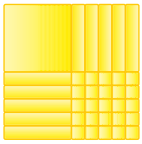
Exercises

A

4. Write the multiplication sentence that each set of algebra tiles represents.

a) 

b) 

c) 

d) 

5. Use algebra tiles to determine each product. Sketch the tiles you used.

a) $(b + 2)(b + 5)$

b) $(n + 4)(n + 7)$

c) $(h + 8)(h + 3)$

d) $(k + 1)(k + 6)$

6. For each set of algebra tiles below:

i) Write the trinomial that the algebra tiles represent.

ii) Arrange the tiles to form a rectangle. Sketch the rectangle.

iii) Use the rectangle to factor the trinomial.

a) 

b) 

c) 

d) 

7. **a)** Find two integers with the given properties.

	a	b	Product ab	Sum $a + b$
i)			2	3
ii)			6	5
iii)			9	10
iv)			10	7
v)			12	7
vi)			15	8

b) Use the results of part a to factor each trinomial.

i) $v^2 + 3v + 2$ **ii)** $w^2 + 5w + 6$

iii) $s^2 + 10s + 9$ **iv)** $t^2 + 7t + 10$

v) $y^2 + 7y + 12$ **vi)** $h^2 + 8h + 15$

B

8. **a)** Use algebra tiles to factor each trinomial. Sketch the tiles you used.

i) $v^2 + 2v + 1$ **ii)** $v^2 + 4v + 4$

iii) $v^2 + 6v + 9$ **iv)** $v^2 + 8v + 16$

b) What patterns do you see in the algebra tile rectangles? How are these patterns shown in the binomial factors?

c) Write the next 3 trinomials in the pattern and their binomial factors.

9. Multiply each pair of binomials. Sketch and label a rectangle to illustrate each product.

a) $(m + 5)(m + 8)$ **b)** $(y + 9)(y + 3)$

c) $(w + 2)(w + 16)$ **d)** $(k + 13)(k + 1)$

10. Copy and complete.

a) $(w + 3)(w + 2) = w^2 + \square w + 6$

b) $(x + 5)(x + \square) = x^2 + \bigcirc x + 10$

c) $(y + \bigcirc)(y + \square) = y^2 + 12y + 20$

11. Factor. Check by expanding.

a) $x^2 + 10x + 24$ **b)** $m^2 + 10m + 16$

c) $p^2 + 13p + 12$ **d)** $s^2 + 12s + 20$

e) $n^2 + 12n + 11$ **f)** $h^2 + 8h + 12$

g) $q^2 + 7q + 6$ **h)** $b^2 + 11b + 18$

12. Expand and simplify. Sketch a rectangle diagram to illustrate each product.

a) $(g - 3)(g + 7)$ **b)** $(h + 2)(h - 7)$
c) $(11 - j)(2 - j)$ **d)** $(k - 3)(k + 11)$
e) $(12 + h)(7 - h)$ **f)** $(m - 9)(m + 9)$
g) $(n - 14)(n - 4)$ **h)** $(p + 6)(p - 17)$

13. Find and correct the errors in each expansion.

a) $(r - 13)(r + 4) = r(r + 4) - 13(r + 4)$
$= r^2 + 4r - 13r + 52$
$= r^2 + 9r + 52$

b) $(s - 15)(s - 5) = s(s - 15) + 15(s + 5)$
$= s^2 - 15s + 15s + 75$
$= s^2 + 75$

14. Factor. Check by expanding.

a) $b^2 + 19b - 20$ **b)** $t^2 + 15t - 54$
c) $x^2 + 12x - 28$ **d)** $n^2 - 5n - 24$
e) $a^2 - a - 20$ **f)** $y^2 - 2y - 48$
g) $m^2 - 15m + 50$ **h)** $a^2 - 12a + 36$

15. Factor. Check by expanding.

a) $12 + 13k + k^2$ **b)** $-16 - 6g + g^2$
c) $60 + 17y + y^2$ **d)** $72 - z - z^2$

16. **a)** Simplify each pair of products.

i) $(x + 1)(x + 2)$ and $11 \cdot 12$
ii) $(x + 1)(x + 3)$ and $11 \cdot 13$

b) What are the similarities between the two answers for each pair of products?

17. Find and correct the errors in each factorization.

a) $m^2 - 7m - 60 = (m - 5)(m - 12)$
b) $w^2 - 14w + 45 = (w + 3)(w - 15)$
c) $b^2 + 9b - 36 = (b + 3)(b - 12)$

18. **a)** Expand each product, then write it as a trinomial.

i) $(t + 4)(t + 7)$ **ii)** $(t - 4)(t - 7)$
iii) $(t - 4)(t + 7)$ **iv)** $(t + 4)(t - 7)$

b) **i)** Why are the constant terms in the trinomials in parts i and ii above positive?
ii) Why are the constant terms in the trinomials in parts iii and iv above negative?
iii) How could you determine the coefficient of the t-term in the trinomial without expanding?

19. Find an integer to replace $\square$ so that each trinomial can be factored.
How many integers can you find each time?

a) $x^2 + \square x + 10$
b) $a^2 + \square a - 9$
c) $t^2 + \square t + 8$
d) $y^2 + \square y - 12$
e) $h^2 + \square h + 18$
f) $p^2 + \square p - 16$

20. Find an integer to replace $\square$ so that each trinomial can be factored.
How many integers can you find each time?

a) $r^2 + r + \square$ **b)** $h^2 - h + \square$
c) $b^2 + 2b + \square$ **d)** $z^2 - 2z + \square$
e) $q^2 + 3q + \square$ **f)** $g^2 - 3g + \square$

21. Factor.

a) $4y^2 - 20y - 56$ **b)** $-3m^2 - 18m - 24$
c) $4x^2 + 4x - 48$ **d)** $10x^2 + 80x + 120$
e) $-5n^2 + 40n - 35$ **f)** $7c^2 - 35c + 42$

C

22. In this lesson, you used algebra tiles to multiply two binomials and to factor a trinomial when all the terms were positive.

a) How could you use algebra tiles to expand $(r - 4)(r + 1)$?
Sketch the tiles you used. Explain your strategy.

b) How could you use algebra tiles to factor $t^2 + t - 6$?
Sketch the tiles you used. Explain your strategy.

23. **a)** Factor each trinomial.

i) $h^2 - 10h - 24$
ii) $h^2 + 10h - 24$
iii) $h^2 - 10h + 24$
iv) $h^2 + 10h + 24$

b) In part a, all the trinomials have the same numerical coefficients and constant terms, but different signs. Find other examples like this, in which all 4 trinomials of the form $h^2 \pm bh \pm c$ can be factored.

Reflect

Suppose a trinomial of the form $x^2 + ax + b$ is the product of two binomials. How can you determine the binomial factors?