2.11 Equations with Brackets and Unknowns on Both Sides: 2-hour Pack

Calculators not allowed · about 120 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Solve 5(x + 1) = 3x + 11

(3)

2 Solve (n + 3)/6 = 5

(3)

3 Solve 6(x - 3) - 2 = 22

(3)

4 Solve (b + 3)/5 = 2

(3)

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5 Solve 7b + 4 = 3b - 4

(3)

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6 I think of a number, multiply it by 3 and add 7. The answer is 13. Form an equation and solve it to find my number.

(3)

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7 Solve (t + 4)/3 = 1

(3)

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8 Solve 2(t + 3) = 4(t + 6) - 30

(4)

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9 Solve 7m - 2 = 5m - 2

(3)

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10 Solve $8n - 3 = n - 3$

(3)

11 Solve $2(x - 4) + 3 = 7$

(3)

12 Solve $(2t - 1)/5 = -3$

(3)

13 I think of a number, multiply it by 3 and add 3. The answer is 18. Form an equation and solve it to find my number.

(3)

14 Solve $5(t + 4) = 4(t + 1) + 16$

(4)

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15 I think of a number, multiply it by 2 and add 7. The answer is 11. Form an equation and solve it to find my number.

(3)

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16 Solve $3(m + 5) = 5(m + 2) + 13$

(4)

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17 Solve $5(t - 1) - 3 = -13$

(3)

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18 Solve $4(x + 4) = 2(x + 7) + 2$

(4)

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19 Solve 5(n + 7) = 2(n + 8) + 7

(4)

20 Solve 3(x + 2) = 2x + 9

(2)

21 Solve 2(2x - 3) = 3x + 1

(3)

22 Solve 3(x + 2) = 18.

(1)

23 Solve (2/3)x + 1 = 9.

(2)

24 Solve 2(x + 5) - 4 = x + 10.

(2)

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25 Solve 4(x + 3) = 28.

(1)

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26 Solve 5(x - 2) = 15.

(1)

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27 Solve 4(x - 3) = 3(x + 1) + 2.

(2)

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28 Solve 3(2x - 1) = 5(x + 1). State the value of x.

(3)

---

29 Solve 4(x - 1) = 16.

(1)

---

30 Solve 2(x + 5) = 3x + 4.

(2)

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31 Solve 3(x - 1) + 5 = 11.

(2)

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32 Solve x/3 + 4 = 9.

(2)

---

33 Solve 2(3x - 2) = 4x + 6.

(2)

---

34 Solve -3(x - 2) = 15.

(2)

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35 Solve 3(x + 4) = 4(x - 2) + 6.

(2)

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Mark scheme · 2.11 Equations with Brackets and Unknowns on Both Sides: 2-hour Pack

Question 1

expand the bracket: 5x + 5 = 3x + 11	M1
collect like terms to isolate x: 2x = 6	M1
x = 3 cao	A1

Answer: **3**

Question 2

multiplies both sides by the denominator	M1
correct second step	M1
n = 27 cao	A1

Answer: **n = 27**

Question 3

expands the bracket: 6x - 18	M1
collects number terms and isolates the term in the letter	M1
x = 7 cao	A1

Answer: **x = 7**

Question 4

multiplies both sides by the denominator	M1
correct second step	M1
b = 7 cao	A1

Answer: **b = 7**

Question 5

collects the letter terms on one side: 4b	M1
collects number terms on the other side	M1
b = -2 cao	A1

Answer: **b = -2**

Question 6

3n + 7 = 13 (or equivalent equation)	M1
correct method to solve	M1
2 cao	A1

Answer: **2**

Question 7

multiplies both sides by the denominator	M1
correct second step	M1
t = -1 cao	A1

Answer: **t = -1**

Question 8

expands one bracket correctly	M1
expands both brackets correctly	M1
collects letter terms and number terms on separate sides	M1
t = 6 cao	A1

Answer: **t = 6**

Question 9

collects the letter terms on one side: 2m	M1
collects number terms on the other side	M1
m = 0 cao	A1

Answer: **m = 0**

Question 10

collects the letter terms on one side: 7n	M1
collects number terms on the other side	M1
n = 0 cao	A1

Answer: **n = 0**

Question 11

expand and simplify: 2x - 8 + 3 = 7 giving 2x - 5 = 7	M1
add 5 then divide by 2: 2x = 12	M1
x = 6 cao	A1

Answer: **6**

Question 12

multiplies both sides by the denominator	M1
correct second step	M1
t = -7 cao	A1

Answer: **t = -7**

Question 13

3n + 3 = 18 (or equivalent equation)	M1
correct method to solve	M1
5 cao	A1

Answer: **5**

Question 14

expands one bracket correctly	M1
expands both brackets correctly	M1
collects letter terms and number terms on separate sides	M1
t = 0 cao	A1

Answer: **t = 0**

Question 15

2n + 7 = 11 (or equivalent equation)	M1
correct method to solve	M1
2 cao	A1

Answer: **2**

Question 16

expands one bracket correctly	M1
expands both brackets correctly	M1
collects letter terms and number terms on separate sides	M1
m = -4 cao	A1

Answer: **m = -4**

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Question 17

expands the bracket: 5t - 5	M1
collects number terms and isolates the term in the letter	M1
t = -1 cao	A1

Answer: **t = -1**

Question 18

expands one bracket correctly	M1
expands both brackets correctly	M1
collects letter terms and number terms on separate sides	M1
x = 0 cao	A1

Answer: **x = 0**

Question 19

expands one bracket correctly	M1
expands both brackets correctly	M1
collects letter terms and number terms on separate sides	M1
n = -4 cao	A1

Answer: **n = -4**

Question 20

expand the bracket or rearrange: 3x + 6 = 2x + 9	M1
x = 3 cao	A1

Answer: **3**

Question 21

expand left side: 4x - 6 = 3x + 1	M1
collect x terms: x = 7	M1
x = 7 cao	A1

Answer: **7**

Question 22

x = 4 cao	B1

Answer: **x = 4**

Question 23

correct first step, e.g. (2/3)x = 8	M1
x = 12 cao	A1

Answer: **x = 12**

Question 24

expands bracket: 2x + 10 - 4 = x + 10	M1
x = 4 cao	A1

Answer: **x = 4**

Question 25

x = 4 cao	B1

Answer: **x = 4**

Question 26

x = 5 cao	B1

Answer: **x = 5**

Question 27

expands both brackets: 4x - 12 = 3x + 3 + 2	M1
x = 17 cao	A1

Answer: **x = 17**

Question 28

expands both brackets: 6x - 3 = 5x + 5	M1
correct rearrangement, e.g. x = 8	M1
x = 8 cao	A1

Answer: **x = 8**

Question 29

x = 5 cao	B1

Answer: **x = 5**

Question 30

expands bracket: 2x + 10 = 3x + 4	M1
x = 6 cao	A1

Answer: **x = 6**

Question 31

expands bracket: 3x - 3 + 5 = 11	M1
x = 3 cao	A1

Answer: **x = 3**

Question 32

correct first step, e.g. x/3 = 5	M1
x = 15 cao	A1

Answer: **x = 15**

Question 33

expands bracket: 6x - 4 = 4x + 6	M1
x = 5 cao	A1

Answer: **x = 5**

Question 34

expands bracket correctly: -3x + 6 = 15	M1
x = -3 cao	A1

Answer: **x = -3**

Question 35

expands both brackets: 3x + 12 = 4x - 8 + 6	M1
x = 14 cao	A1

Answer: **x = 14**

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