Name:

Exam Style Questions

# Equating Coefficients

Corbettmaths

Equipment needed: Pen

**Guidance**

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 367

Answers and Video Solutions

1. $5(3x + c) \equiv 15x + 40$

Work out the value of c.

$15x + 5c \equiv 15x + 40$

Constants

$5c = 40$

$c = 8$

c = 8

**(1)**

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2. Work out the values of c and d in the identity.

$2(x + 7) + cx + d \equiv 5x + 1$

$2x + 14 + cx + d \equiv 5x + 1$

$x$

$2 + c = 5$

$c = 3$

Constants

$14 + d = 1$

$d = -13$

c = 3

d = -13

**(3)**

3. $a(2x + 7) \equiv 8x + 14b$

Work out the values of a and b.

$2ax + 7a \equiv 8x + 14b$

(x)

$2a = 8$

$a = 4$

(Constants)

$7a = 14b$

$28 = 14b$

$b = 2$

a = 4

b = 2

**(3)**

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4. Work out the values of c and d in the identity.

$(c - 2)x^2 + 3d \equiv 7x^2 + 9$

$cx^2 - 2x^2 + 3d \equiv 7x^2 + 9$

($x^2$)

$c - 2 = 7$

$c = 9$

(Constants)

$3d = 9$

$d = 3$

c = 9

d = 3

**(2)**

5. Work out the values of a and b in the identity.

$$9(2x+5)+2(3x+b) \equiv ax+23$$

$18x + 45 + 6x + 2b \equiv ax + 23$

(x) $18 + 6 = a$

$24 = a$

(Constants) $45 + 2b = 23$

$2b = -22$

$b = -11$

a = 24

b = -11

**(3)**

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6. Work out the values of a and b in the identity.

$$4(2x+b)+a(x+3) \equiv 10x+2$$

$8x + 4b + ax + 3a \equiv 10x + 2$

(x) $8 + a = 10$

$a = 2$

(Constants) $4b + 3a = 2$

$4b + 6 = 2$

$4b = -4$

$b = -1$

a = 2

b = -1

**(3)**

7. Work out the values of a and b in the identity.

$$4(3x+2)+a(x+b)\equiv 15x-16$$

$12x + 8 + ax + ab \equiv 15x - 16$

(x) $12 + a = 15$

$a = 3$

(Constants) $8 + ab = -16$

$8 + 3b = -16$

$3b = -24$

$b = -8$

a = 3

b = −8

**(3)**

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8. $$2ax+9-3(x+b)\equiv 5x-30$$

Work out the values of a and b.

$2ax + 9 - 3x - 3b \equiv 5x - 30$

(x) $2a - 3 = 5$

$2a = 8$

$a = 4$

(Constants) $9 - 3b = -30$

$-3b = -39$

$b = 13$

a = 4

b = 13

**(3)**

9. $(x+4)(x-6)+ax+b \equiv x^2+8x-25$

Work out the values of a and b.

$x^2 - 6x + 4x - 24 + ax + b \equiv x^2 + 8x - 25$

$x^2 - 2x - 24 + ax + b \equiv x^2 + 8x - 25$

(x) $-2 + a = 8$

$a = 10$

(Constants) $-24 + b = -25$

$b = -1$

a = 10

b = −1

**(3)**

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10. $(2x-5)(2x-7)+ax^2+b \equiv 3x^2-24x+12$

Work out the values of a and b.

$4x^2 - 14x - 10x + 35 + ax^2 + b \equiv 3x^2 - 24x + 12$

$4x^2 - 24x + 35 + ax^2 + b \equiv 3x^2 - 24x + 12$

($x^2$) $4 + a = 3$

$a = -1$

(x) $-24 = -24$ ✓

(Constants) $35 + b = 12$

$b = -23$

a = −1

b = −23

**(3)**

11. Work out the values of a and b in the identity.

$(x-2)^2 + x + a(x+b) \equiv x^2 + 1$

$(x-2)(x-2) + x + a(x+b) \equiv x^2 + 1$

$x^2 - 4x + 4 + x + ax + ab \equiv x^2 + 1$

$x^2$: $1 = 1$ ✓

Constants: $4 + ab = 1$

$4 + 3b = 1$

$3b = -3$

$b = -1$

$x$: $-4 + 1 + a = 0$

$-3 + a = 0$

$a = 3$

a = 3

b = -1

**(3)**

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12. $(x+b)^2 \equiv x^2 + cx + 49$

Find the two possible values of b.

$(x+b)(x+b) \equiv x^2 + cx + 49$

$x^2 + 2bx + b^2 \equiv x^2 + cx + 49$

Constants: $b^2 = 49$

$b = 7$ or $-7$

$x$: $2b = c$

if $b = 7$ $14 = c$

if $b = -7$ $-14 = c$

c = 14 or c = -14

**(2)**

13. $(x + 2c)(x + c) \equiv x^2 + dx + 50$

Find the two possible values of d.

$x^2 + cx + 2cx + 2c^2 \equiv x^2 + dx + 50$

(Constants)

$2c^2 = 50$

$c^2 = 25$

$c = 5$ or $-5$

(x) $c + 2c = d$

$3c = d$

if $c = 5$ $d = 15$

$c = -5$ $d = -15$

d = 15 or d = −15

**(3)**

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14. $4x^3 + (x + a)(x + b) + cx \equiv ax^3 - 3x^3 + x^2 - x - 42$

Work out the values of a, b and c.

$4x^3 + x^2 + ax + bx + ab + cx \equiv ax^3 - 3x^3 + x^2 - x - 42$

($x^3$) $4 = a - 3$

$a = 7$

($x^2$) $1 = 1$ ✓

(Constants) $ab = -42$

$7b = -42$

$b = -6$

(x) $a + b + c = -1$

$a = 7$ $b = -6$

$7 - 6 + c = -1$

$1 + c = -1$

$c = -2$

a = 7

b = −6

c = −2

**(5)**

15. $(ax+1)(x+5)(x+b) \equiv 2x^3+23x^2+71x+30$

Work out the values of a and b.

$ax \times x \times x = 2x^3$

$a = 2$

$1 \times 5 \times b = 30$

$b = 6$

a = 2

b = 6

**(2)**

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16. Given that

$(x+a)^2(x-2) \equiv x^3+bx^2-3x-18$

Work out the values of a and b.

$(x^2+2ax+a^2)(x-2) \equiv x^3+bx^2-3x-18$

$x^3+2ax^2+a^2x-2x^2-4ax-2a^2 \equiv x^3+bx^2-3x-18$

Constants: $-2a^2 = -18$

$a^2 = 9$

$a = \pm 3$

$x^2$: $2a-2 = b$

$6-2 = b$

$b = 4$

$x$: $a^2-4a = -3$

if $a=3$ $9-12 = -3$ ✓

if $a=-3$ $9-(-12) \neq -3$ ×

$a = 3$

a = 3

b = 4

**(5)**

17. Adil expands $(x + 4)(x + c)(2x - 1)$

The coefficient of $x^2$ is $-9$

Find the value of c.

$(x^2 + cx + 4x + 4c)(2x - 1)$

$2x^3 + 2cx^2 + 8x^2 + 8cx - x^2 - cx - 4x - 4c$

$x^2$

$2c + 8 - 1 = -9$

$2c + 7 = -9$

$2c = -16$

$c = -8$

$-8$

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**(5)**