

Past-paper walk-through

Powers and roots ■ E1.3

eXercise

Questions in this set

- 0580/21 N25 Q21 ■ 2 marks
- 0580/22 N25 Q18 ■ 4 marks
- 0580/23 N25 Q24 ■ 8 marks
- 0580/21 J25 Q15 ■ 5 marks
- 0580/22 J25 Q18 ■ 4 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 21

0580/21 N25 ■ Q21 ■ 2 marks

21 (a) $(3 - \sqrt{5})(2 + 3\sqrt{5}) = a + b\sqrt{5}$

Find the value of a and the value of b .

Question 21

[2]

- (b) Rationalise the denominator.
Write your answer in its simplest form.

$$\frac{6}{\sqrt{2}}$$

Solution 21

(a) Mark scheme

$$a = -9$$

$$b = 7$$

- 2 B1 for each
- or for three correct terms from
- 6
- 9 5
- 2 5
- 3 5 5

Solution 21

- +
- —
- —
- oe

Solution 21

(b) Mark scheme

- 3 2 final answer
- 2 M1
- for
- 2
- 2
- $\times$
- oe
- 22

Solution 21

- -1 and 4
- 5 B2 for $x^2 - 3x - 4 [= 0]$
- or M1 for $2(x + 2) = x(x - 1)$ or better M2
- for a correct method to solve their
- three-term quadratic in the numerator
- or M1 for $(x + a)(x + b)$ where $ab = -4$ or
- $a + b = -3$ or (
- 4)
- 1 (
- 4)

Solution 21

■ $\times \times$

■ $\times$

■ $-$

■ $+$

■ $-$

■ or

■ $($

■ $1)$

■ $4($

■ $1)$

Solution 21

- $x \times x$

- x

- $+$

- $-$

- $+$

- or M1 for

- 2

- (3)

- 4 [1]

- 4

Solution 21

- —
- $-\times$
- $\times-$ or better
- or if in the form
- $+$
- p
- q
- r
- or
- —

Solution 21

- p
- q
- r
- then M1
- for $p = -(-3)$ and $r = 2(1)$ or better
- 0580/21
- October/November 2025
- Partial Marks
- 23
- $(-1, 8)$

Solution 21

- 4 B3 for $x = -1$
- OR M1
- for $-2 - 2x$ M1
- for their derivative $= 0$
- OR M2
- for $[x =]$ (
■)
■ (
■)
■ 2

Solution 21

- 2
- 1
- ---
- —
- or better
- or B1 for 2
- $-b$
- a
- OR M2
- for $-((x + 1)^2 - 8) [= 0]$ oe

Solution 21

- or M1 for $[\pm](x + 1)^2 + k$
- 24
- 1
- $6a + 5$
- 4 b final answer
- 4 B3 for
-
- DM or
-
- MC =

Solution 21

- 1
- 4
- —
- $b + 1$
- 6 a
- or
-
- MD or
-
- $CM = 1$

Solution 21

- $4b - 1$
- $6a$
- or B2 for
-
- $BD = 1$
- $2b$ or
-
- $OD = 3$
- $2b$
- or M1 for a correct route for

Solution 21

-
- OM
- 25
- 5 3
- 2 5
- +
- +
- a
- b
- x

Solution 21

- final answer
- 4 B2 for (5
- 3)(2
- 5)
- a
- b
- x
- +
- —
- or B1 for 5 (2

Solution 21

- 5)
- 3 (2
- 5)
- a
- x
- b
- x
- —
- +
- —

Solution 21

- or for 2 (5
- 3)
- 5(5
- 3)
- x
- a
- b
- a
- b
- +

Solution 21

- —
- + **B1**
- for (2
- 5)(2
- 5)
- x
- x
- +
- —
- 26

Solution 21

- 150 and 330
- 3 B2 for one correct answer
- or B1 for $[\tan^{-1} \dots] = 30$ or -30
- If 0 scored, SC1 for two answers in range
- with a difference of 180

Question 18

0580/22 N25 ■ Q18 ■ 4 marks

18 Rationalise the denominator and simplify. $\frac{4\sqrt{6}}{20 + 3\sqrt{2}}$ +
[3] , ,

[4]

Solution 18

- $2(4 -$
- $6)$ or $8 - 2/6$
- 3 M2
- for
- (
-)
- 20 4 6
- 16 4 6 4 6 6

Solution 18

- —
- +
- —
- —
- oe or better
- or M1 for
- 20
- 4 6
- 4 6

Solution 18

■ 4 6

■ —

■ ×

■ +

■ —

■ oe

Question 24

0580/23 N25 ■ Q24 ■ 8 marks

24 (a) Simplify.

$$\sqrt{125} - \sqrt{20}$$

Question 24

(b)



$2\sqrt{2}$ cm

NOT TO
SCALE

$3\sqrt{8}$ cm

The area of this rectangle is $k \text{ cm}^2$.

Work out the value of k .

Question 24

(c) Rationalise the denominator.

$$\frac{1}{\sqrt{7}+2}$$

Question 24

Question 24

Question 24

Solution 24

(a)

Mark scheme

- 3 5
- 2 B1 for 5 5 or 2 5

Solution 24

(b)

Mark scheme

- 24
- 2 M1 for 6 16 oe
- or 6 2
- 2 2
- $\times$
- or 3 $8/8$ $\times$

Solution 24

(c) Mark scheme

- 7 2
- 3
- —
- or $1/7$
- 3
- 2
- 3
- 2 M1

Solution 24

■ for

■ 1

■ 7 2

■ 7 2

■ 7 2

■ —

■ ×

■ +

■ —

■ oe

Question 15

0580/21 J25 ■ Q15 ■ 5 marks

15 (a) Expand and simplify.

$$(2 - \sqrt{5})(1 - 3\sqrt{5})$$

Question 15

- (b) Rationalise the denominator.
Give your answer in its simplest form.

$$\frac{6}{\sqrt{10}}$$

Question 15

16 Expand and simplify.

$$(x+4)(x-3)(3x+2)$$

Question 15

Question 15

Question 15

Solution 15

(a)

Mark scheme

- 17 – 7 5 final answer
- 2 B1 for 3 correct terms from
- $2 - 6 \ 5 - 5 + 3 \times 5 \times 5$ oe

Solution 15

(b)

Mark scheme

■ 3 10

Question 18

0580/22 J25 ■ Q18 ■ 4 marks

18 (a) $\frac{7}{\sqrt{3}}$

Rationalise the denominator.
Give your answer in its simplest form.

Question 18

(b) $(5 - \sqrt{2})(1 + 3\sqrt{2}) = c + k\sqrt{2}$

Find the value of c and the value of k .

Question 18

[2]

19 Write as a single fraction in its simplest form.

(a) $\frac{5a}{6} \times \frac{3b}{a}$

Question 18

(b) $\frac{p}{2} + \frac{3t}{4}$

Question 18

(c) $\frac{2}{x-2} - \frac{3}{x+1}$

Question 18

Solution 18

(a)

Mark scheme

- 3 3 cao
- 2 (M1)
- for $9/3 \times$
- 3
- 3 oe

Solution 18

(b) Mark scheme

$$c = -1$$

$$k = 14$$

- 2 B1 for each
- or for 3 correct terms from
- 5 15 2
- 2
- 3 2 2
- +

Solution 18

■ —

■ —

■ oe