

<p><i>Eric has answered this question <b>correctly</b>.</i></p> <p><b>Q:</b> Convert 27/60 to a percentage</p> <p><b>A:</b> <math>\frac{27}{60} = \frac{9}{20} = \frac{45}{100} \rightarrow \underline{45\%}</math></p>	<p><b>1:</b> What is meant by the word 'percentage'?</p>
<p style="text-align: center;"><i>Your turn</i></p> <p><b>Q:</b> Convert 28/80 to a percentage</p> <p><b>A:</b></p>	<p><b>2:</b> Using Eric's answer, write 27/60 as a decimal</p>
	<p><b>3:</b> Complete the sentence describing Eric's method</p> <p><i>Eric converted the fraction a percentage by...</i></p>

Calculate the following, giving your answers as percentages Task 1.1

a) 14 out of 20	b) 14 out of 35	c) 45 out of 150
d) 24 out of 40	e) 12 out of 75	f) 42 out of 120
g) 2 red, 6 blue. % red?	h) 2 red, 8 blue. % blue?	i) 23 red, 27 blue. % red?
j) 18 red, 22 blue. % blue?	k) 6 red, 10 blue. % red?	l) 38 red, 42 blue. % blue?
m) $\frac{2}{5} + \frac{1}{10}$	n) $\frac{4}{5} - \frac{3}{20}$	o) $\frac{1}{4} + \frac{1}{5}$
p) $\frac{9}{20} - \frac{3}{10}$	q) $\frac{13}{20} + \frac{1}{10}$	r) $\frac{3}{4} - \frac{17}{25}$
s) $\frac{6}{25} + \frac{1}{4}$	t) $\frac{3}{20} - \frac{3}{25}$	u) $\frac{3}{50} + \frac{3}{4}$
v) $\frac{1}{2} + \frac{3}{30} + \frac{1}{50}$	w) $\frac{1}{5} + \frac{3}{4} - \frac{3}{50}$	x) $\frac{3}{5} + \frac{9}{10} - \frac{4}{25}$

3%	7%	15%	16%	25%	30%	35%	37.5%
40%	45%	46%	49%	50%	52.5%	55%	60%
62%	65%	<b>a</b> 70%	75%	80%	81%	89%	134%

Complete the tables of equivalent fractions, decimals and percentages.										Task 1.2
$\frac{1}{2}$						25%				8%
$\frac{2}{10}$				$\frac{3}{5}$				$\frac{3}{25}$		
	0.9			$\frac{3}{20}$						6.5%
	0.09				0.4					45%
		2%			0.8				2	
$\frac{1}{4}$	$\frac{2}{1}$	$\frac{2}{5}$	$\frac{4}{5}$	$\frac{9}{10}$	$\frac{9}{20}$	$\frac{2}{25}$	$\frac{1}{50}$	$\frac{9}{100}$	$\frac{13}{200}$	
0.02	0.065	0.08	0.12	0.15	0.2	0.25	0.45	0.5	0.6	
9%	12%	15%	20%	40%	50%	60%	80%	90%	200%	

Fill each empty box with the sum of shaded boxes surrounding it, as a percentage.							Task 1.3
0.2		25%			0.1		18%
	$\frac{1}{4}$			$\frac{1}{5}$		$\frac{11}{25}$	
30%		0.15			1%		0.23
	$\frac{1}{20}$			$\frac{3}{10}$		$\frac{8}{25}$	
0.4		35%			0.12		30%

Comparing with Percentages		Worked Example 2
<p><i>Sam has answered this question <b>correctly</b>.</i></p> <p><b>Q:</b> A student scored 13 out of 25 in a Physics test and 18 out of 30 in Biology. Which did they do better in?</p> <p><b>A:</b> <i>Physics: <math>\frac{13}{25} = \frac{52}{100} \rightarrow 52\%</math></i>  <i>Biology: <math>\frac{18}{30} = \frac{6}{10} \rightarrow 60\%</math></i></p>	<p><b>1:</b> Sam's friend says 'The student did worse in Biology than Physics because they lost more marks.' Why is Sam's friend wrong?</p>	
<p><i>Your turn</i></p> <p><b>Q:</b> A student scored 13 out of 20 in a Geography test and 27 out of 45 in Art. Which did they do better in?</p> <p><b>A:</b></p>	<p><b>2:</b> The student did better in Chemistry than in Physics, but worse than in Biology. What result could they have got in their Chemistry test?</p>	

Order these test scores by converting to percentages.						Task 2.1
$\frac{17}{25}$	$\frac{25}{40}$	$\frac{13}{20}$	$\frac{48}{75}$	$\frac{54}{80}$	$\frac{40}{60}$	

Beth has answered this question **correctly**.

Q: Find 32% of £120.

A:

100%	£120	
10%	£12	
30%	£36	
2%	£2.40	
32%	£38.40	<u>£38.40</u>

*(Handwritten note: ÷5 (x3) →)*

1: Beth found 2% by dividing 10% by 5.  
How else could Beth have found 2%?

2: Beth's friend answered the question like this.

100%	£120	
1%	£1.20	
32%	£38.40	↓ x32

Whose method do you prefer? Why?

Your turn

Q: Find 41% of £80.

A:

Complete the percentage chains. Task 3.1

100%	10%	20%	40%	80%	8%	16%	1.6%
150							
100%	50%	25%	5%	30%	300%	330%	33%
80							
100%	20%	2%	18%	1.8%	21.8%	218%	220%
	11						
100%	10%	70%	35%	45%	4.5%	9%	36%
			21				
100%		75%		15%		165%	
48	12		3.6		72		7.92
100%	20%		4%		28%		0.28%
125		2.5		30		350	
				3%			
180	18	54	5.4	2.7	8.1	81	89.1

Fill in the gaps. Cross off the shaded answers as you find them. Task 3.2

100%	10%	1%	5%	15%	30%	16%	130%	84%
90						14.4		
25								
	8							
		6						
			12					
				6				
					9			

4	4.8	6.4	12.8	<del>14.4</del>	21	25.2	32.5
33.6	38.4	39	52	67.2	75.6	80	96
104	117	201.6	312	420	504	650	780

Fill in the gaps. Task 3.3

a	25%   £17 50%	b	50%   £350 10%	c	5%   £15 20%	d	25%   75%   £900	e	25%   10%   £60
f	5%   £45   £900	g	20%   £12 50%	h	15%   £90   £60	i	£150 10%   £60	j	10%   25%   £45
k	48%   £480 66%	l	48%   £480   £540	m	48%   £80 15%	n	80%   £48   £15	o	15%   £48   £80
p	100%   £210 140%	q	100%   140%   £210	r	100%   £210 60%	s	100%   60%   £210	t	100%   £60 210%
u	100%   £5   £3	v	100%   £10   £3	w	100%   £15   £3	x	100%   £20   £3	y	100   £25   £3

*Jo has answered this question correctly.*

**Q:** Find 64% of £625.

**A:**  $64\% \rightarrow 0.64$   
 $0.64 \times 625 = \underline{400}$

**1:** Jo’s friend says that to find 4% of a number you should multiply by 0.4. Explain why Jo’s friend is wrong.

**2:** Jo answered a second question correctly. If this is their method, what was the question?  
 $0.27 \times 130 = 35.1$

*Your turn*

**Q:** Find 16% of £735.

**A:**

**3:** Using Jo’s original answer, find:

a) 32% of £625

b) 16% of £6.25

Fill in the gaps. Task 4.1

	Question	Calculation	Answer
a	36% of 175	$0.36 \times 175$	
b	28% of 225	$\times 225$	
c	30% of 210	$\times$	
d	3% of 210	$\times$	
e	35% of	$\times 40$	
f	3.5% of 404	$\times$	
g	350% of 122	$\times$	
h	of	$3.05 \times 140$	
i	140% of 305	$\times$	

	Question	Calculation	Answer
j	of	$0.07 \times 300$	
k	of	$\times 200$	22
l	46% of	$\times$	23
m	of 16	$1.5 \times$	
n	62.5% of	$\times 40$	
o	of 25	$\times$	26
p	33.75% of 80	$\times$	
q	4.48% of 625	$\times$	
r	362.5% of	$\times$	29

Fill in the gaps. Task 4.2

20% of 150 is the same as \_\_\_\_\_% of 300.

\_\_\_\_\_% of 450 is the same as 50% of 225.

35% of 32 is the same as \_\_\_\_\_% of 35.

100% of \_\_\_\_\_ is the same as 20% of \_\_\_\_\_

Kim has answered this question **correctly**.

Q: Increase £60 by 23%.

A:  $100\% + 23\% = 123\% \rightarrow 1.23$

$1.23 \times 60 = 73.8$  £73.80

1: Kim says 'To reduce by 23%, you multiply by 0.77'  
Explain why Kim is **correct**.

2: Kim's friend says 'To increase by 3%, you multiply by 1.3'  
Explain why Kim's friend is **incorrect**.

Your turn

Q: Increase £64 by 35%.

A:

3: Kim correctly answered a question with the calculation  $1.58 \times 750 = 1185$   
What was the original question?

Fill in the gaps Task 5.1

	Question	New %	Multiplier	Calculation	Answer
a	Increase 15 by 54%	154%	1.54	$1.54 \times 15$	
b	Decrease 30 by 23%	77%	0.77	$\times 30$	
c	Increase 14 by 65%	165%		$\times$	
d	Decrease 35 by 34%			$\times$	
e	Increase 22 by	105%		$\times$	
f	Decrease by		0.7	$\times 33$	
g	Increase by			$1.1 \times 21$	
h	by			$0.55 \times 42$	
i	by			$1.155 \times 20$	
j	Decrease 25 by 7.6%			$\times$	
k	Decrease 24 by 3.75%			$\times$	
l	Increase 12 by 92.5%			$\times$	
m	28 by			$\times$	23.1
n	Decrease by 47.5%			$\times$	23.1

%	Find	Increase by	Decrease by	%	Find	Increase by	Decrease by
42%	$\times 0.42$	$\times 1.42$	$\times 0.58$		$\times 0.15$		
37%						$\times 1.5$	
20%							$\times 0.15$
8%					$\times 0.105$		
98%						$\times 1.05$	
108%							$\times 0.15$
218%							$\times 0.995$
21.8%						$\times 2.05$	

## Bonus questions

50% of 24	
25% of 120	
75% of 120	
10% of 90	
10% of 9	
10% of 19	

20% of 55	
20% of 110	
20% of 165	
40% of 5	
40% of 55	
40% of 155	

80% of 50	
80% of 250	
25% of 56	
35% of 40	
75% of 48	
75% of 240	

90% of 60	
90% of 15	
70% of 70	
70% of 7	
70% of 35	
20% of 45	

50% of 24	<b>12</b>
25% of 120	<b>30</b>
75% of 120	<b>90</b>
10% of 90	<b>9</b>
10% of 9	<b>0.9</b>
10% of 19	<b>9.9</b>

20% of 55	<b>11</b>
20% of 110	<b>22</b>
20% of 165	<b>33</b>
40% of 5	<b>2</b>
40% of 55	<b>22</b>
40% of 155	<b>62</b>

80% of 50	<b>40</b>
80% of 250	<b>200</b>
25% of 56	<b>14</b>
35% of 40	<b>14</b>
75% of 48	<b>32</b>
75% of 240	<b>180</b>

90% of 60	<b>54</b>
90% of 15	<b>13.5</b>
70% of 70	<b>49</b>
70% of 7	<b>4.9</b>
70% of 35	<b>24.5</b>
20% of 45	<b>9</b>