

Higher Check In - 2.03 Percentages

1. What multiplier would you use to increase a quantity by 1.7%?
2. Calculate 2.3% of £15.75. Give your answer to the nearest penny.
3. An investment of £ P increases 6% in value to £222 600. Find P .
4. A 10°C rise in temperature increases the length of a 5 m bar of lead by 1.5 mm. What percentage increase in length is this?
5. A value is decreased by 25% and the answer is then increased by 25%. What is the overall percentage change?
6. A shop advertises shirts at 10% off the original price. Harry says, "If I buy 2 shirts, I will get 20% off." Is Harry correct? Explain your answer.
7. Show that $144.\dot{4}\% = \frac{13}{9}$.
8. A hockey team scores goals from 15% of their short corners and from 7% of their long corners. In one game, 25% of the corners were short corners and 75% were long corners. Show that 9% of all the corners in this game resulted in a goal scored.
9. A population of mice increases according to the rule
$$P_t = P_o \times 1.5^t$$
where P_o is the original population and P_t is the population after t years. By what percentage will the population have increased after 5 years? Give your answer to 2 significant figures.
10. A container holds 28 litres of a solution that is 25% antifreeze, the remainder being water. How many litres of antifreeze must be added to the container to make a solution that is 30% antifreeze?

Extension

If the base of a rectangle is increased by 10% and the area is unchanged, by what percentage is the height decreased?

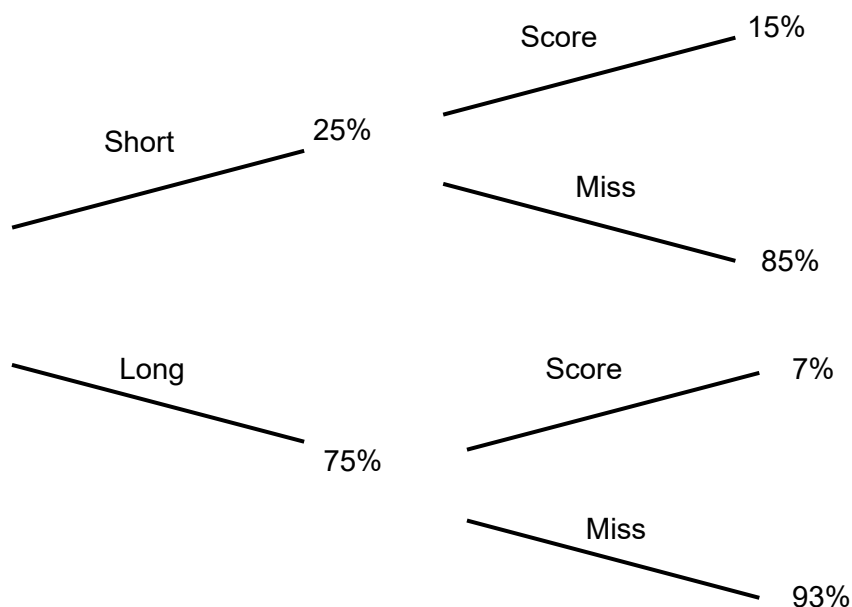
What if you increase the base by 20%?

Investigate how the percentage reduction in the height for a given percentage increase in the base varies and show the relationship on a graph.

GCSE (9–1) MATHEMATICS

Answers

- 1.017
- 36p
- (£)210 000
- 0.03%
- 6.25%
- No, with correct reason such as “the 10% is off the total price” or “if you buy two shirts you get more off but the total goes up too so it is still 10%”.
- $144.\dot{4}\% = 1.44\dot{4} = 1.\dot{4}$
Let $x = 1.\dot{4}$, so $10x = 14.\dot{4}\%$
Therefore $9x = 13$ and then $x = \frac{13}{9}$.
-



$(0.25 \times 0.15 + 0.75 \times 0.07) = 0.09$, so 9% of corners resulted in a goal.

- 660(%) [659.375%]
- 2 (litres)

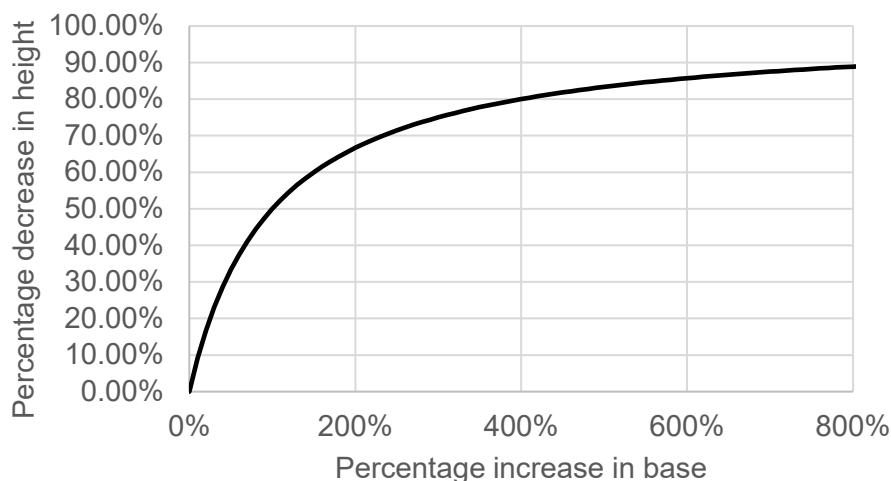
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Extension

9.09%
16.67%

Base	Height	Area
100	100	10000
110	90.90909	10000
120	83.33333	10000
130	76.92308	10000
140	71.42857	10000
150	66.66667	10000
160	62.5	10000
170	58.82353	10000
180	55.55556	10000
190	52.63158	10000
200	50	10000

Base % increase	Height % decrease
0%	0.00%
10%	9.09%
20%	16.67%
30%	23.08%
40%	28.57%
50%	33.33%
60%	37.50%
70%	41.18%
80%	44.44%
90%	47.37%
100%	50.00%



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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Use a multiplier			
AO1	2	Calculate a percentage of a quantity			
AO1	3	Calculate a reverse percentage			
AO1	4	Express one quantity as a percentage of another			
AO1	5	Calculate a percentage change			
AO2	6	Decrease a quantity by a percentage			
AO2	7	Convert between fractions, decimals and percentages			
AO2	8	Calculate a weighted percentage			
AO3	9	Find percentage change of exponential model			
AO3	10	Model with percentages			

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