

1:08 | Equations, Inequations and Formulae

1 Solve the following.

a $a + 7 = 25$	b $m - 6 = -1$	c $5x = 75$	d $10 - y = 12$
e $3p = 7$	f $\frac{n}{4} = 3$	g $2x + 3 = 7$	h $8m + 5 = 21$
i $5y + 2 = 3$	j $9k - 1 = 5$	k $5 + 3x = 11$	l $15 - 2q = 8$

2 Solve the following.

a $5m + 2 = 4m + 7$	b $3x - 7 = 2x - 3$	c $5x + 2 = 6x - 5$
d $2a + 3 = 3a - 5$	e $3m - 2 = 5m - 10$	f $q + 7 = 8q + 14$
g $10 - 2x = x + 4$	h $3z + 7 = z + 10$	i $13 - 2m = 9 - 5m$

3 Solve these equations involving grouping symbols.

a $5(a + 1) = 15$	b $4(x - 3) = 16$	c $3(2x + 5) = 33$
d $3(5 - 2a) = 27$	e $4(3 - 2x) = 36$	f $3(2m - 5) = 11$
g $3(a + 2) + 2(a + 5) = 36$	h $2(p + 3) + p + 1 = 31$	
i $4(2b + 7) = 2(3b - 4)$	j $4(2y + 3) + 3(y - 1) = 2y$	
k $3(m - 4) - (m + 2) = 0$	l $2m - 3(1 - m) = 22$	
m $5(y - 3) - 3(1 - 2y) = 4$	n $4(2x - 1) - 2(x + 3) = 5$	

4 Solve these equations.

a $\frac{5x}{2} = 10$	b $\frac{2a}{3} = 6$	c $\frac{3m}{5} = 4$	d $\frac{n+1}{5} = 2$	e $\frac{x-4}{2} = 1$	f $\frac{2p+5}{3} = 1$
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5 Solve these equations involving fractions.

a $\frac{a}{3} + \frac{a}{3} = 4$	b $\frac{2x}{5} - \frac{x}{5} = 3$	c $\frac{5p}{3} - \frac{p}{3} = 8$
d $\frac{q}{2} - \frac{q}{3} = 6$	e $\frac{2k}{3} - \frac{k}{4} = 10$	f $\frac{3x}{4} - \frac{x}{2} = 15$
g $\frac{m+6}{3} = \frac{2m+4}{4}$	h $\frac{n-3}{2} = \frac{3n-5}{4}$	i $\frac{5x-1}{3} = \frac{3-x}{2}$
j $\frac{x+3}{2} + \frac{x+5}{5} = 8$	k $\frac{m+2}{5} - \frac{m+3}{6} = 1$	l $\frac{3a+4}{2} - \frac{a-1}{3} = \frac{2a+3}{4}$

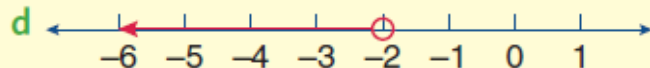
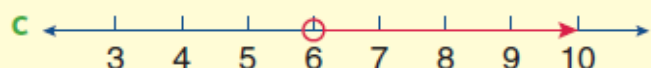
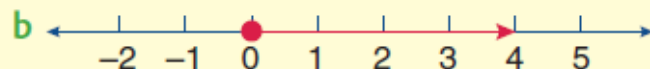
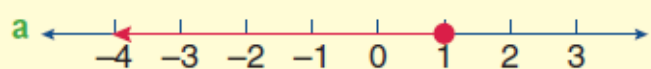
6 a Translate these into an equation, using n as the unknown number.

- A certain number is multiplied by 8, then 11 is added and the result is 39.
- I think of a number, double it, add 7 and the result is 5.
- I think of a number, add 4 and then divide the result by 10. The answer is 7.

b Solve each of the following problems by first forming an equation.

- If 5 is added to 3 times a certain number, the result is 38.
What is the number?
- If one quarter of a certain number is added to half the same number, the result is 6. What is the number?
- A rectangle is four times as long as it is wide. If it has a perimeter of 340 m, what are its dimensions?

7 Write the set of x that has been graphed below.



8 Solve these inequations and show the solution to each on a number line.

a $x + 7 > 11$

b $a - 5 < 3$

c $10 - y \geq 8$

d $3m \leq 21$

e $15 < 4x$

f $\frac{m}{4} < 1$

g $2x + 1 > 5$

h $7 - 3n > 4$

i $5x + 6 > x + 18$

j $3x - 5 < x + 6$

k $3 - a < 5 - 2a$

l $3(m + 4) < 2(m + 6)$

m $\frac{x}{2} + 1 < 6$

n $\frac{3x}{4} - 5 > 1$

o $5 - \frac{2y}{3} < 6$

p $\frac{p-1}{4} < 2$

q $\frac{2p+3}{2} > 7$

r $\frac{4-x}{3} > 1$

s $\frac{x}{2} + \frac{x}{3} > 5$

t $\frac{a}{4} + \frac{a}{2} < 6$

u $\frac{x}{2} - \frac{2x}{3} < 3$

9 a If $s = ut + \frac{1}{2}at^2$, find s if $u = 9$, $t = 4$ and $a = 7$.

b Given $F = p + qr$, find F if $p = 2.3$, $q = 3.9$ and $r = 0.9$.

c For the formula $T = a + (n - 1)d$, find T if $a = 9.2$, $n = 6$ and $d = 1.3$.

10 a Given that $V = LBH$, evaluate B when $V = 4.32$, $L = 1.2$ and $H = 0.9$.

b It is known that $S = \frac{a}{1-r}$. Find a when $S = 25$ and $r = 0.6$.

c $F = 32 + \frac{9C}{5}$. Find C if $F = 77$.

d If $v^2 = u^2 + 2as$, find a if $v = 2.1$, $u = 1.6$ and $s = 0.3$.

e Given that $T = a + (n - 1)d$, find d if $T = 24.6$, $a = 8.8$ and $n = 4$.

11 Change the subject of each formula to y .

a $\frac{x}{a} + \frac{y}{b} = 1$

b $ay^2 = x$

c $T = \sqrt{\frac{B}{y}}$

d $ay = by - 1$

The subject goes on the left.



Answers:

Exercise 1:08

1 a $a = 18$ b $m = 5$ c $x = 15$ d $y = -2$ e $p = 2\frac{1}{3}$ f $n = 12$ g $x = 2$ h $m = 2$

i $y = \frac{1}{5}$ j $k = \frac{2}{3}$ k $x = 2$ l $q = 3\frac{1}{2}$
2 a $m = 5$ b $x = 4$ c $x = 7$ d $a = 8$ e $m = 4$ f $q = -1$ g $x = 2$ h $z = 1\frac{1}{2}$ i $m = -1\frac{1}{3}$

3 a $a = 2$ b $x = 7$ c $x = 3$ d $a = -2$ e $x = -3$ f $m = 4\frac{1}{3}$ g $a = 4$ h $p = 8$
i $b = -18$ j $y = -1$ k $m = 7$ l $m = 5$ m $y = 2$ n $x = 2\frac{1}{2}$

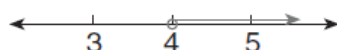
4 a $x = 4$ b $a = 9$ c $m = 6\frac{2}{3}$ d $n = 9$ e $x = 6$ f $p = -1$

5 a $a = 6$ b $x = 15$ c $p = 6$ d $q = 36$ e $k = 24$ f $x = 60$ g $m = 6$ h $n = -1$
i $x = \frac{11}{13}$ j $x = \frac{55}{7}$ k $m = 33$ l $a = \frac{-19}{8}$

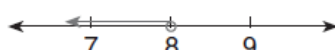
6 a i $8n + 11 = 39$ ii $2n + 7 = 5$ iii $\frac{n+4}{10} = 7$ or $(n+4) \div 10 = 7$

b i 11 ii 8 iii width = 34 m, length = 136 m 7 a $x \leq 1$ b $x \geq 0$ c $x > 6$ d $x < -2$

8 a $x > 4$



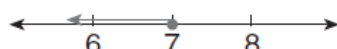
b $a < 8$



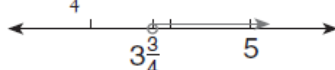
c $y \leq 2$



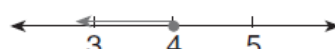
d $m \leq 7$



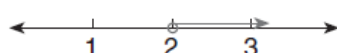
e $x > 3\frac{3}{4}$



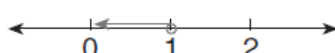
f $m \leq 4$



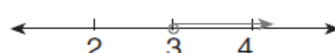
g $x > 2$



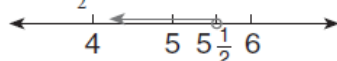
h $n < 1$



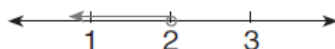
i $x > 3$



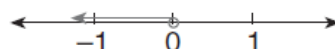
j $x < 5\frac{1}{2}$



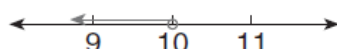
k $a < 2$



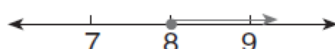
l $m < 0$



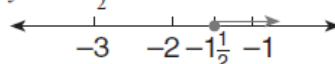
m $x < 10$



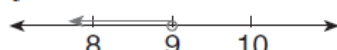
n $x \geq 8$



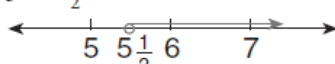
o $y \geq -1\frac{1}{2}$



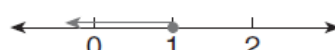
p $p < 9$



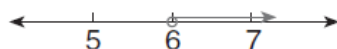
q $p > 5\frac{1}{2}$



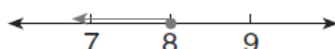
r $x \leq 1$



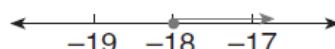
s $x > 6$



t $a \leq 8$



u $x \geq -18$



9 a 92 b 5.81 c 15.7

10 a 4 b 10 c 25 d $3.08\dot{3}$ e $5.2\dot{6}$

11 a $y = \frac{ab-bx}{a}$ (or $y = \frac{b(a-x)}{a}$) b $y = \pm \sqrt{\frac{x}{a}}$ c $y = \frac{B}{T^2}$ d $y = \frac{-1}{a-b}$ (or $y = \frac{1}{b-a}$)