2.6 Substitution into Expressions and Formulae: 2-hour Pack

Calculators not allowed · about 120 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The cost, C pounds, of hiring a ladder for h days is given by C = 13 + 6h.
The total cost is £91. Work out the number of days.

(3)

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2 Work out the value of $b^2 + 7$ when b = 4.

(2)

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3 The cost, C pounds, of hiring a ladder for h days is given by C = 41 + 9h.
The total cost is £122. Work out the number of days.

(3)

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4 Work out the value of $(b + 8)^2 - 4$ when b = 8.

(3)

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5 Work out the value of 6n - 10 when n = 2.

(2)

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6 Work out the value of 2x - 5y when x = -3 and y = 0.

(2)

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7 The cost, C pounds, of hiring a ladder for h days is given by C = 13 + 5h.
Work out the cost of hiring the ladder for 9 days.

(2)

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8 Work out the value of 5x + 6y when x = 4 and y = 6.

(2)

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9 Work out the value of 9n + 12 when n = 6.

(2)

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10 The cost, C pounds, of hiring a ladder for h days is given by C = 39 + 9h.
The total cost is £84. Work out the number of days.

(3)

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11 Work out the value of 9n + 14 when n = 2.

(2)

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12 Work out the value of 5x + 5y when x = -2 and y = 1.

(2)

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13 The cost, C pounds, of hiring a ladder for h days is given by C = 37 + 8h.
Work out the cost of hiring the ladder for 12 days.

(2)

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

(2)

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15 The cost, C pounds, of hiring a ladder for h days is given by C = 16 + 4h.
Work out the cost of hiring the ladder for 7 days.

(2)

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16 Use the formula P = 2(l + w)
to work out the value of P when l = 9, w = 3.

(2)

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17 The cost, C pounds, of hiring a ladder for h days is given by C = 33 + 8h.
Work out the cost of hiring the ladder for 10 days.

(2)

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18 The cost, C pounds, of hiring a ladder for h days is given by C = 44 + 3h.
The total cost is £53. Work out the number of days.

(3)

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19 The cost, C pounds, of hiring a ladder for h days is given by C = 34 + 8h.
Work out the cost of hiring the ladder for 9 days.

(2)

---

20 Use the formula P = 2(l + w)
to work out the value of P when l = 3, w = 4.

(2)

---

21 Work out the value of 6t - 11 when t = 1.

(2)

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22 Work out the value of $6x + 6y$ when $x = 7$ and $y = 6$.

(2)

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23 Use the formula $v = u + at$
to work out the value of v when $u = 9$, $a = 4$, $t = 7$.

(2)

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24 Use the formula $E = mc^2$
to work out the value of E when $m = 9$, $c = 2$.

(2)

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

(2)

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26 Work out the value of $13 - 2a$ when $a = 4$.

(2)

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27 Work out the value of $xy + 4x$ when $x = -2$ and $y = -2$.

(2)

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28 Work out the value of 9b - 11 when b = 5.

(2)

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29 Work out the value of xy + 5x when x = -4 and y = 2.

(2)

---

30 Work out the value of 3x + 2y when x = -2 and y = 2.

(2)

---

31 Use the formula $E = mc^2$
to work out the value of E when m = 3, c = 5.

(2)

---

32 Work out the value of xy + 2x when x = 0 and y = 5.

(2)

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33 Work out the value of $b^2 + 8$ when b = -1.

(2)

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34 Use the formula $E = mc^2$
to work out the value of E when m = 10, c = 4.

(2)

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

(2)

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36 Work out the value of 6x - 3y when x = -4 and y = -1.

(2)

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37 The formula for the cost of a taxi journey is C = 2n + 3, where n is the number of miles.
Work out C when n = 8.

(2)

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38 A recipe uses 3c + 2 grams of salt, where c is the number of portions. Work out the amount of salt needed for c = 5 portions.

(2)

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39 Evaluate $5y - 3(x + 1)$ when $x = 2$ and $y = 4$. Show the steps.

(3)

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40 A petrol pump formula for cost is $P = 1.4n$, where n is the number of litres bought and P is the cost in pounds. Priya buys 15 litres of petrol and pays with a £25 note. Work out how much change she receives.

(3)

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41 Stretch. A sequence rule is given by $T = 2n^2 - n$. Work out T when $n = 5$, then work out T when $n = -2$, and state the sum of these two values.

(4)

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42 The formula for the area of a rectangle is $A = lw$. Find A when $l = 9$ and $w = 4$.

(2)

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Mark scheme · 2.6 Substitution into Expressions and Formulae: 2-hour Pack

Question 1

13 + 6h = 91	M1
6h = 78 or equivalent	M1
13 (days) cao	A1

Answer: **13 days**

Question 2

substitutes b = 4 correctly (brackets round negative numbers)	M1
23 cao	A1

Answer: **23**

Question 3

41 + 9h = 122	M1
9h = 81 or equivalent	M1
9 (days) cao	A1

Answer: **9 days**

Question 4

substitutes b = 8: (8 + 8)	M1
evaluates the bracket or square correctly	M1
252 cao	A1

Answer: **252**

Question 5

substitutes n = 2 correctly (brackets round negative numbers)	M1
2 cao	A1

Answer: **2**

Question 6

substitutes x = (-3) and y = 0 correctly	M1
-6 cao	A1

Answer: **-6**

Question 7

substitutes h = 9: 13 + 5 x 9	M1
£58 cao	A1

Answer: **£58**

Question 8

substitutes x = 4 and y = 6 correctly	M1
56 cao	A1

Answer: **56**

Question 9

substitutes n = 6 correctly (brackets round negative numbers)	M1
66 cao	A1

Answer: **66**

Question 10

39 + 9h = 84	M1
9h = 45 or equivalent	M1
5 (days) cao	A1

Answer: **5 days**

Question 11

substitutes n = 2 correctly (brackets round negative numbers)	M1
32 cao	A1

Answer: **32**

Question 12

substitutes x = (-2) and y = 1 correctly	M1
-5 cao	A1

Answer: **-5**

Question 13

substitutes h = 12: 37 + 8 x 12	M1
£133 cao	A1

Answer: **£133**

Question 14

substitutes x = 2 and y = 5 correctly	M1
30 cao	A1

Answer: **30**

Question 15

substitutes h = 7: 16 + 4 x 7	M1
£44 cao	A1

Answer: **£44**

Question 16

correct substitution into the formula	M1
24 cao	A1

Answer: **24**

Question 17

substitutes h = 10: 33 + 8 x 10	M1
£113 cao	A1

Answer: **£113**

Question 18

44 + 3h = 53	M1
3h = 9 or equivalent	M1
3 (days) cao	A1

Answer: **3 days**

Question 19

substitutes h = 9: 34 + 8 x 9	M1
£106 cao	A1

Answer: **£106**

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Question 20

correct substitution into the formula	M1
14 cao	A1

Answer: **14**

Question 21

substitutes t = 1 correctly (brackets round negative numbers)	M1
-5 cao	A1

Answer: **-5**

Question 22

substitutes x = 7 and y = 6 correctly	M1
78 cao	A1

Answer: **78**

Question 23

correct substitution into the formula	M1
37 cao	A1

Answer: **37**

Question 24

correct substitution into the formula	M1
36 cao	A1

Answer: **36**

Question 25

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

Answer: **-3**

Question 26

substitutes a = 4 correctly (brackets round negative numbers)	M1
5 cao	A1

Answer: **5**

Question 27

substitutes x = (-2) and y = (-2) correctly	M1
-4 cao	A1

Answer: **-4**

Question 28

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

Answer: **34**

Question 29

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

Answer: **-28**

Question 30

substitutes x = (-2) and y = 2 correctly	M1
-2 cao	A1

Answer: **-2**

Question 31

correct substitution into the formula	M1
75 cao	A1

Answer: **75**

Question 32

substitutes x = 0 and y = 5 correctly	M1
0 cao	A1

Answer: **0**

Question 33

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

Answer: **9**

Question 34

correct substitution into the formula	M1
160 cao	A1

Answer: **160**

Question 35

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

Answer: **12**

Question 36

substitutes x = (-4) and y = (-1) correctly	M1
-21 cao	A1

Answer: **-21**

Question 37

substitutes n = 8 correctly, e.g. 2(8) + 3	M1
19 cao	A1

Answer: **19**

Question 38

substitutes c = 5 correctly, e.g. 3(5) + 2	M1
17 grams cao	A1

Answer: **17 grams**

Question 39

substitutes x = 2 and y = 4 correctly	M1
works out the bracket first, e.g. 3(3) = 9	M1
11 cao	A1

Answer: **11**

Question 40

substitutes n = 15 correctly, e.g. 1.4 x 15	M1
correct cost of £21 found and subtracted from 25	M1
£4 cao	A1

Answer: **£4**

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Question 41

correctly finds T when n = 5, e.g. 2(25) - 5 = 45	**M1**
correctly finds T when n = -2, keeping track of both negative signs, e.g. 2(4) - (-2) = 10	**M1**
correctly adds the two values	**M1**
55 cao	**A1**

Answer: **T(5) = 45, T(-2) = 10; the sum is 55**

Question 42

substitutes l = 9 and w = 4 correctly	**M1**
36 cao	**A1**

Answer: **36**

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