Rearranging Formulae

GCSE Mathematics • **Higher Tier** • Grades 6–7 • Non-calculator

WORKED SOLUTIONS

Name: worked example Class: _____ Total: 52 / 52

Show all your working. Marks are given for correct method as well as the final answer.

1. Make x the subject of $y = x + 7$. **[1 mark]**

take 7 from both sides

Answer: $x = y - 7$

2. Make x the subject of $y = 5x$. **[1 mark]**

divide both sides by 5

Answer: $x = \frac{y}{5}$

3. Make x the subject of $y = 3x + 2$. **[2 marks]**

-2: $y - 2 = 3x$
$\div 3$

Answer: $x = \frac{y-2}{3}$

4. Make x the subject of $y = \frac{x}{4} - 1$. **[2 marks]**

$+1$: $y + 1 = \frac{x}{4}$
$\times 4$

Answer: $x = 4(y + 1)$

5. Make a the subject of $v = u + at$. **[2 marks]**

$-u$: $v - u = at$
$\div t$

Answer: $a = \frac{v-u}{t}$

6. Make t the subject of $d = st$. **[1 mark]**

divide by s

Answer: $t = \frac{d}{s}$

7. Make h the subject of $A = \frac{1}{2}bh$. **[2 marks]**

$\times 2$: $2A = bh$
$\div b$

Answer: $h = \frac{2A}{b}$

8. Make r the subject of $C = 2\pi r$. **[2 marks]**

divide by 2π

Answer: $r = \frac{C}{2\pi}$

9. Make x the subject of $y = 2(x + 5)$. **[2 marks]**

$\div 2$: $\frac{y}{2} = x + 5$
-5

Answer: $x = \frac{y}{2} - 5$

10. Make C the subject of $F = \dfrac{9C}{5} + 32$. **[3 marks]**

-32: $F - 32 = \frac{9C}{5}$
$\times 5$: $5(F - 32) = 9C$
$\div 9$

Answer: $C = \frac{5(F-32)}{9}$

11. Make x the subject of $y = x^2$ (taking the positive root). **[2 marks]**

square root both sides

Answer: $x = \sqrt{y}$

12. Make x the subject of $y = \sqrt{x}$. **[2 marks]**

square both sides
squaring undoes a root

Answer: $x = y^2$

13. Make r the subject of $A = \pi r^2$. **[3 marks]**

$\div \pi$: $\frac{A}{\pi} = r^2$
square root

Answer: $r = \sqrt{\frac{A}{\pi}}$

14. Make x the subject of $y = \sqrt{x+3}$. **[3 marks]**

square: $y^2 = x + 3$
-3

Answer: $x = y^2 - 3$

15. Make t the subject of $s = \dfrac{1}{2}gt^2$. **[3 marks]**

$\times 2$: $2s = gt^2$
$\div g$, then square root

Answer: $t = \sqrt{\frac{2s}{g}}$

16. Make x the subject of $y = \dfrac{6}{x}$. **[3 marks]**

$\times x$: $xy = 6$
$\div y$
get x off the bottom first

Answer: $x = \frac{6}{y}$

17. Make R the subject of $I = \dfrac{V}{R}$. **[3 marks]**

$\times R$: $IR = V$
$\div I$

Answer: $R = \frac{V}{I}$

18. Make x the subject of $ax = bx + c$. **[4 marks]**

$-bx$: $ax - bx = c$
factorise: $x(a - b) = c$
x appears twice -- factorise it out
$\div (a - b)$

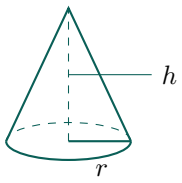
Answer: $x = \frac{c}{a-b}$

19. Make x the subject of $y = \dfrac{x+1}{x-2}$. **[5 marks]**

$\times (x - 2)$: $y(x - 2) = x + 1$
$xy - 2y = x + 1$
$xy - x = 2y + 1$
$x(y - 1) = 2y + 1$
$\div (y - 1)$

Answer: $x = \frac{2y+1}{y-1}$

20. The volume of a cone is $V = \dfrac{1}{3}\pi r^2 h$.



(a) Make h the subject. **[3 marks]**

$\times 3$: $3V = \pi r^2 h$
$h = \frac{3V}{\pi r^2}$

(b) Work out h when $V = 100\pi$ and $r = 5$. **[3 marks]**

$h = \frac{3\times 100\pi}{\pi \times 25}$
$= \frac{300}{25}$
$= 12$

Answer: $h = \frac{3V}{\pi r^2}$; $h = 12$

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