



KS3.M-A6 Substitution into Expressions and Formulae

AQA KS3.M-A6 · Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 Evaluate $3n$ when $n = 4$.

(1)

2 Find the value of $p + 5$ when $p = 7$.

(1)

3 Evaluate $2a + 1$ when $a = 0$.

(1)

4 Substitute $x = 5$ into x^2 and give the value.

(1)

5 Evaluate $4b - 3$ when $b = 2$.

(1)

6 Substitute $t = \frac{1}{2}$ into $6t$ and give the answer as a fraction.

(1)

7 Evaluate $5x + 2$ when $x = -1$.

(2)

8 Substitute $a = -2$ into $3a^2$ and give the result.

(2)

9 The formula for the area of a rectangle is $A = l w$. Find A when $l = 7$ and $w = 3$.

(2)

10 Use the formula $P = 2(l + w)$ to find the perimeter of a rectangle with $l = 4$ and $w = 2$.

(2)

11 The formula for the cost of bus travel is $C = 0.5n + 1$, where n is the number of journeys. Work out C when $n = 6$.

(3)

12 A recipe uses $2c + 1$ teaspoons of spice where c is the number of cups of flour. How many teaspoons are needed when $c = 3$?

(3)

13 Evaluate $2(x + 3)$ when $x = 4$. Show the substitution and give the final value.

(3)

14 Evaluate $3y - 2(x + 1)$ when $x = 2$ and $y = 5$. Show the steps.

(3)

15 A simple conversion formula is $m = 100c$, where c is speed in metres per second and m is speed in centimetres per second. Find m when $c = 3.2$.

(2)

16 The formula for the area of a triangle is $A = \frac{1}{2} b h$. Find A when $b = 8$ and $h = 5$.

(2)

17 A small theatre charges $C = 6p + 2$ for a ticket, where p is the number of people in a group. A teacher is buying tickets for 4 groups of 3 pupils each and 1 group of 5 pupils. Calculate the total cost.

(4)

- 18** Stretch question. The cooling formula for a cup of tea is $T = 80 - 2n$, where T is temperature in degrees Celsius after n minutes. A class drinks tea in pairs. Calculate the total temperature sum for 3 pairs if they drink after 5, 7 and 9 minutes. Show all substitution and addition steps.

(6)

Mark scheme · KS3.M-A6 Substitution into Expressions and Formulae

Question 1

- **B1** 12 cao
- Answer: **12**

Question 2

- **B1** 12 cao
- Answer: **12**

Question 3

- **B1** 1 cao
- Answer: **1**

Question 4

- **B1** 25 cao
- Answer: **25**

Question 5

- **B1** 5 cao
- Answer: **5**

Question 6

- **B1** 3/1 or 3 cao (3) as fraction 3/1 acceptable
- Answer: **3**

Question 7

- **M1** substitutes -1 for x and evaluates $5(-1) + 2$ or shows method
- **A1** -3 cao
- Answer: **-3**

Question 8

- **M1** substitutes -2 into a^2 to get $(-2)^2 = 4$ and multiplies by 3
- **A1** 12 cao
- Answer: **12**

Question 9

- **M1** substitutes 7 and 3 into $A = l w$ or shows multiplication 7×3
- **A1** 21 (square units) cao
- Answer: **21**

Question 10

- **M1** substitutes l and w and evaluates $2(4+2)$
- **A1** 12 cao
- Answer: **12**

Question 11

- **M1** substitutes 6 for n and shows $0.5 \times 6 + 1$ or equivalent
- **M1** evaluates $0.5 \times 6 = 3$ or shows intermediate step
- **A1** 4 pounds cao
- Answer: **4**

Question 12

- **M1** substitutes 3 for c and writes $2 \times 3 + 1$ or equivalent
- **M1** evaluates $2 \times 3 = 6$
- **A1** 7 teaspoons cao
- **Answer: 7**

Question 13

- **M1** substitutes 4 into $x + 3$ to get $(4 + 3)$ or shows step
- **M1** multiplies by 2 correctly to get 2×7
- **A1** 14 cao
- **Answer: 14**

Question 14

- **M1** substitutes $x = 2$ and $y = 5$ into expression and shows $3(5) - 2(2 + 1)$ or equivalent
- **M1** evaluates brackets and multiplication correctly, e.g. $15 - 2 \times 3$
- **A1** 9 cao
- **Answer: 9**

Question 15

- **M1** substitutes 3.2 into $m = 100c$ and shows 100×3.2 or equivalent
- **A1** 320 cao
- **Answer: 320**

Question 16

- **M1** substitutes $b = 8$ and $h = 5$ into $A = \frac{1}{2} b h$ or shows $\frac{1}{2} \times 8 \times 5$
- **A1** 20 (square units) cao
- **Answer: 20**

Question 17

- **M1** calculates cost for a group of 3 using $C = 6p + 2$ or shows $6 \times 3 + 2 = 20$
- **M1** calculates cost for a group of 5 or shows $6 \times 5 + 2 = 32$
- **M1** multiplies the group-of-3 cost by 4 to get 80 or shows 4×20
- **A1** 112 pounds cao
- **Answer: 112**

Question 18

- **M1** substitutes $n = 5$ correctly to get $T = 80 - 2 \times 5 = 70$ for first pair
- **M1** substitutes $n = 7$ correctly to get $T = 80 - 2 \times 7 = 66$ for second pair
- **M1** substitutes $n = 9$ correctly to get $T = 80 - 2 \times 9 = 62$ for third pair
- **M1** adds the three temperatures to get $70 + 66 + 62$
- **M1** evaluates the sum correctly to 198 or shows intermediate addition
- **A1** 198 degrees Celsius cao
- **Answer: 198**