# Number Puzzles
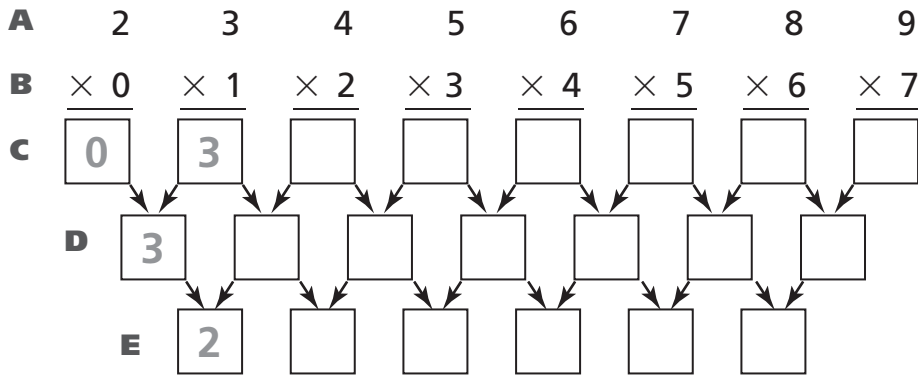
**1** Complete the puzzle. Each number in rows D and E is the difference between the numbers in the two boxes above it.

| **A** | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| **B** | × 0 | × 1 | × 2 | × 3 | × 4 | × 5 | × 6 | × 7 |
| **C** | 0 | 3 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| **D** | 3 | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
|---|---|---|---|---|---|---|---|

| **E** | 2 | ☐ | ☐ | ☐ | ☐ | ☐ |
|---|---|---|---|---|---|---|

**2** What do you notice about the numbers in rows A and B?

_____

_____

_____

**3** What do you notice about the numbers in row D?

_____

## Test Prep

**4** Multiplying 37 by multiples of 3 creates a pattern.

$$37 \times 3 = 111$$
$$37 \times 6 = 222$$
$$37 \times 9 = 333$$

Assuming the pattern continues, what is $37 \times 24$?

**A.** 666          **C.** 888

**B.** 777          **D.** 999

**5** Explain how you found the answer.

_____

_____

_____

_____

_____

# Introducing Variables

**1** Complete the puzzle.

| | | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|
| **Think of a number.** | 👝 | 2 | 8 | | | 1 | |
| **Add 3.** | 👝 ⋯ | 5 | | 15 | 10 | | |
| **Triple the result.** | 👝👝👝 ⁝⁝⁝⁝ | | | | | | |
| **Subtract 1.** | 👝👝👝 ⁝⁝⁝ | | | | | | |
| **Subtract the number you thought of first.** | 👝👝 ⁝⁝⁝ | | | | | | |
| **Divide by 2.** | 👝 ⋯⋯ | | | | | | |
| **Subtract the number you thought of first.** | ⋯⋯ | | | | | | |

---

**Test Prep**

**2** Tyken used squares to make the pattern shown.

How many squares are in the 10th figure in the pattern?

**A.** 16　　　**B.** 18　　　**C.** 20　　　**D.** 22
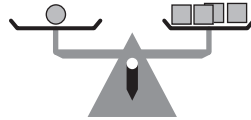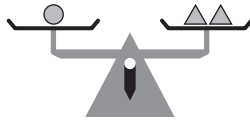
---

# Introducing a Shorthand Notation

**1** Complete the shorthand notation for this puzzle. Then figure out the numbers in each round of the puzzle.

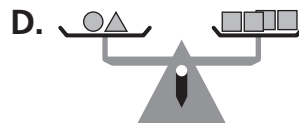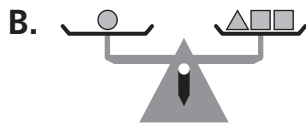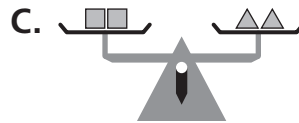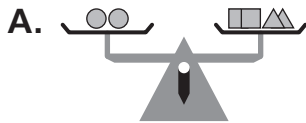| Words | Pictures | Shorthand | A | B | C |
|-------|----------|-----------|---|---|---|
| Think of a number. | 👝 | $x$ | 10 | 5 | |
| Double it. | 👝👝 | $2x$ | 20 | | |
| Double it again. | 👝👝👝👝 | | | | |
| Subtract the number you thought of first. | 👝👝👝 | | | | |
| Add 6. | 👝👝👝 ⦂⦂ | | | | 30 |
| Divide by 3. | 👝 ⠐ | $x + 2$ | | | |
| Subtract the number you thought of first. | ⠐ | | | | |

---

## Test Prep

**2** These scales are balanced.

Which scale is also balanced?

A.

C.

B.

D.

# Using Shorthand Notation to Complete Number Puzzles

**Fill in the missing numbers.**

**1** 

| | | A | B | C | D | E |
|---|---|---|---|---|---|---|
| Think of a number. | 👝 | 12 | | | | |
| | 👝👝 ⁖ | 30 | 14 | 6 | 40 | 8 |

**2**

| | | F | G | H | I | J |
|---|---|---|---|---|---|---|
| Think of a number. | 👝 | | 6 | | | |
| | 👝👝 + 100 | 138 | | 220 | 150 | 100 |

**3**

| | | K | L | M | N | O |
|---|---|---|---|---|---|---|
| Think of a number. | $x$ | | | | 9 | |
| | $5x + 75$ | 90 | 80 | 125 | | 175 |

**4**

| | | P | Q | R | S | T |
|---|---|---|---|---|---|---|
| Think of a number. | $x$ | | | | 15 | |
| | $3x + 150$ | 225 | 150 | 300 | | 240 |

## Test Prep

**5** If $x = 4$, what is $3x + 18$?

A. 25

B. 28

C. 30

D. 52

**6** Explain how you found the solution to $3x + 18$.

_____

_____

_____

_____

# Using Square Numbers to Remember Other Multiplication Facts

**Complete the diagrams and number sentences.**

**1**

3    4    5

$4 \times 4 =$ ⬜     $3 \times 5 =$ ⬭

**2**

4    5    6

$5 \times 5 =$ ⬜     $4 \times 6 =$ ⬭

**3**

196

13    14    15

$14 \times 14 =$ ⬜     $13 \times 15 =$ ⬭

**4**

19    20    21

$20 \times 20 =$ ⬜     $19 \times 21 =$ ⬭

## Test Prep

**5** Which equation matches this table?

| A | 8 | 12 | 76 |
|---|---|---|---|
| B | 16 | 24 | 152 |

**A.** $A \times 3 = B$     **C.** $A + 10 = B$

**B.** $A + 3 = B$     **D.** $A \times 2 = B$

**6** Explain how you found the right equation.

_____

_____

_____

_____

_____

# Generalizing a Multiplication Pattern

**Complete the number sentence.**

**1**

$7 \cdot 7 = \boxed{\phantom{00}}$

$6 \cdot 8 = \bigcirc$

**2**

$11 \cdot 11 = \boxed{\phantom{00}}$

$10 \cdot 12 = \bigcirc$

**3**

$(5 \cdot 5) - 1 = \boxed{\phantom{00}}$

$4 \cdot 6 = \bigcirc$

**4**

$(10 \cdot 10) - 1 = \boxed{\phantom{00}}$

$9 \cdot 11 = \bigcirc$

**5**

$(12 \cdot 12) - 1 = \boxed{\phantom{00}}$

$11 \cdot 13 = \bigcirc$

**6**

$(15 \cdot 15) - 1 = \boxed{\phantom{00}}$

$14 \cdot 16 = \bigcirc$

**7**

$(\boxed{\phantom{00}} \cdot \boxed{\phantom{00}}) - 1 = 399$

$19 \cdot 21 = \bigcirc$

**8**

$(\boxed{\phantom{00}} \cdot \boxed{\phantom{00}}) - 1 = 3{,}599$

$59 \cdot \bigcirc = 3{,}599$

## Test Prep

**9** About how long will an alligator be when it's 10 years old?

**A.** 10 feet **C.** 6 feet

**B.** 8 feet **D.** 2 feet

| GROWTH RATE OF ALLIGATORS | |
|---|---|
| Years 1–5 | 1 foot per year |
| Years 6–15 | 3 inches per year |