



**education**

Department of  
Education  
FREE STATE PROVINCE

**EXPERIMENT / *EKSPERIMENT***

**GRADE 10 / *GRAAD 10***

**TECHNICAL SCIENCES  
*TEGNIJSE WETENSKAPPE***

**MEMORANDUM**

**SEPTEMBER 2017**

**MARKS: 30 / *PUNTE: 30***

**TIME: 1 HOUR / *TYD: 1 UUR***

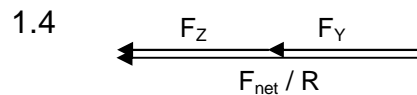
**This memorandum consists of THREE pages.  
*Hierdie memorandum bestaan uit DRIE bladsye.***

### QUESTION 1/ VRAAG 1

1.1 Spring balance ✓ Trekskaal ✓ (1)

1.2 9 N (✓✓) Unit omitted: Max -1 / Eenheid weggelaat: Maks -1 (2)

1.3 Resultant/net ✓ force ✓ Resulterende/netto ✓ krag ✓ (2)



#### Marking criteria

Two arrows, point to the left,  
tail-to-head. ✓  
Labels for forces Z and Y. ✓  
Resultant correctly drawn and labelled. ✓

#### Nasienriglyne

Twee pyle, wys na links, stert-by-kop. ✓  
Byskrifte vir kragte Z en Y. ✓  
Resultant korrek geteken en met 'n  
byskrif. ✓

(3)

1.5 9 ✓ (N) (1)

1.6 Equal in magnitude ✓ Gelyk in grootte ✓  
Opposite in direction ✓ Teenoorgesteld in rigting ✓ (2)

1.7 Equilibrant / Ekwilibrant ✓ (1)

1.8 The equilibrant and resultant ✓ have the same magnitude ✓,  
but act in opposite directions. ✓

*Die ekwilibrant en resultant ✓ het dieselfde grootte ✓  
maar werk in teenoorgestelde rigtings in. ✓*

(3)

**[15]**

## QUESTION 2/ VRAAG 2

2.1

$$\begin{aligned}\tau &= Fd_{\perp} \checkmark \\ &= (0,98) \checkmark (1) \checkmark \\ &= 0,98 \text{ N}\cdot\text{m} \checkmark\end{aligned}$$

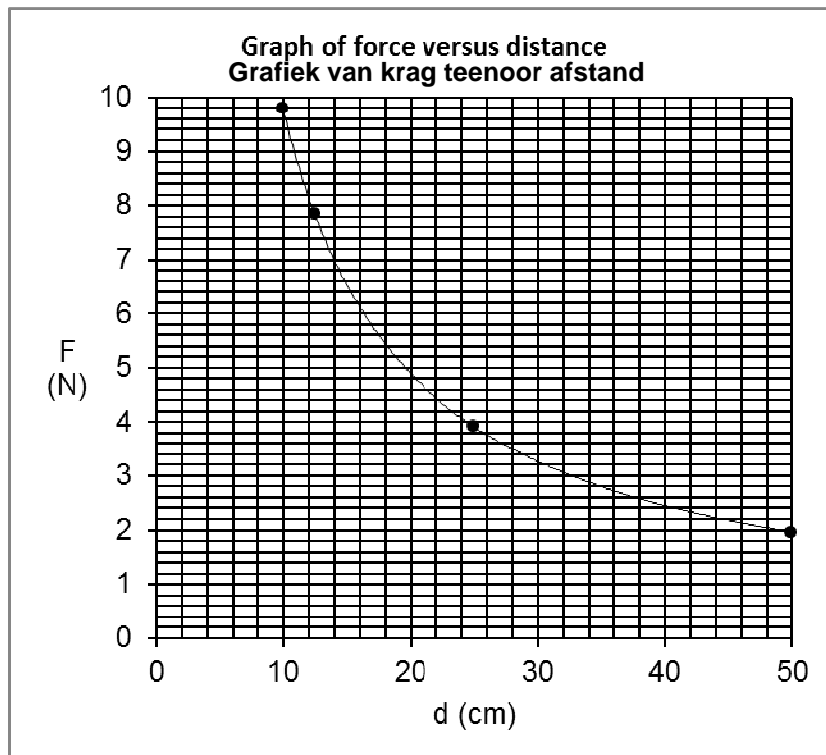
(4)

2.2

$$\begin{aligned}\tau &= Fd_{\perp} \\ 0,98 \checkmark &= (F_2)(0,1667) \checkmark \\ F_2 &= 5,88 \text{ N} \checkmark\end{aligned}$$

(3)

2.3



### Marking criteria

Each point correctly plotted ( $\checkmark \times 4$ )  
Smooth curve for best-fit (hyperbola)  $\checkmark$

### Nasienriglyne

Elke punt korrek gestip ( $\checkmark \times 4$ )  
Gladde bes-passende kurwe (hiperbool)  $\checkmark$

(5)

2.4 Distance / Afstand  $\checkmark$

(1)

2.4 Force  $\checkmark$  is inversely proportional to (perpendicular) distance  $\checkmark$  OR  $F \propto \frac{1}{d}$

Krag  $\checkmark$  is omgekeerd eweredig aan (loodregte) afstand  $\checkmark$  OF  $F \propto \frac{1}{d}$  (2)

[15]

**GRAND TOTAL/GROOTTOTAAL: 30**