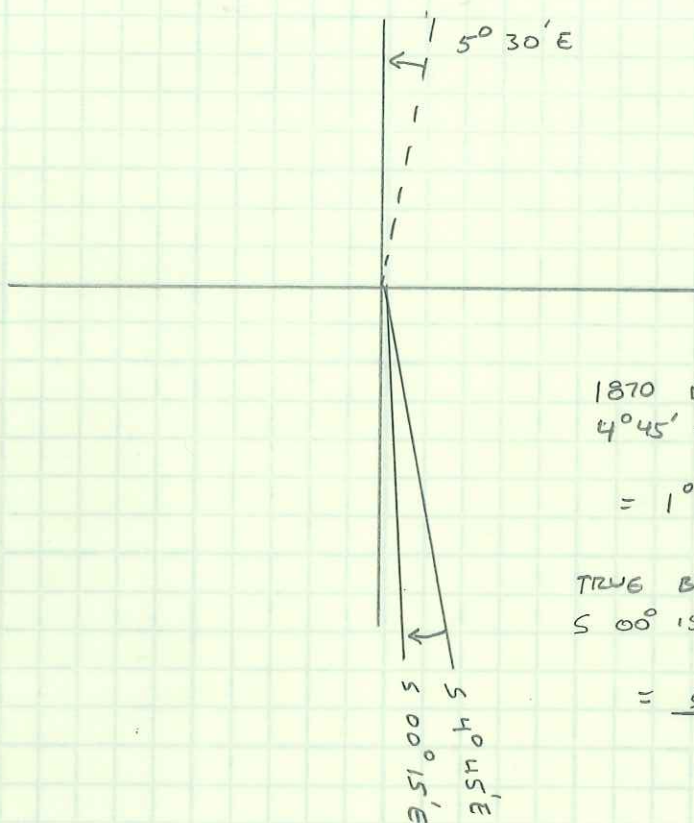
$$\begin{aligned} \text{PRESENT MAG BEARING} &= \\ \underline{S 32^{\circ} 55' E} \end{aligned}$$



2. Calculate the true bearing in 1870 based on the following

	1870 Magnetic Bearing	Present Magnetic Bearing	Present Declination
a	S $00^{\circ} 15' E$	S $4^{\circ} 45' E$	$5^{\circ} 30' E$
b	S $50^{\circ} 30' W$	S $62^{\circ} 15' W$	$15^{\circ} 40' E$
c	N $02^{\circ} 30' W$	N $02^{\circ} 15' E$	$3^{\circ} 15' E$
d	N $24^{\circ} 30' E$	N $21^{\circ} 10' E$	$4^{\circ} 45' E$

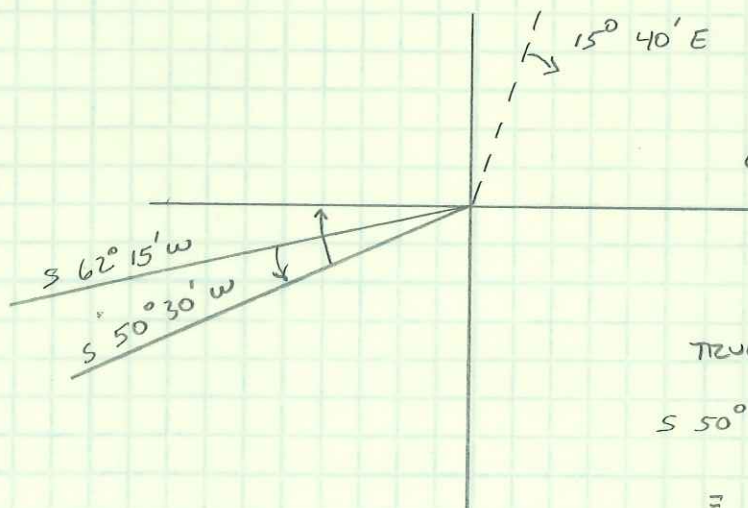
a.



$$\begin{aligned} 1870 \text{ DECLINATION} &= \\ 4^{\circ} 45' - 00^{\circ} 15' &= 4^{\circ} 30' \text{ WESTWARD} \\ &= 1^{\circ} 00' \text{ EAST} \end{aligned}$$

$$\begin{aligned} \text{TRUE BEARING} &= \\ S 00^{\circ} 15' E + 1^{\circ} 00' \text{ WESTWARD} \\ &= \underline{S 00^{\circ} 45' W} \end{aligned}$$

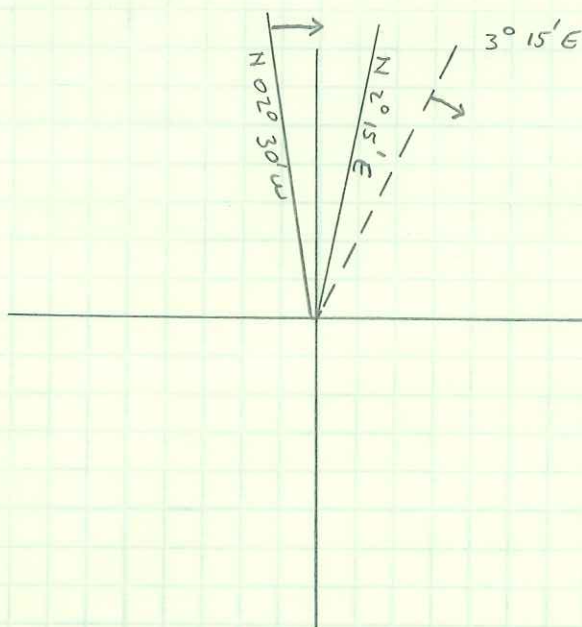
b.



$$\begin{aligned} 1870 \text{ DECLINATION} &= \\ 62^{\circ} 15' - 50^{\circ} 30' &= 11^{\circ} 45' \\ 11^{\circ} 45' + 15^{\circ} 40' &= \\ 27^{\circ} 25' E \end{aligned}$$

$$\begin{aligned} \text{TRUE BEARING} &= \\ S 50^{\circ} 30' W + 27^{\circ} 25' \text{ WESTWARD} \\ &= \underline{S 77^{\circ} 55' W} \end{aligned}$$

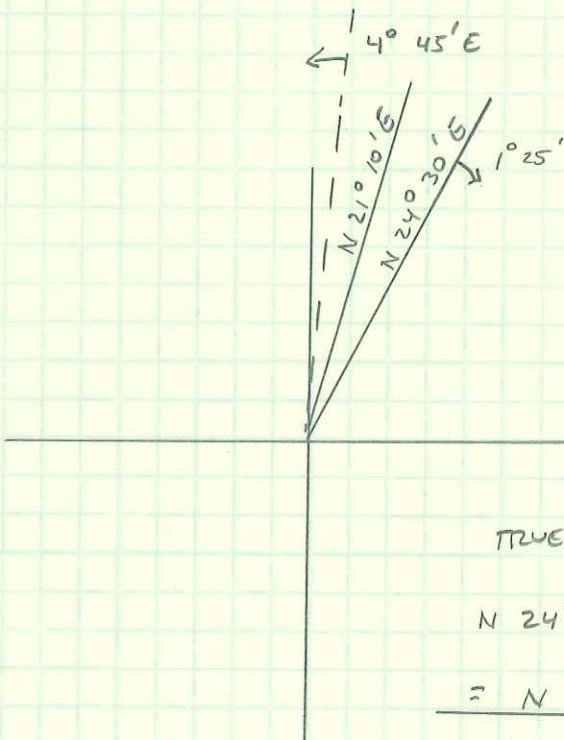
c.



$$\begin{aligned}
 1870 \text{ DECLINATION} &= \\
 &= 2^{\circ} 15' \text{ E} + 2^{\circ} 30' \\
 &= 4^{\circ} 45' \text{ EASTWARD} \\
 &= 3^{\circ} 15' + 4^{\circ} 55' = 8^{\circ} 00' \text{ E}
 \end{aligned}$$

$$\begin{aligned}
 \text{TRUE BEARING} &= \\
 &= 2^{\circ} 30' \text{ W} - 8^{\circ} 00' \text{ EASTWARD} \\
 &= \text{N } 5^{\circ} 30' \text{ E}
 \end{aligned}$$

d.



$$\begin{aligned}
 1870 \text{ DECLINATION} &= \\
 &= 24^{\circ} 30' - 21^{\circ} 10' \text{ WESTWARD} \\
 &= 3^{\circ} 20' \text{ WESTWARD} \\
 &= 1^{\circ} 25' \text{ E}
 \end{aligned}$$

$$\begin{aligned}
 \text{TRUE BEARING} &= \\
 &= \text{N } 24^{\circ} 30' \text{ E} + 1^{\circ} 25' \\
 &= \underline{\text{N } 25^{\circ} 55' \text{ E}}
 \end{aligned}$$