Name:_____

Year 7 Unit 6 Answers

Expressions

6.1 Introduction to algebra

6.2 Simplifying (multiplication)

6.3 Simplifying (indices)

6.4 Substitution

6.5 Substitution (indices)

6.6 Collecting like terms

6.7 Expanding brackets

6.8 Expanding and collecting

6.9 Algebraic factors

6.10 Factorising



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Simplifying (multiplication) - answers

Build

1. a) $6 \times 3h$
$= 6 \times 3 \times h$
$= 18 \times h$
$= 18h$

b) $3 \times 5r$
$= 3 \times 5 \times r$
$= 15 \times r$
$= 15r$

c) $4 \times 6s$
$= 4 \times 6 \times s$
$= 24 \times s$
$= 24s$

d) $2 \times 9t$
$= 2 \times 9 \times t$
$= 18 \times t$
$= 18t$

e) $9 \times 3r$
$= 9 \times 3 \times r$
$= 27 \times r$
$= 27r$

f) $5 \times 11p$
$= 5 \times 11 \times p$
$= 55 \times p$
$= 55p$

2. a) $3a \times 5$
$= 3 \times a \times 5$
$= 3 \times 5 \times a$
$= 15 \times a$
$= 15a$

b) $4b \times 2$
$= 4 \times b \times 2$
$= 4 \times 2 \times b$
$= 8 \times b$
$= 8b$

c) $7c \times 3$
$= 7 \times c \times 3$
$= 7 \times 3 \times c$
$= 21 \times c$
$= 21c$

d) $6d \times 2$
$= 6 \times d \times 2$
$= 6 \times 2 \times d$
$= 12 \times d$
$= 12d$

e) $9e \times 5$
$= 9 \times e \times 5$
$= 9 \times 5 \times e$
$= 45 \times e$
$= 45e$

f) $10i \times 2$
$= 10 \times i \times 2$
$= 10 \times 2 \times i$
$= 20 \times i$
$= 20i$

3. a) $6b \times 4a$
$= 6 \times b \times 4 \times a$
$= 6 \times 4 \times b \times a$
$= 24 \times b \times a$
$= 24\ b\ a$
$= 24ab$

b) $2f \times 7e$
$= 2 \times f \times 7 \times e$
$= 2 \times 7 \times f \times e$
$= 14 \times f \times e$
$= 14\ f\ e$
$= 14ef$

c) $3z \times 5y$
$= 3 \times z \times 5 \times y$
$= 3 \times 5 \times z \times y$
$= 15 \times z \times y$
$= 15\ z\ y$
$= 15yz$

d) $6i \times 2h$
$= 6 \times i \times 2 \times h$
$= 6 \times 2 \times i \times h$
$= 12 \times i \times h$
$= 12\ i\ h$
$= 12hi$

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Simplifying (multiplication) - answers

Build - continued

e) $3d \times 7c$
$= 3 \times d \times 7 \times c$
$= 3 \times 7 \times d \times c$
$= 21 \times d \times c$
$= 21\,d\,c$
$= 21cd$

f) $2b \times 5a$
$= 2 \times b \times 5 \times a$
$= 2 \times 5 \times b \times a$
$= 10 \times b \times a$
$= 10\,ba$
$= 10ab$

Practise

4. a) $6r$
b) $28e$
c) $16h$
d) $35t$
e) $36i$
f) $-54x$
g) $-12s$
h) $12p$
i) $-25n$
j) $64e$
k) $-24q$
l) $9t$

5. a) $30tu$
b) $28pq$
c) $-12ef$
d) $-27tu$
e) $35xy$
f) $63iu$
g) $27ef$
h) $-25yz$
i) $-32qr$
j) $12tu$

6. a) Students' own explanations e.g.

Katherine has added the two coefficients instead of multiplying them together.

Marva did not simplify the expression correctly because the variables (letters) are not in alphabetical order.

b) $20dh$

7. The incorrect expanded expressions should be circled.

a) i. $6 + y + 3 + z$
b) iii. $7 + b \times 2 + a$
c) ii. $43 \times g \times l$
d) iii. $9 \times z \times 2 \times y$

8. Accept any letters used.

a) $20y$ $(= y \times 5 \times 4)$
b) $21y$ $(= y \times 7 \times 3)$
c) $30y$ $(= 5 \times y \times 6)$
d) $24y$ $(= 12y \times 2)$
e) $27y$ $(= 3 \times 9y)$
f) $12y$ $(= 6 \times 2y)$

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Simplifying (multiplication) - answers

Practise - continued

9. a) $20x$ $(= x \times 5 \times 4)$

   b) $6y$ $(= y \times 2 \times 3)$

   c) $20z$ $(= 4 \times z \times 5)$

   d) $20a$ $(= a \times 5 \times 4)$

10. a) Students' own answers e.g.
   $2 \times a \times b \times c = 2abc$
   $5 \times b \times 6 \times a = 30ab$
   $5 \times a \times 2 \times c = 10ac$
   $b \times 6 \times a \times 2 = 12ab$

   b) Students' own answers.
   Any four of these simplified expressions:
   $60a, 60b, 60c$
   $10ab, 10ac, 10bc$
   $12ab, 12ac, 12bc$
   $30ab, 30ac, 30bc$
   $2abc$
   $5abc$
   $6abc$

Extend

11. a) $90bf$

   b) $98pr$

   c) $-117es$

   d) $-279ah$

   e) $572yz$

   f) $-672jw$

   g) $-8ij$

   h) $-9gk$

   i) $3ab$

12. a) 3600 $(= 60 \times 60)$

   b) $3600x$

   c) $3600y$

   d) $14\,400y$

13. a) Students' own answer that simplifies to $-8ab$
   E.g.
   $4a \times -2b$
   $-4a \times 2b$
   $-8a \times b$
   $-b \times 8a$

   Terms can be in either order.

   b) Students' own answers e.g.
   $-8 \times a \times b$
   $-4a \times 2b$
   $4b \times -2a$
   $8 \times -a \times b$

   Terms can be in either order because multiplication is commutative.

   c) Students' own answer e.g.
   $-4 \times 2 \times a \times b$

   Commutative alternatives also accepted.

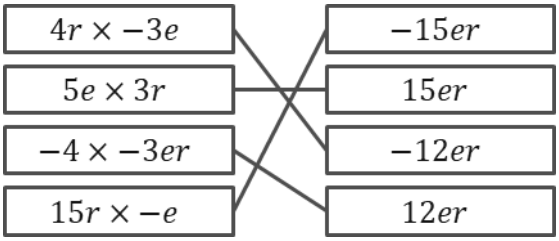
   d) Students' own answer e.g.
   $-16ab \div 2$
   $-16ba \div 2$
   $-32ab \div 4$
   $-32ba \div 2$

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Simplifying (multiplication) - answers

Extend - continued

14. a)



b) Students' own four answers that simplify to $15er$
E.g.
$5r \times 3e = 15er$
$3e \times 5r = 15er$
$3r \times 5e = 15er$
$-5e \times -3\text{r} = 15er$
$-3e \times -5\text{r} = 15er$
$-5r \times -3e = 15er$
$-3r \times -5e = 15er$

$15e \times \text{r} = 15er$
$15r \times e = 15er$
$e \times 15r = 15er$
$r \times 15e = 15er$
$-15e \times -r = 15er$
$-15r \times -e = 15er$
$-e \times -15\text{r} = 15er$
$-r \times -15e = 15er$

15. a) £15 $(= 3 \times £5)$

b) £75 $(= 3 \times £5 \times 5)$

c) £450 $(= 3 \times £5 \times 5 \times 6)$

Students' answers need to be in simplest form:

d) $75x$ $(= 3 \times £5 \times x)$

e) $25xy$ $(= y \times £5 \times 5 \times x)$

f) $5xyz$ $(= y \times £5 \times z \times x)$

g) Students' own choice of letters.
E.g.

Earnings in a year = $adhw$.

Where a = hourly pay,
h = hours worked in a day,
d = days worked in a week,
w = weeks worked in a year.

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