Name:

Exam Style Questions

Advanced Changing the Subject

Corbettmaths

Equipment needed: Calculator, 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 8

Answers and Video Solutions

1. Rearrange $y = a - 7c^3$ to make c the subject

$+7c^3 \quad +7c^3$

$y + 7c^3 = a$

$-y \quad -y$

$7c^3 = a - y$

$\div 7 \quad \div 7$

$c^3 = \frac{a-y}{7}$

$c = \sqrt[3]{\frac{a-y}{7}}$

$c = \sqrt[3]{\frac{a-y}{7}}$

(2)

2. Make w the subject of the formula $4(g - w) = 5w - 3$

$4g - 4w = 5w - 3$

$+4w \quad +4w$

$4g = 9w - 3$

$+3 \quad +3$

$4g + 3 = 9w$

$\div 9 \quad \div 9$

$\frac{4g+3}{9} = w$

$w = \frac{4g+3}{9}$

(3)

3. $4(2a + p) = c + p + a$

Express a in terms of c and p.

$8a + 4p = c + p + a$

$-a \qquad\qquad -a$

$7a + 4p = c + p$

$-4p \qquad -4p$

$7a = c - 3p$

$\div 7 \qquad \div 7$

$a = \frac{c - 3p}{7}$

a = $\frac{c-3p}{7}$

(3)

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4. Make y the subject of the formula $c = w - 4ay^3$

$+4ay^3 \qquad +4ay^3$

$c + 4ay^3 = w$

$-c \qquad -c$

$4ay^3 = w - c$

$\div 4a \qquad \div 4a$

$y^3 = \frac{w - c}{4a}$

$y = \sqrt[3]{\frac{w - c}{4a}}$

y = $\sqrt[3]{\frac{w-c}{4a}}$

(3)

5. Make a the subject of the formula

$$s = ut + \frac{1}{2}at^2$$

$-ut \quad -ut$

$s - ut = \frac{1}{2}at^2$

$\times 2 \quad \times 2$

$2s - 2ut = at^2$

$a = \frac{2s - 2ut}{t^2}$

or

$a = \frac{2s}{t^2} - \frac{2u}{t}$

a = ...

(3)

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6. Make v the subject of the formula.

$$s = \frac{1}{2}(u + v)t$$

$\times 2 \quad \times 2$

$2s = (u + v)t$

$2s = ut + vt$

$-ut \quad -ut$

$2s - ut = vt$

$\div t \quad \div t$

$\frac{2s - ut}{t} = v$

or

$\frac{2s}{t} - u = v$

v = $\frac{2s}{t} - u$

(3)

7. Make a the subject of $14a + 6w = ac + 8w$

$-ac \quad -ac$

$14a + 6w - ac = 8w$

$-6w \quad -6w$

$14a - ac = 2w$

$a(14 - c) = 2w$

$a = \frac{2w}{14 - c}$

a = $\frac{2w}{14-c}$

(3)

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8. Make c the subject of

$$w = \frac{3c + 5}{c}$$

$\times c \quad \times c$

$cw = 3c + 5$

$-3c \quad -3c$

$cw - 3c = 5$

$c(w - 3) = 5$

$c = \frac{5}{w - 3}$

c = $\frac{5}{w-3}$

(3)

9. Make x the subject of

$$y = \frac{x+3}{x-8}$$

$\times(x-8)$ $\times(x-8)$

$y(x-8) = x+3$

$xy - 8y = x + 3$

$+8y$ $+8y$

$xy = x + 3 + 8y$

$-x$ $-x$

$xy - x = 3 + 8y$

$x(y-1) = 3+8y$

x = $\frac{3+8y}{y-1}$

(4)

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10. Rearrange $y + 3 = x(y + 2)$ to make y the subject of the formula.

$y + 3 = xy + 2x$

-3 -3

$y = xy + 2x - 3$

$-xy$ $-xy$

$y - xy = 2x - 3$

$y(1-x) = 2x - 3$

$y = \frac{2x-3}{1-x}$

y = $\frac{2x-3}{1-x}$

(4)

11. Make w the subject of the formula

$$g = \frac{w}{w-5}$$

$g(w-5) = w$

$gw - 5g = w$

$+5g \quad +5g$

$gw = w + 5g$

$-w \quad -w$

$gw - w = 5g$

$w(g-1) = 5g$

$w = \frac{5g}{g-1}$

(3)

12. Make x the subject of the formula

$$P = 4x + \frac{\pi x}{5}$$

$\times 5 \quad \times 5$

$5P = 20x + \pi x$

$5p = x(20 + \pi)$

$x = \frac{5p}{20+\pi}$

$x = \frac{5p}{20+\pi}$

(3)

13. Make p the subject of the formula $p - 2 = \pi(y - 3p)$

$p - 2 = \pi y - 3\pi p$

$+2 \qquad +2$

$p = \pi y - 3\pi p + 2$

$+3\pi p \qquad +3\pi p$

$p + 3\pi p = \pi y + 2$

$p(1 + 3\pi) = \pi y + 2$

$p = \dfrac{\pi y + 2}{1 + 3\pi}$

p = $\dfrac{\pi y + 2}{1 + 3\pi}$

(4)

14. Make m the subject of the formula $E = mgh + \frac{1}{4}mv^2$

$\times 4 \qquad \times 4$

$4E = 4mgh + mv^2$

$4E = m(4gh + v^2)$

$\dfrac{4E}{4gh + v^2}$

m = $\dfrac{4E}{4gh + v^2}$

(3)

15. Make b the subject of

$$\sqrt{\frac{3ab}{a-b}} = 4$$

$\frac{3ab}{a-b} = 16$

$3ab = 16(a-b)$

$3ab = 16a - 16b$

$3ab + 16b = 16a$

$b(3a + 16) = 16a$

$b = \frac{16a}{3a+16}$

b = $\frac{16a}{3a+16}$

(3)

16. Make a the subject of

$$\frac{x-4a}{a+x} = y$$

$x - 4a = y(a+x)$

$x - 4a = ay + xy$

$x - xy = ay + 4a$

$x - xy = a(y+4)$

$a = \frac{x-xy}{y+4}$

a = $\frac{x-xy}{y+4}$

(4)

17. Express y in terms of c and p.

$$p = \frac{2(c-y)}{3c}$$

$3cp = 2c - 2y$

$3cp + 2y = 2c$

$2y = 2c - 3cp$

$y = \frac{2c - 3cp}{2}$ or $y = c - \frac{3cp}{2}$

y = $\frac{2c-3cp}{2}$

(3)

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18. Make m the subject of

$$\pi x = \frac{m-2}{m+8}$$

$\pi x(m+8) = m - 2$

$\pi mx + 8\pi x = m - 2$

$8\pi x + 2 = m - \pi mx$

$8\pi x + 2 = m(1 - \pi x)$

$m = \frac{8\pi x + 2}{1 - \pi x}$

m = $\frac{8\pi x + 2}{1 - \pi x}$

(4)

19. Express b in terms of a

$$a = \frac{2(3-b)}{b+1}$$

$a(b+1) = 6 - 2b$

$ab + a = 6 - 2b$

$ab + 2b = 6 - a$

$b(a+2) = 6 - a$

$b = \frac{6-a}{a+2}$

b = $\frac{6-a}{a+2}$

(3)

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20. Make m the subject of

$$\frac{4m+1}{c} = \frac{m-1}{a}$$

$a(4m+1) = c(m-1)$

$4am + a = cm - c$

$a + c = cm - 4am$

$a + c = m(c - 4a)$

$m = \frac{a+c}{c-4a}$

m = $\frac{a+c}{c-4a}$

(4)

21. Make a the subject of the formula.

$$\frac{1}{a} - \frac{1}{b} = \frac{1}{c}$$

$$\frac{b}{ab} - \frac{a}{ab} = \frac{1}{c}$$

$$\frac{b-a}{ab} \times \frac{1}{c}$$

$$(b-a)c = ab$$

$$bc - ac = ab$$

$$bc = ab + ac$$

$$bc = a(b+c)$$

$$a = \frac{bc}{b+c}$$

a = $\frac{bc}{b+c}$

(3)

22. Rearrange $\frac{p}{qr} = 3 + \frac{1}{q}$ to make r the subject

$$\frac{p}{qr} = \frac{3q}{q} + \frac{1}{q}$$

$$\frac{p}{qr} \times \frac{3q+1}{q}$$

$$pq = (3q+1)qr$$

~~$pq = 3q \times qr$~~

$$\frac{pq}{q(3q+1)} = r$$

$$r = \frac{p}{3q+1}$$

$$r = \frac{pq}{q(3q+1)}$$

23. Make x the subject of

$$c = \frac{7x-2}{3x} + \frac{5+x}{x}$$

$$c = \frac{7x-2}{3x} + \frac{15+3x}{3x}$$

$$c = \frac{10x+13}{3x}$$

$$3cx = 10x + 13$$

$$3cx - 10x = 13$$

$$x(3c-10) = 13$$

$$x = \frac{13}{3c-10}$$

x = $\frac{13}{3c-10}$

(4)