22.0 INTRO

1 **a** Er zijn leerlingen die twee (of zelfs drie) van de hobby's hebben.
b Er zijn 16 + 16 − 8 = 24 leerlingen die Zingen of Gamen (of allebei). De overige 30 − 24 = 6 doen dus alleen aan Sporten.
c Er zijn 18 die maar één hobby (6 die alleen Zingen, 6 die alleen Gamen en 6 die alleen Sporten).
Er zijn 6 leerlingen met twee hobby's (2 met alleen Zingen en Gamen, 2 met alleen Sporten en Zingen, 2 met alleen Sporten en Gamen).
Er zijn 6 leerlingen met alle drie de hobby's.

2 Omdat er ook nog getallen zijn tussen 2 en 3.

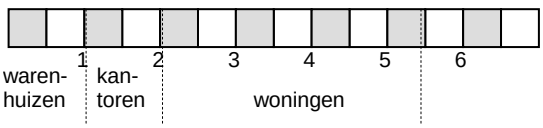
3 **a** $x > 2$
b $x < 1$
c $x > -1$
d $x < 5$
e $x < 0$
f $x > 4$
g $x > -6$
h $x > 6$

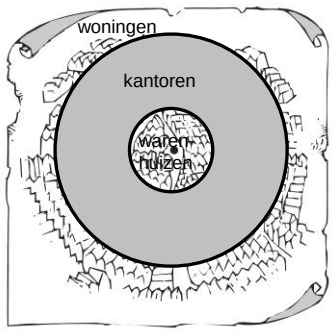
22.1 ONGELIJKHEDEN

4 **a**

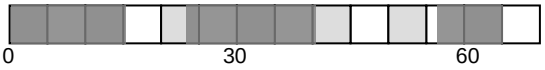

b

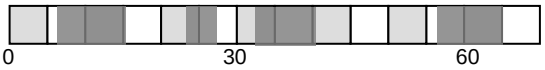

c


5 **a** € 100,-
b 400 m
c $1\frac{1}{2}$ km
d Bij warenhuizen ; Bij woningen
e Warenhuizen ; Kantoren
f


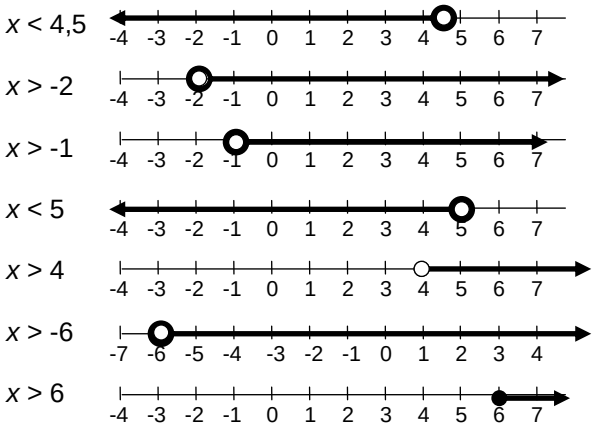
g


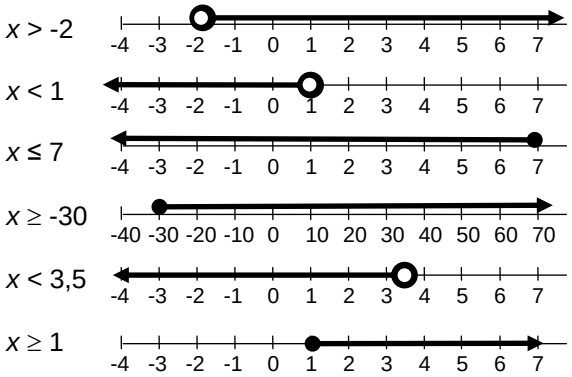
6 **a** Steeds klimt de slak een stuk naar boven. Tijdens de rustpauzes glijdt de slak een stukje naar beneden.
b

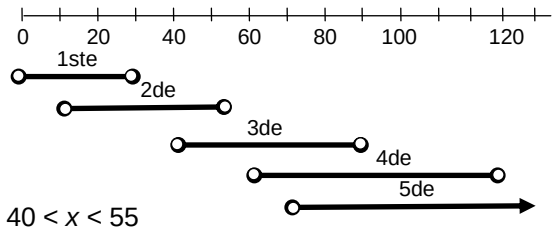

c


d


e $h \leq 30$
$15 \leq h \leq 30$

7


8


9 **a**


b $40 < x < 55$
c De 4e versnelling. Je kunt direct schakelen tussen de 3de en de 5de versnelling.
d $40 < x \leq 60$

10 **a** 4 (in 3 klassen passen 96 leerlingen).
b $128 < x \leq 160$
c $32 < x \leq 64$
$64 < x \leq 96$
$96 < x \leq 128$
$160 < x \leq 192$
$192 < x \leq 224$

d Bij 5 klassen zijn er minstens 129 leerlingen.
Dus gemiddeld per klas 129 : 5 = 25,8.

e $65 : 3 = 21\frac{2}{3}$

f $33 : 2 = 16\frac{1}{2}$
$97 : 4 = 24\frac{1}{4}$
$161 : 6 = 26\frac{5}{6}$
$193 : 7 = 27\frac{4}{7}$

g $\frac{(n-1)\cdot 32+1}{n} = \frac{32n-31}{n}$

h $\frac{32n-31}{n} > 28$
$32n - 31 > 28n$
$4n > 31$
$n > 7\frac{3}{4}$
$n \geq 8$, dus minstens 8 klassen

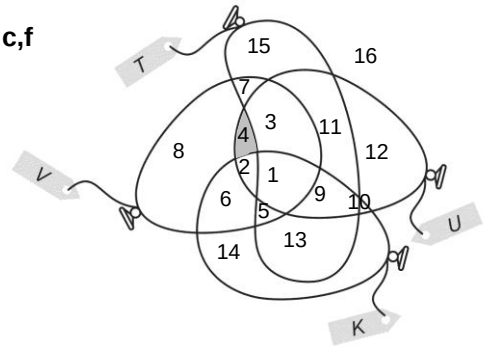
11 a Er zitten geen *gehele* getallen tussen 100 en 101

b $64 < x < 151$

c $122 \geq x \geq 90$

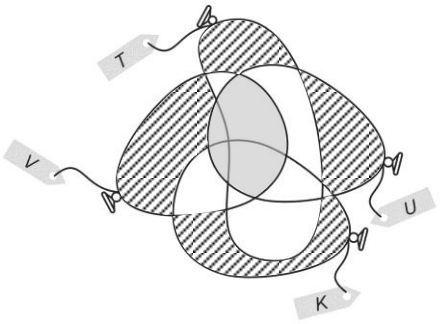
d $85 - 69 = 16$
$84 - 70 = 14$

12 c,f

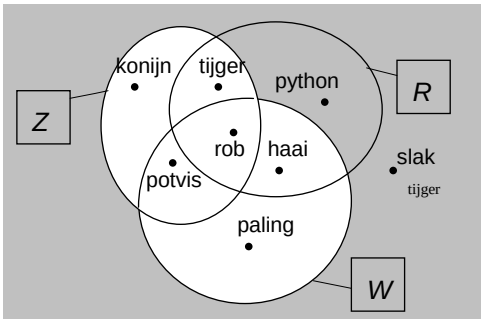


e $2^4 = 16$ (4 keer kiezen uit 2 dingen).

g,h



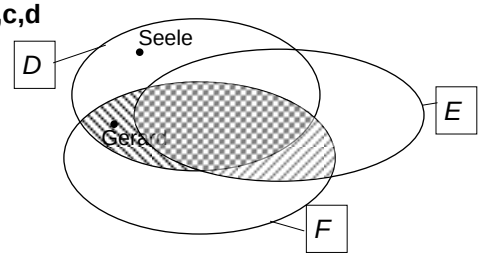
13 a,b



14 a 5 ; 18 ; 7 ; 6

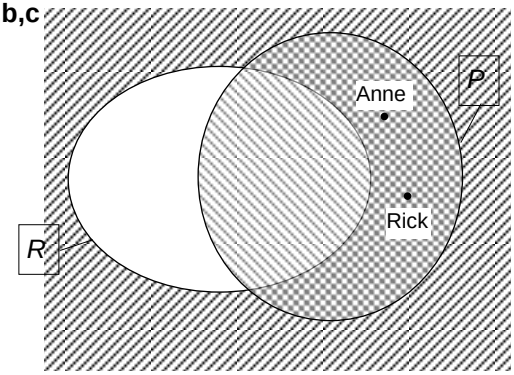
b 18 = 5 + 7 + 6

15 a,c,d

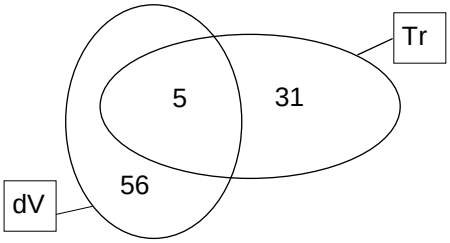


b Die spreken alledrie de talen.

16 a,b,c

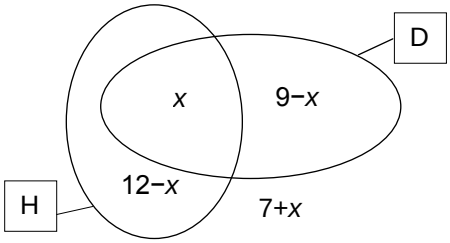


17 a



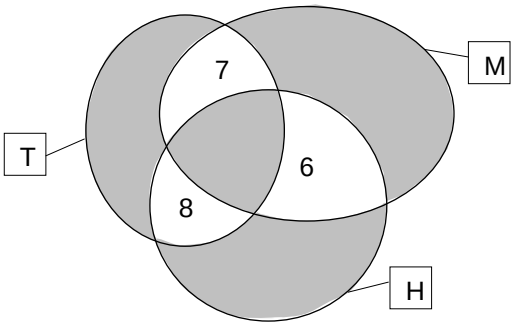
b In 5 gezinnen.

18 a



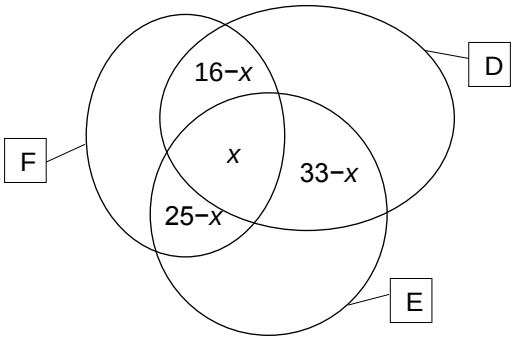
b $21-x = 2\cdot(12-x)$ geeft $x = 3$

19 a



b Wel tekenen: 7 + 8 = 15 leerlingen
Wel handvaardigheid: 8 + 6 = 14 leerlingen
Wel muziek: 7 + 6 = 13 leerlingen

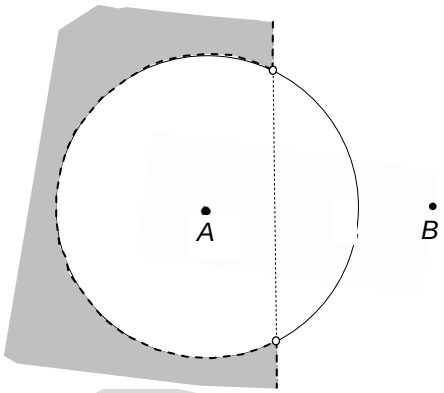
20 a



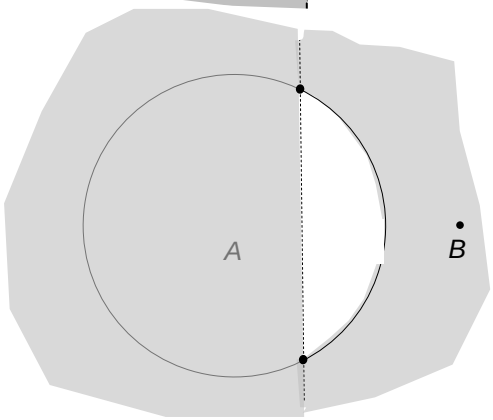
b $50 = x + (16 - x) + (33 - x) + (25 - x)$
$50 = 74 - 2x$
$2x = 24$
$x = 12$

22.3 EN / OF

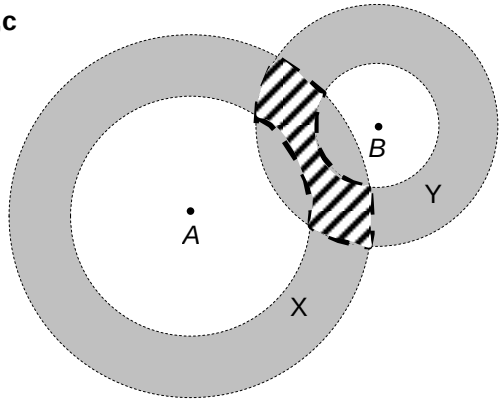
21 a,b



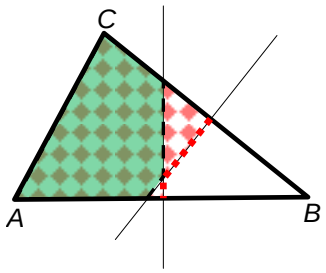
c



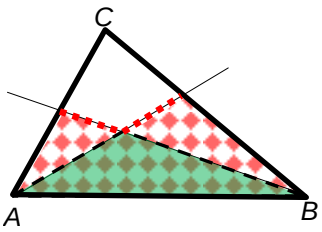
22 a,b,c



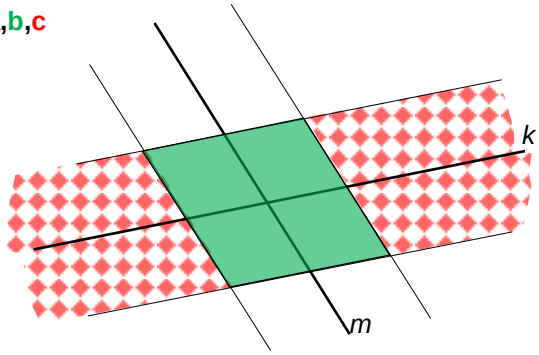
23 a,b,c



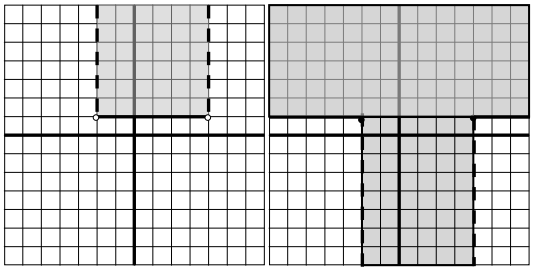
24 a,b,c



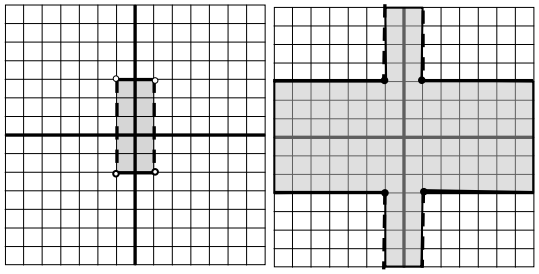
25 a,b,c



26 a,b



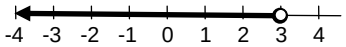
c,d



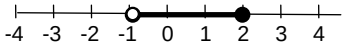
27 $40 \le x \le 54$
$30 < x \le 54$
$x < 41$

28 a,b

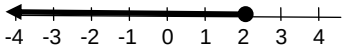
$x < 3$



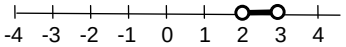
$-1 < x \le 2$



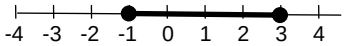
$x \le 2$



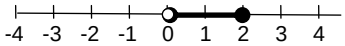
$2 < x < 3$



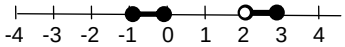
c,d $-1 \le x \le 3$



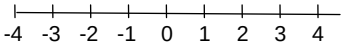
$0 < x \le 2$



$-1 \le x \le 0$ of $2 < x \le 3$

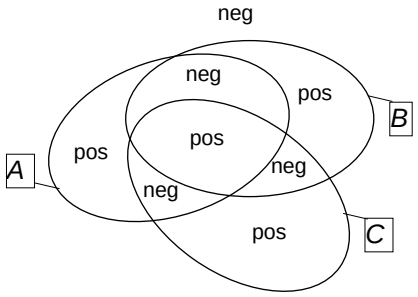


geen x



29 a drie
b twaalf
c zes
d drie

30 a



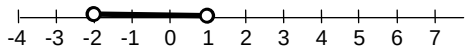
b $a > 0$ en $b < 0$ en $c > 0$
$a < 0$ en $b > 0$ en $c > 0$
$a,b,c < 0$
c $a > 0$ en $b > 0$ en $c > 0$
$a > 0$ en $b < 0$ en $c < 0$
$a < 0$ en $b > 0$ en $c < 0$
$a < 0$ en $b < 0$ en $c > 0$

31 a $a > 0$ en $b > 0$ of
$a < 0$ en $b < 0$
b $a > 0$ en $b < 0$ of
$a > 0$ en $b < 0$

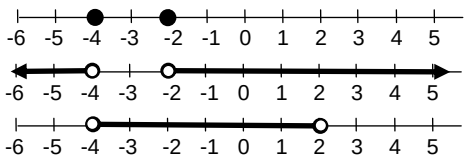
32 a Bijvoorbeeld: $a = 1, b = 2, c = 5$
$a = 0{,}5, b = 20, c = 0{,}5$
$a = 5, b = 0{,}4, c = 5$
b $c = 40$
c Minstens een van de drie getallen is 0.
d $a = 0$ of $b = 0$ of $c = 0$

33 a $x = -2$, $x = 1$
b $x = 0$, $x = 5$
c $x = 0$, $x = 2{,}5$, $x = -0{,}3$
d $x = -2$, $x = 2$

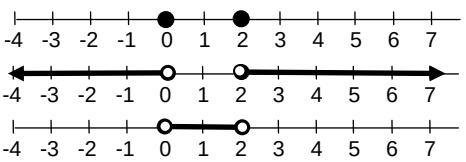
34 a



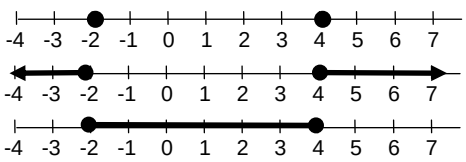
b



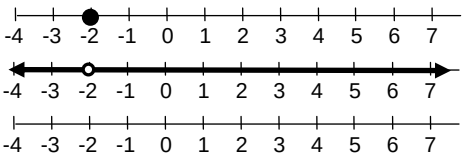
c



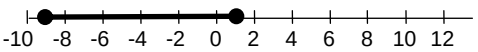
d



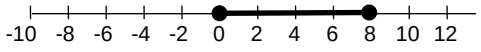
e



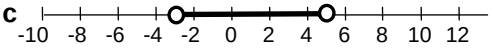
35 a $(x-1)(x+9) \le 0$



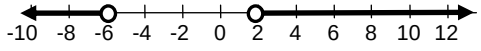
b $x(x-8) \le 0$



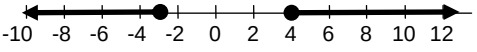
c



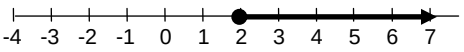
d $(x+6)(x-2) > 0$



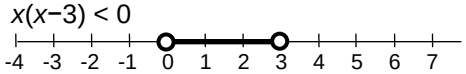
e $(x-4)(x+3) \ge 0$



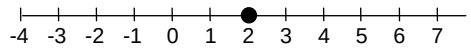
36 a $x \ge 2$



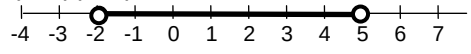
b $x(x-3) < 0$



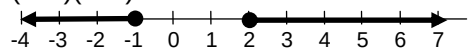
c $(x-2)^2 \le 0$



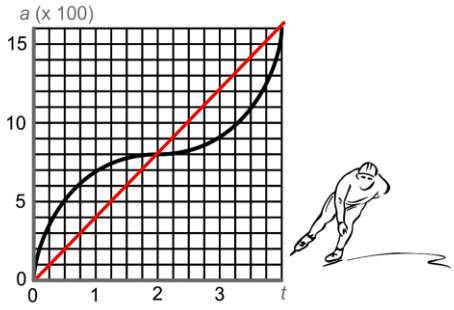
d $(x-5)(x+2) < 0$



e $(x-2)(x+1) \ge 0$



37 a Is Jan Peter misschien gevallen?
b $t=1$ geeft $a=1-6+12 = 7$; dat klopt.
$t=2$ geeft $a=8-24+24 = 8$; dat klopt.
$t=3$ geeft $a=27-54+36 = 9$; dat klopt.
$t=4$ geeft $a=64-96+48 = 16$; dat klopt.
c

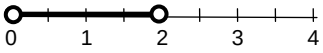


d $a = 4t$

e $t^3 - 6t^2 + 8t = 0$
$t(t^2-6t+8) = 0$
$t(t-4)(t-2) = 0$

f $t = 0$, $t = 4$, $t = 2$

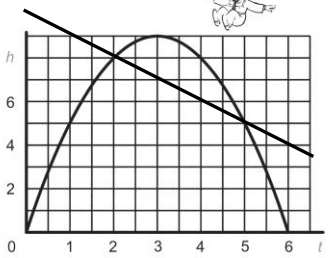
g $t^3 - 6t^2 + 12t > 4t$
$0 < t < 2$



38 a t=1 geeft h=6–1=5 ; dat klopt.
t=4 geeft h=24–16=8 ; dat klopt.

b $6t - t^2 = 0$
$t(6-t) = 0$
$t = 0$, $t = 6$
Op tijdstip 6 sec.

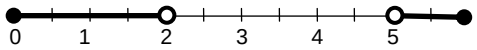
c



d $h = 10 - t$

e $6t - t^2 = 10 - t$
$-t^2 + 7t - 10 = 0$
$t^2 - 7t + 10 = 0$
$(t-5)(t-2) = 0$
$t = 5$, $t = 2$

f $6t - t^2 > 10 - t$
$t < 2$ of $t > 5$



g Nee, je kunt alleen zien dat ze dan even hoog zijn.

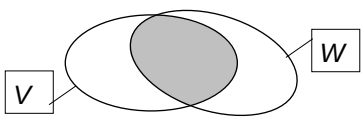
OKER OPGAVEN

2 Antwoord B (want lichtblauw is lichter dan wit, dat volgt uit het feit dan P lichter is dan Q)

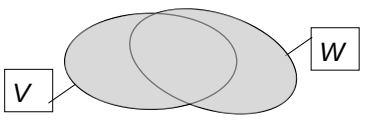
8 a $-2 < x < 2$
$x < -1$ of $x > 2$
alle x
geen x

b $x > 0$
$x < 0$
$0 < x < 2$
$x < 0$ of $x > 2$

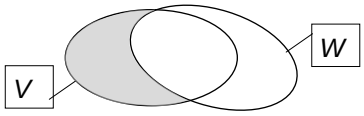
16 a



b



c



19 a 10

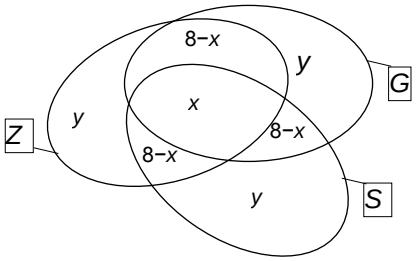
b 5 ; 7

c 12 ; 0

d 5 ; 12

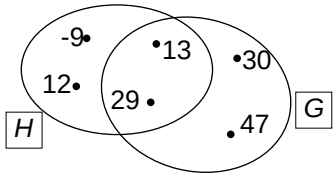
e 0 ; 5

20 a



b Noem het aantal leerlingen dat alledrie de hobby's heeft: x en het aantal leerlingen dat maar één hobby heeft: y.
$y + 8-x + 8-x + x = 16$, dus $y = x$.
Er zijn 30 leerlingen in totaal, dus
$4x + 3(8-x) = 30$, dus $x = 6$.

28 a



b 17 ; 57 ; 18 ; 22

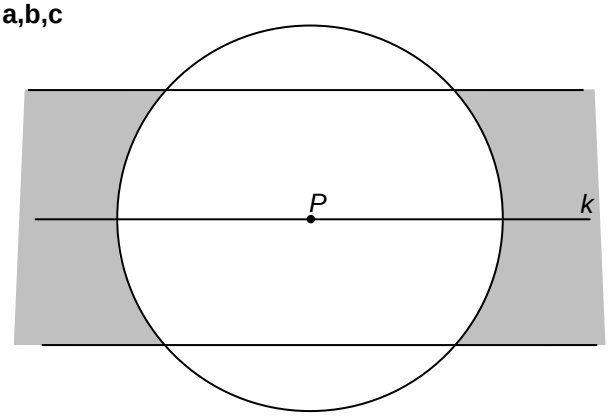
c 57 = 17 + 18 + 22

30 a 16

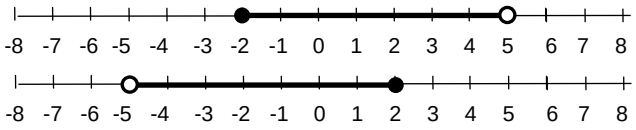
b $a > 0$ en $b > 0$ en $c > 0$ en $d > 0$
$a > 0$ en $b > 0$ en $c < 0$ en $d < 0$
$a > 0$ en $b < 0$ en $c < 0$ en $d > 0$
$a > 0$ en $b < 0$ en $c > 0$ en $d < 0$
$a < 0$ en $b > 0$ en $c > 0$ en $d < 0$
$a < 0$ en $b > 0$ en $c < 0$ en $d > 0$
$a < 0$ en $b < 0$ en $c > 0$ en $d > 0$
$a < 0$ en $b < 0$ en $c < 0$ en $d < 0$

22.5 EXTRA OPGAVEN

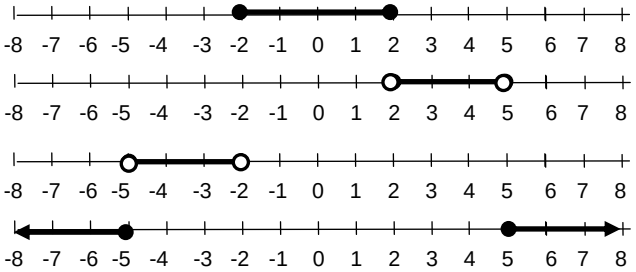
1 **a,b,c**



2 **a**

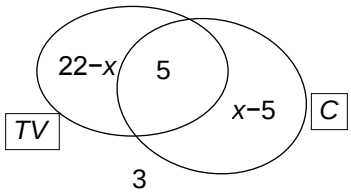


b



c $-2 \le x \le 2$
$2 < x < 5$
$-5 < x < -2$
$x \le -5$ of $x \ge 5$

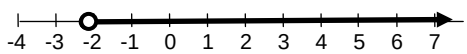
3 **a**



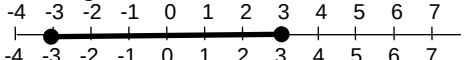
b $27-x = 2 \cdot x$, dus $x = 9$
18 leerlingen hebben een eigen tv op hun kamer.

4

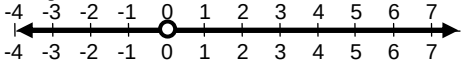
$x > -2$



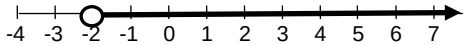
$-3 \le x \le 3$



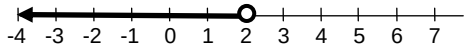
$x \neq 0$



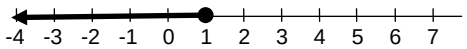
$x > -2$



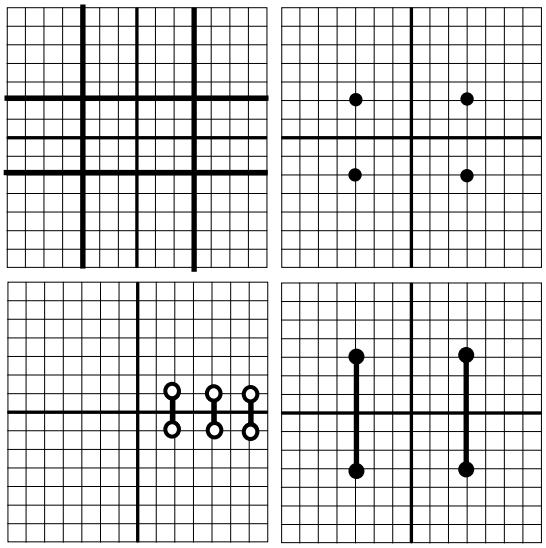
$x < 2$



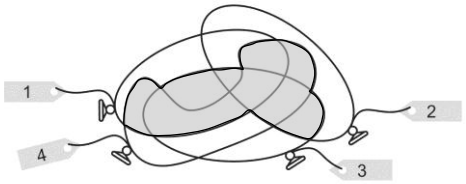
$x \le 1$



5

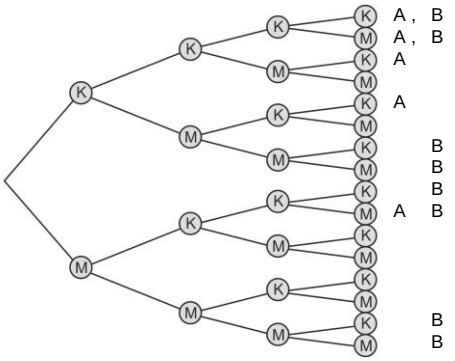


6 **a**



b … als (brug 1 of brug 2 niet is ingestort) en
(brug 3 of brug 4 niet is ingestort)

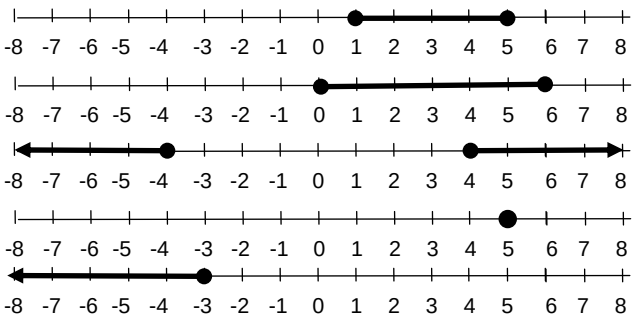
7 **a**



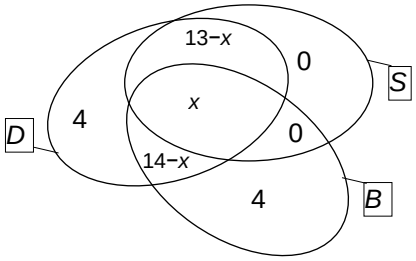
b 5 8 3 10 5

c $\frac{5}{16}$ $\frac{1}{2}$ $\frac{3}{16}$ $\frac{5}{8}$ $\frac{5}{16}$

8



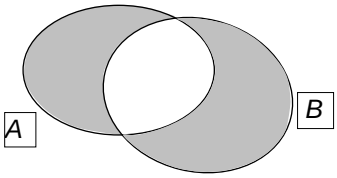
9



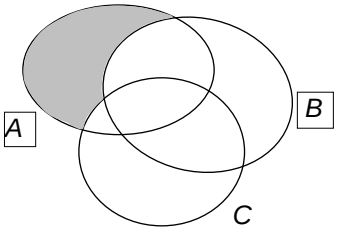
Noem het aantal leden dat alle drie de denksporten doet: x, Dan is het aantal dat alleen schaakt en damt: $13 - x$
En het aantal leden dat alleen bridget en damt:
$18 - x - 4 = 14 - x$
Omdat het totaal 32 is, moet
$4 + 4 + 13 - x + x + 14 - x = 32$ zijn.
Dus $35 - x = 32$, $x = 3$.

Aantal leden dat dam en bridget, maar niet schaakt = $14 - 3 = 11$.

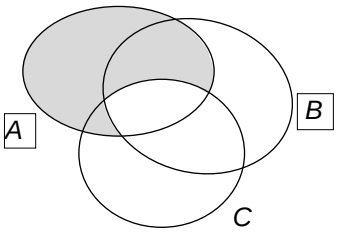
10 a Ja, want beiden bekijken:



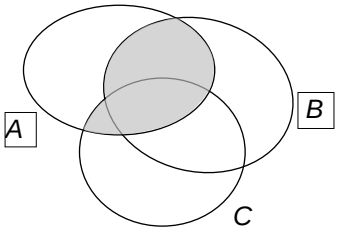
b Nee, want Jan bekijkt:



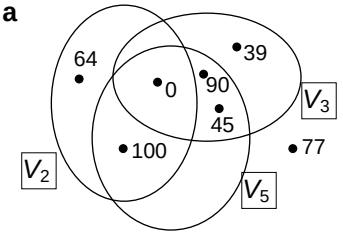
en Piet bekijkt:



c Ja, want beiden bekijken:



11 a



b 0 , 6 , 12 , 18 , 24 , ...
c V_6
d 15
e V_{30}
f 30 ; 30 ; 36 ; 12