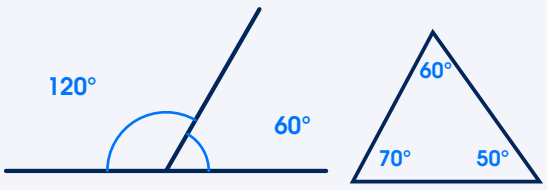
EQUATION AND INEQUALITY PROBLEMS

BUILDING BLOCKS

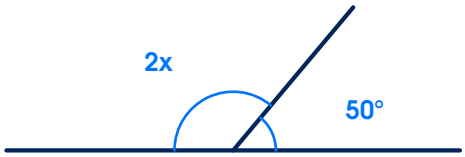
NAME _____ CLASS _____ DATE _____

KEY IDEA

- Angles on a straight line add up to 180°
- Angles in a triangle add up to 180°
- Perimeter = add up all the sides



1 The angles are on a straight line. Find x.

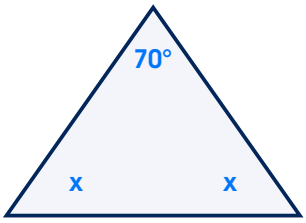


2x + 50 = ☐

2x = ☐

x = ☐

2 Find x in the triangle.



x + x + 70 = 180

☐x + 70 = 180

☐x = ☐

x = ☐

3 The perimeter of the rectangle is 26 cm. Find x.



x + 5 + x + 5 = 26

2x + ☐ = 26

2x = ☐ x = ☐

4 I think of a number n. I multiply it by 3, then add 4. The answer is 25.

n → × 3 → ☐ → + 4 → 25

Equation: ☐n + ☐ = 25 n = ☐

EQUATION AND INEQUALITY PROBLEMS

SUPPORT

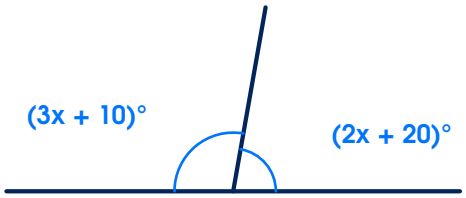
NAME _____ CLASS _____ DATE _____

KEY IDEA

1 Use a fact | 2 Write an equation | 3 Solve it | 4 Check

Angles x, 2x and 90° are in a triangle: $x + 2x + 90 = 180$, $3x = 90$, $x = 30$

1 The angles are on a straight line. Their sum is 5x + 30. Solve to find x.



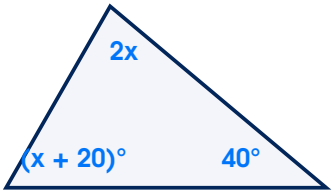
$5x + 30 = 180$

-30 $\quad -30$

$5x = $ ☐

$x = $ ☐ $\quad \div 5$

2 Here is a triangle.

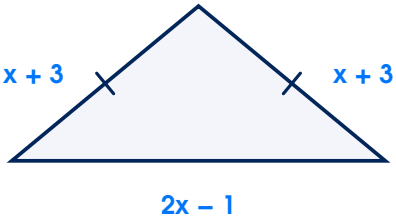


a) Equation: ☐

b) x = ☐

c) The largest angle = ☐

3 The isosceles triangle has a perimeter of 37 cm. The sides are in cm.



a) Equation: ☐

b) x = ☐

c) The longest side = ☐

4 The perimeter of this rectangle is less than 40 cm. Solve the inequality to find x.



$2x + 12 < 40$

-12 $\quad -12$

$2x <$ ☐

$x <$ ☐ $\quad \div 2$

EQUATION AND INEQUALITY PROBLEMS

CORE

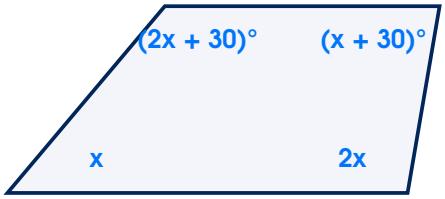
NAME _____ CLASS _____ DATE _____

KEY IDEA

Decide which fact links the information (angle sums, perimeter, area, cost), form an equation or an inequality, then solve it. Answer the question that was asked, and check that it makes sense.

FLUENCY

1 The angles are in a quadrilateral.

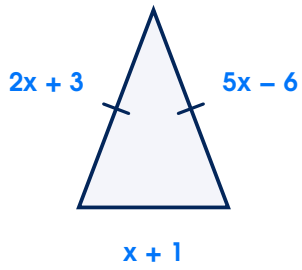


a) Form an equation.

b) Find x.

c) Find the largest angle.

2 This isosceles triangle has two equal sides. The lengths are in cm.



a) Find x.

b) Find the perimeter.

REASONING

3 Cinema tickets cost £8 each and there is a £3 booking fee. Maya has £45.

a) Write an inequality for the number of tickets, t.

b) What is the greatest number of tickets Maya can buy?

c) Explain why your answer is not the exact solution of the inequality.

.....

4 Sophie says, "The perimeter of a square with side (x + 4) cm is (4x + 4) cm."

a) Explain Sophie's mistake. .....

b) The perimeter is 52 cm. Find x.

EQUATION AND INEQUALITY PROBLEMS

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

If it is sometimes true, give an example of when it is true and when it is not.

a) Perimeter of a square > 20 cm means side > 5 cm. ALWAYS SOMETIMES NEVER

b) If a triangle has angles 2x and 3x, then x < 36. ALWAYS SOMETIMES NEVER

c) An x by 2x rectangle has a perimeter that is a multiple of 6. ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 The perimeter of this rectangle is 52 cm.



a) x = ____

b) Area = ____

3 Consecutive even numbers go up in 2s, e.g. 10, 12, 14.

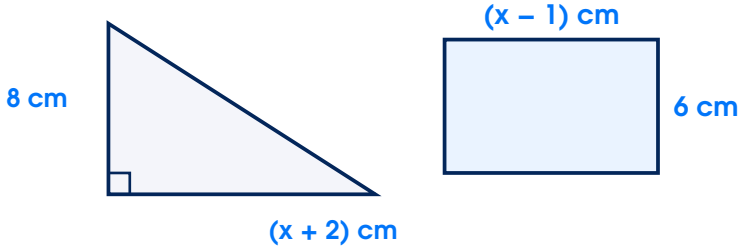
a) Three consecutive even numbers add up to 138. Find them. ____

b) Three consecutive even numbers add up to less than 100.

What is the largest possible set? ____

★ CHALLENGE FOR ALL

4 Compare the areas of the right-angled triangle and the rectangle.



a) Equal areas: x = ____

b) Triangle area is bigger: ____

EQUATION AND INEQUALITY PROBLEMS – ANSWERS

ANSWERS

BUILDING BLOCKS

1 $2x + 50 = 180$ · $2x = 130$ · $x = 65$

2 $2x + 70 = 180$ · $2x = 110$ · $x = 55$

3 $2x + 10 = 26$ · $2x = 16$ · $x = 8$

4 box after × 3: 21 · equation $3n + 4 = 25$ · $n = 7$

SUPPORT

1 $3x + 10 + 2x + 20 = 180$ · -30: $5x = 150$ · ÷ 5: $x = 30$

2 a) $x + 20 + 2x + 40 = 180$ ($3x + 60 = 180$) · b) $x = 40$ · c) 80° (angles 60°, 80°, 40°)

3 a) $x + 3 + x + 3 + 2x - 1 = 37$ ($4x + 5 = 37$) · b) $x = 8$ · c) 15 cm (sides 11, 11, 15)

4 -12: $2x < 28$ · ÷ 2: $x < 14$ (and $x > 0$ because it is a length)

CORE

1 a) $x + 2x + x + 30 + 2x + 30 = 360$ ($6x + 60 = 360$) · b) $x = 50$ · c) 130° (50°, 100°, 80°, 130°)

2 a) $2x + 3 = 5x - 6$, $x = 3$ · b) sides 9, 9 and 4: perimeter 22 cm

3 a) $8t + 3 \leq 45$ · b) $8t \leq 42$, $t \leq 5.25$, so 5 tickets · c) you cannot buy part of a ticket, so t must be a whole number

4 a) She only multiplied the x by 4: the perimeter is $4(x + 4) = 4x + 16$ · b) $4x + 16 = 52$, $x = 9$

GREATER DEPTH

1 a) always · b) always (the third angle is $180 - 5x > 0$, so $x < 36$) · c) sometimes (perimeter 6x: $x = 3$ gives 18; $x = 2.5$ gives 15)

2 a) $2(3x - 2) + 2(x + 4) = 52$: $8x + 4 = 52$, $x = 6$ · b) 16 cm by 10 cm: area 160 cm²

3 a) $n + n + 2 + n + 4 = 138$: $3n + 6 = 138$, $n = 44$: 44, 46, 48 · b) $3n + 6 < 100$, $n < 31.3$, n even: 30, 32, 34

4 triangle area $\frac{1}{2} \times 8 \times (x + 2) = 4x + 8$; rectangle $6(x - 1) = 6x - 6$ · a) $4x + 8 = 6x - 6$, $x = 7$ · b) $4x + 8 > 6x - 6$ gives $x < 7$; lengths must be positive so $1 < x < 7$