

In the following,  $a$ ,  $b$ , and  $c$  represent any real numbers.

### Properties of Algebra

1  $a + b = b + a$

---

2  $ab = ba$

---

3  $(a + b) + c = a + (b + c)$

---

4  $(ab)c = a(bc)$

---

5  $a(b + c) = ab + ac$

---

### Properties of Equality

1  $a = a$

---

2 If  $a = b$  and  $b = c$ , then  $a = c$

---

3 If  $a = b$  and  $x + a = c$ , then  $x + b = c$

---

4 If  $a = b$ , then  $b = a$

---

If  $a = b$ , then  $a + c = b + c$

5 (if  $a = b$  and  $c = d$  then  $a + c = b + d$ )

---

If  $a = b$ , then  $a - c = b - c$

6 (if  $a = b$  and  $c = d$  then  $a - c = b - d$ )

---

If  $a = b$ , then  $ac = bc$

7 (if  $a = b$  and  $c = d$  then  $ac = bd$ )

---

If  $a = b$ , then  $a/c = b/c$  provided  $c \neq 0$

8 (if  $a = b$  and  $c = d$  then  $a/c = b/d$  for  $c, d \neq 0$ )

---

9 If  $ab = 0$ , then  $a = 0$  or  $b = 0$

---

10 If  $a^2 = b$ , then  $a = \pm\sqrt{b}$

---

### Properties of Congruence

1  $\angle A \cong \angle A$

---

If  $\angle A \cong \angle B$  and  $\angle B \cong \angle C$

2 then  $\angle A \cong \angle C$

---

3 If  $\angle A \cong \angle B$ , then  $\angle B \cong \angle A$

---

State the property represented by each of the following examples.

1  $\overline{JK} \cong \overline{JK}$

2 If  $JK = PQ$  and  $PQ = ST$ , then  $JK = ST$

3 If  $m\angle S = 30^\circ$ , then  $5^\circ + m\angle S = 35^\circ$

4 If  $\angle Q \cong \angle R$  and  $\angle R \cong \angle Z$ , then  $\angle Q \cong \angle Z$

5  $3(A + B) = 3A + 3B$

6  $AB = AB$

7 If  $ST = 2$ , then  $2(ST) = 2(2)$

8 If  $m\angle K = 45^\circ$ , then  $3(m\angle K) = 135^\circ$

9 If  $m\angle P = m\angle Q$ , then  $m\angle Q = m\angle P$

10 If  $PQ + ST = ST + RS$ , then  $PQ = RS$

11 If  $\overline{AB} \cong \overline{CD}$ , then  $\overline{CD} \cong \overline{AB}$

12 If  $AB = CD + DT$  and  $OR = CD + DT$ , then  $AB = OR$

13  $m\angle S = m\angle S$

14 If  $x = 5$  and  $y = 3$ , then  $x + y = 8$

15  $8x + 10 = 2(4x + 5)$

16 If  $3x = 12$ , then  $x = 4$

17  $w + x = x + w$

18  $E + (F + G) = (E + F) + G$

If  $MN = 0$ , then  $M = 0$  or  $N = 0$

19 or  $M = 0$  and  $N = 0$