2.6 Substitution into Expressions and Formulae: Test Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Evaluate 3n when n = 4.

(1)

2 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)

3 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)

4 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)

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5 The cost, C pounds, of hiring a ladder for h days is given by C = 28 + 2h.
The total cost is £40. Work out the number of days.

(3)

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6 Use the formula P = 2(l + w)
to work out the value of P when l = 4, w = 8.

(2)

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7 Use the formula $T = 3n^2 - 5$
to work out the value of T when n = 7.

(3)

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8 Work out the value of $3b^2$ when b = 1.

(2)

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

(1)

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10 Use the formula v = u + at
to work out the value of v when u = 10, a = 2, t = 2.

(2)

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11 Work out the value of 4x - 1 when x = -5.

(2)

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12 Work out the value of 5x + 4y when x = 4 and y = 2.

(2)

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13 Work out the value of $x^2 + 2$ when x = 1.

(2)

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14 Work out the value of $2b^2$ when b = 5.

(2)

---

15 Evaluate 5n when n = 3.

(1)

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

(2)

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17 A theatre charges C = 8p + £3 for a group booking, where p is the number of people in the party. A group of 12 friends has a total budget of £100. Work out the cost for the group and state whether the budget is enough.

(4)

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18 The cooling formula for a mug of tea is T = 90 - 3n, where T is the temperature in degrees Celsius after n minutes. Mug A is left to cool for 8 minutes and Mug B is left to cool for 15 minutes. Find the temperature of each mug, then work out the difference between them.

(4)

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19 Evaluate 6 - y when y = 9.

(1)

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20 Use the formula P = 2(l + w) to find the perimeter of a rectangle with l = 6 and w = 5.

(2)

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Mark scheme · 2.6 Substitution into Expressions and Formulae: Test Pack

Question 1

12 cao	B1

Answer: **12**

Question 2

substitutes 3 for c and writes 2 x 3 + 1 or equivalent	M1
evaluates 2 x 3 = 6	M1
7 teaspoons cao	A1

Answer: **7**

Question 3

substitutes 3.2 into m = 100c and shows 100 x 3.2 or equivalent	M1
320 cao	A1

Answer: **320**

Question 4

calculates cost for a group of 3 using C = 6p + 2 or shows 6 x 3 + 2 = 20	M1
calculates cost for a group of 5 or shows 6 x 5 + 2 = 32	M1
multiplies the group-of-3 cost by 4 to get 80 or shows 4 x 20	M1
£112 cao	A1

Answer: **112**

Question 5

28 + 2h = 40	M1
2h = 12 or equivalent	M1
6 (days) cao	A1

Answer: **6 days**

Question 6

correct substitution into the formula	M1
24 cao	A1

Answer: **24**

Question 7

correct substitution into the formula	M1
correct order of operations when evaluating	M1
142 cao	A1

Answer: **142**

Question 8

substitutes b = 1 correctly (brackets round negative numbers)	M1
3 cao	A1

Answer: **3**

Question 9

25 cao	B1

Answer: **25**

Question 10

correct substitution into the formula	M1
14 cao	A1

Answer: **14**

Question 11

substitutes x = -5 correctly (brackets round negative numbers)	M1
-21 cao	A1

Answer: **-21**

Question 12

substitutes x = 4 and y = 2 correctly	M1
28 cao	A1

Answer: **28**

Question 13

substitutes x = 1 correctly (brackets round negative numbers)	M1
3 cao	A1

Answer: **3**

Question 14

substitutes b = 5 correctly (brackets round negative numbers)	M1
50 cao	A1

Answer: **50**

Question 15

15 cao	B1

Answer: **15**

Question 16

squares -3 correctly to get 9 before multiplying by 2	M1
18 cao	A1

Answer: **18**

Question 17

substitutes p = 12 correctly, e.g. 8(12) + 3	M1
correct multiplication, e.g. 8 x 12 = 96	M1
£99 cao	A1
correct conclusion: yes, the budget is enough, since 99 ≤ 100	A1

Answer: **£99; yes, the budget of £100 is enough**

Question 18

substitutes n = 8 correctly, e.g. 90 - 3(8) = 66	M1
substitutes n = 15 correctly, e.g. 90 - 3(15) = 45	M1
correctly subtracts the two temperatures	M1
21 degrees cao	A1

Answer: **Mug A: 66 degrees; Mug B: 45 degrees; difference: 21 degrees**

Question 19

-3 cao	B1

Answer: **-3**

Question 20

substitutes l = 6 and w = 5 correctly, e.g. 2(6 + 5)	M1
22 cao	A1

Answer: **22**

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