

Exercise WS1.1

1. 14
2. 6
3. -2

Exercise WS1.2

4. -2
5. -18
6. -10

Exercise WS1.3

7. $5(1 - 5 + 15) = 5(11)$
8. $-3(1 + 3 - 4) = -3(0) = 0$
9. $12 + 300 = 312$
10. $-90 + 12 = -78$

Exercise WS1.4

11. $\frac{1}{19}$
12. won't simplify
13. $\frac{1}{4}$

Exercise WS1.5

14. $\frac{19}{20}$
15. $\frac{49}{99}$

16. $\frac{211}{72}$

Exercise WS1.6

1.

(a) $\frac{2}{15}$

(b) $\frac{5}{6}$

(c) 1

2.

(d) $6(3 + 4)$

(e) $\frac{5}{8}\left(\frac{3}{2} + 1\right)$

(f) $3\left(\frac{3}{10} + \frac{1}{9}\right)$

Exercise WS1.7

1.

(g) 0.75

(h) 0.0385

(i) 11

(j) 0.001

2.

(k) $\frac{1}{4}$

(l) $\frac{22}{100}$

(m) $\frac{3}{5}$

3.

(n) (a) 0.25

(o) (b) 0.1875

(p) (c) 1.66 (recurring)

Exercise WS1.8

1.

(q) 22.5 per cent

(r) $\frac{40}{9} = 44.44$ recurring per cent

(s) $\frac{12.5}{100} \times 100 = 12.5$ per cent

(t) 400 per cent

2.

(u) $200 \times \frac{7.5}{100} = 15$

(v) 0.75

(w) $90 \times \frac{0.75}{100} = 0.675$

3. (a) Assume "selling price" means list price, minus discount for immediate payment. Then selling price is:

$$200 - 200 \times \frac{10}{100} = 200 \left(1 - \frac{10}{100} \right)$$

Transport charges are therefore:

$$200\left(1 - \frac{10}{100}\right) \times \frac{2.5}{100}$$

So total cost to me is selling price plus transport charges, which is:

$$200\left(1 - \frac{10}{100}\right) + 200\left(1 - \frac{10}{100}\right) \times \frac{2.5}{100}$$

This factorises as:

$$\begin{aligned} & 200\left(1 - \frac{10}{100}\right)\left(1 + \frac{2.5}{100}\right) \\ & = 200\left(\frac{90}{100}\right)\left(\frac{102.5}{100}\right) = 184.5 \end{aligned}$$

(b) If transport costs are 2.5 per cent of the *list* price, transport costs are:

$$200 \times \frac{2.5}{100}$$

while in (a) above, transport costs were:

$$\begin{aligned} & 200\left(1 - \frac{10}{100}\right) \times \frac{2.5}{100} \\ & = 180 \times \frac{2.5}{100} \end{aligned}$$

which is obviously less. Thus transport costs are higher if they are calculated as a percentage of the list price rather than as a percentage of the selling price.

4. Assume GDP(1990) was, say, 500 billion euros. Then GDP(1991) was:

$$500 \times \frac{96.5}{100} = 482.5 \text{ billion euros}$$

and GDP(1992) was therefore:

$$482.5 \times \frac{102.5}{100} = 494.56 \text{ billion euros, to 2 decimal places (d.p.)}$$

Therefore (a) GDP(1992) as a proportion of GDP(1990) was:

$$\frac{494.56}{500} = 0.9891$$

and (b) GDP(1992) as a percentage of GDP(1990) was:

$$\frac{494.56}{500} \times 100 = 98.91 \text{ per cent}$$

(Note that the proportion and the percentage are pure numbers; they are not measured in euros or any other unit.)

(c) The levels of GDP were:

1990	1991	1992
500	482.5	494.56

(Note that these levels are measured in billions of euros.)

So the levels of GDP, in index number form with 1992 = 100, were:

1990	1991	1992
$\frac{500}{494.56} \times 100$ = 101.10 (to two d.p)	$\frac{482.5}{494.56} \times 100$ = 97.56 (to two d.p)	$\frac{494.56}{494.56} \times 100$ = 100

Note that the index number form always gives a base value of 100, with the other values depending solely on the growth rates from one year to the next. Whether the initial level is 500 billion euros, 700 billion pounds, or 1200 billion dollars, has no effect on the index values.

Exercise WS1.9

1. 16
2. 3
3. +6 or -6
4. 5