2.14 Introduction to Factorising Quadratics: 1-hour Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Factorise $t^2 - 5t$.

(2)

2 Expand and simplify $(p + 2)(p - 2)$.

(2)

3 Show that $x^2 + 13x + 40$ can be written as $(x + 8)(x + 5)$.

(3)

4 Expand and simplify $(p + 7)(p - 7)$.

(2)

5 Factorise $a^2 - a - 6$.

(2)

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6 Factorise $n^2 - 16$.

(2)

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7 Factorise $a^2 - 12a + 35$.

(2)

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8 Expand and simplify $(t + 5)(t - 5)$.

(2)

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9 Expand and simplify $(a - 6)^2$.

(3)

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10 Factorise $b^2 - 64$.

(2)

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11 Expand and simplify $(p - 5)(p + 5)$.

(2)

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12 Show that $n^2 + 6n + 5$ can be written as $(n + 5)(n + 1)$.

(3)

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13 Show that $x^2 + 16x + 64$ can be written as $(x + 8)(x + 8)$.

(3)

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14 Factorise fully: $x^2 + 9x + 20$

(2)

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15 Factorise $b^2 - 81$.

(2)

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16 Show that $n^2 + 14n + 49$ can be written as $(n + 7)(n + 7)$.

(3)

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17 The product of two consecutive integers is 90. Let the smaller integer be x. Write an equation in x and solve it to find the positive value of x.

(3)

18 Show that $x^2 + 10x + 25$ can be written as $(x + 5)^2$. Use this to explain why $x^2 + 10x + 25$ is never negative for any real x. Give the value(s) of x for which the expression equals 0.

(3)

19 Factorise fully: $4x^2 - 49$. Hence solve $4x^2 - 49 = 0$.

(3)

20 Multiply out $(x + 9)(x - 4)$ and then factorise your answer to show you get back the original factors.

(2)

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Mark scheme · 2.14 Introduction to Factorising Quadratics: 1-hour Pack

Question 1

a correct factor taken out or a correct bracket	M1
t(t - 5) oe cao	A1

Answer: **t(t - 5)**

Question 2

all products attempted, at least three correct	M1
p^2 - 4 cao	A1

Answer: **p^2 - 4**

Question 3

expands (x + 8)(x + 5) with at least three terms correct	M1
x^2 + 8x + 5x + 40 shown	M1
x^2 + 13x + 40 shown (with 8x + 5x = 13x)	A1

Answer: **x^2 + 13x + 40 (shown)**

Question 4

all products attempted, at least three correct	M1
p^2 - 49 cao	A1

Answer: **p^2 - 49**

Question 5

two numbers with the correct product or the correct sum identified	M1
(a + 2)(a - 3) oe cao	A1

Answer: **(a + 2)(a - 3)**

Question 6

a correct factor taken out or a correct bracket	M1
(n + 4)(n - 4) oe cao	A1

Answer: **(n + 4)(n - 4)**

Question 7

two numbers with the correct product or the correct sum identified	M1
(a - 5)(a - 7) oe cao	A1

Answer: **(a - 5)(a - 7)**

Question 8

all products attempted, at least three correct	M1
t^2 - 25 cao	A1

Answer: **t^2 - 25**

Question 9

at least three of the four products correct	M1
all four products correct	M1
a^2 - 12a + 36 cao	A1

Answer: **a^2 - 12a + 36**

Question 10

a correct factor taken out or a correct bracket	M1
(b + 8)(b - 8) oe cao	A1

Answer: **(b + 8)(b - 8)**

Question 11

all products attempted, at least three correct	M1
p^2 - 25 cao	A1

Answer: **p^2 - 25**

Question 12

expands (n + 5)(n + 1) with at least three terms correct	M1
n^2 + 5n + n + 5 shown	M1
n^2 + 6n + 5 shown (with 5n + n = 6n)	A1

Answer: **n^2 + 6n + 5 (shown)**

Question 13

expands (x + 8)(x + 8) with at least three terms correct	M1
x^2 + 8x + 8x + 64 shown	M1
x^2 + 16x + 64 shown (with 8x + 8x = 16x)	A1

Answer: **x^2 + 16x + 64 (shown)**

Question 14

Identify two numbers multiply to 20 and add to 9	M1
Correct factorisation (x + 4)(x + 5) cao	A1

Answer: **(x + 4)(x + 5)**

Question 15

a correct factor taken out or a correct bracket	M1
(b + 9)(b - 9) oe cao	A1

Answer: **(b + 9)(b - 9)**

Question 16

expands (n + 7)(n + 7) with at least three terms correct	M1
n^2 + 7n + 7n + 49 shown	M1
n^2 + 14n + 49 shown (with 7n + 7n = 14n)	A1

Answer: **n^2 + 14n + 49 (shown)**

Question 17

forms x(x + 1) = 90, i.e. x^2 + x - 90 = 0	M1
factorises as (x - 9)(x + 10) = 0	M1
x = 9 (rejecting x = -10)	A1

Answer: **x = 9 (the integers are 9 and 10)**

Question 18

expands $(x + 5)^2$ to confirm x^2 + 10x + 25	M1
explains a square is never negative, so the expression is never negative	A1
x = -5	B1

Answer: **x^2 + 10x + 25 = $(x + 5)^2$, never negative since a square cannot be negative; equals 0 only when x = -5**

Question 19

identifies $4x^2 = (2x)^2$ and $49 = 7^2$	M1
(2x - 7)(2x + 7) cao	A1
x = 3.5 and x = -3.5	B1

Answer: **(2x - 7)(2x + 7); x = 3.5 or x = -3.5**

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Question 20

$x^2 + 5x - 36$ cao	**M1**
factorises back to $(x + 9)(x - 4)$	**A1**

Answer: **$x^2 + 5x - 36 = (x + 9)(x - 4)$**

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