

## Algebra Chains

A. Use two of the following operations to complete the algebra chains:

$$+ a$$

$$\times a$$

$$+ 1$$

$$\times 2$$

1.  $6 \rightarrow \boxed{\phantom{000}} \rightarrow \boxed{\phantom{000}} \rightarrow 12+2a$

2.  $a \rightarrow \boxed{\phantom{000}} \rightarrow \boxed{\phantom{000}} \rightarrow 2a+1$

3.  $3b \rightarrow \boxed{\phantom{000}} \rightarrow \boxed{\phantom{000}} \rightarrow 6b+2$

4.  $2a \rightarrow \boxed{\phantom{000}} \rightarrow \boxed{\phantom{000}} \rightarrow 5a$

5.  $a+b \rightarrow \boxed{\phantom{000}} \rightarrow \boxed{\phantom{000}} \rightarrow 4a+2b$

6.  $b \rightarrow \boxed{\phantom{000}} \rightarrow \boxed{\phantom{000}} \rightarrow ab+a^2$

7.  $b-a \rightarrow \boxed{\phantom{000}} \rightarrow \boxed{\phantom{000}} \rightarrow 2b-a$

8.  $5a \rightarrow \boxed{\phantom{000}} \rightarrow \boxed{\phantom{000}} \rightarrow 10a^2$

9.  $4 \rightarrow \boxed{\phantom{000}} \rightarrow \boxed{\phantom{000}} \rightarrow 5a$

10.  $\frac{1}{2}a \rightarrow \boxed{\phantom{000}} \rightarrow \boxed{\phantom{000}} \rightarrow a+2$

B. Use 3 operations to produce a chain to get from:

1.  $a$  to  $4a+1$

2.  $2b$  to  $2ab + 2a$

3.  $3$  to  $6a^2$

## Teaching Notes Algebra Chains

### A. Answers

1. 6  $\rightarrow$   $\boxed{+ a}$   $\rightarrow$   $\boxed{\times 2}$   $\rightarrow$   $\boxed{12+2a}$
2. a  $\rightarrow$   $\boxed{\times 2}$   $\rightarrow$   $\boxed{+ 1}$   $\rightarrow$   $\boxed{2a+1}$
3. 3b  $\rightarrow$   $\boxed{+ 1}$   $\rightarrow$   $\boxed{\times 2}$   $\rightarrow$   $\boxed{6b+2}$
4. 2a  $\rightarrow$   $\boxed{\times 2}$   $\rightarrow$   $\boxed{+ a}$   $\rightarrow$   $\boxed{5a}$
5. a+b  $\rightarrow$   $\boxed{+ a}$   $\rightarrow$   $\boxed{\times 2}$   $\rightarrow$   $\boxed{4a+2b}$
6. b  $\rightarrow$   $\boxed{+a}$   $\rightarrow$   $\boxed{a}$   $\rightarrow$   $\boxed{ab+a^2}$
7. b-a  $\rightarrow$   $\boxed{\times 2}$   $\rightarrow$   $\boxed{+ a}$   $\rightarrow$   $\boxed{2b-a}$
8. 5a  $\rightarrow$   $\boxed{\times 2}$   $\rightarrow$   $\boxed{\times a}$   $\rightarrow$   $\boxed{10a^2}$
9. 4  $\rightarrow$   $\boxed{\times a}$   $\rightarrow$   $\boxed{+ a}$   $\rightarrow$   $\boxed{5a}$
10.  $\frac{1}{2}a$   $\rightarrow$   $\boxed{+ 1}$   $\rightarrow$   $\boxed{\times 2}$   $\rightarrow$   $\boxed{a+2}$

(The operations in question 8 could also be the other way round)

### B. Answers (there may also be other answers)

1. a  $\rightarrow$   $\boxed{+a}$   $\rightarrow$   $\boxed{\times 2}$   $\rightarrow$   $\boxed{+1}$   $\rightarrow$   $4a+1$
2. 2b  $\rightarrow$   $\boxed{+1}$   $\rightarrow$   $\boxed{\times a}$   $\rightarrow$   $\boxed{+a}$   $\rightarrow$   $2ab+ 2a$
3. 3  $\rightarrow$   $\boxed{\times a}$   $\rightarrow$   $\boxed{\times 2}$   $\rightarrow$   $\boxed{\times a}$   $\rightarrow$   $6a^2$