Yr12 Pure December 2017 revision answers

**1.** (i) *36* B1 1

cao

(i)  B1

1000y3 soi

 = 1500*y*2

1500 B1
y2 B1 3

[4]

**2.** (i) (–4)2 – 4 × *k* × *k*

Uses b2 – 4ac (involving k) M1

 = 16 – 4*k*2 = 0 M1

(ii) 16 – 4*k*2 = 0

Attempts b2 – 4ac = 0 (involving k) or

attempts to complete square (involving k)

 *k*2 = 4

 *k* = 2 B1

 or *k* = –2 B1

[5]

**3.** 2(6 – 2*y*)2 + *y*2 = 57

substitute for x/y or attempt to get an equation in 1
variable only \*M1
correct unsimplified expression A1

 2(36 *–* 24*y* **+** 4*y*2) ***+*** *y*2 =57
9*y2* – 48*y* **+** 15 **=** 0 A1

obtain correct 3 term quadratic

 3*y*2 – 16*y* **+** 5 **=** 0
(3*y* **–** 1)( *y* **–** 5) **=** 0 M1dep

correct method to solve 3 term quadratic

 *y* ***= *** or *y* = 5 A1

 *x* = or *x =* –4 A1

**SC** If A0 A0, one correct pair of values, **6** spotted or from correct factorisation **www** B1[6]

**4.** (i) (*x*2 – 4*x* **+** 4)(*x* **+** 1)

Attempt to multiply a 3 term quadratic by a linear
factor or to expand all 3 brackets with an appropriate
number of terms (including an x3 term) M1
Expansion with at most 1 incorrect term A1

 **=** *x*3 – 3*x*2 + 4 A1 3

Correct, simplified answer

(ii)


+ ve cubic with 2 or 3 roots B1

Intercept of curve labelled (0, 4) or indicated on y-axis B1

(–1, 0) and turning point at (2, 0) labelled or indicated
on x-axis and no other x intercepts B1 3

[6]

**5.** (i)  M1

 Correct method (may be implied by one correct coordinate)

 *p* = –6 A1

 *q* = 1 A1 3

(ii) *r2* **=**(4 **– –**1)2 + (5 – 3)2 M1

 *r* =  A1 2

Use of  for either radius or diameter

(iii) (*x* **+** 1)2 + ( *y* – 3)2 =29

(x **+** 1)2 and (y – 3)2 seen M1
(x ± 1)2 + (y ± 3)2 **=** their r2 M1

 *x*2 + *y*2 + 2*x* – 6*y* – 19 **=** 0 A1 3

Correct equation in correct form

(iv) gradient of radius =  M1

uses 

 =  A1

oe

 gradient of tangent =  B1ft

oe

 *y* – 5 = (*x* – 4) M1

correct equation of straight line through (4, 5), any non-zero gradient

 *y* = *x* + 15 A1 5

oe 3 term equation e.g. 5x + 2y = 30

[13]

**6.** *y* **=** 2*x* **–** 4

 4*x*2 + (2*x* – 4)2 =10 \*M1

Attempt to get an equation in 1 variable only

 8*x*2 – 16*x* **+** 16 **=** 10
8*x*2 – 16*x* **+** 6 **=** 0 A1

Obtain correct 3 term quadratic (aef)

 4*x*2 – 8*x* **+** 3 **=** 0
(2*x* – 1)(2*x* – 3) **=** 0 \*M1dep

Correct method to solve quadratic of form
ax2 + bx + c = 0 (b ≠ 0) Correct factorisation oe

 *x* **= **, *x* **= ** A1

Both x values correct

 *y =* –3, *y* = –1 A1 A1 6

Both y values correct

or
one correct pair of values www B1
second correct pair of values B1

[6]

**7.** (i) Gradient = 4

Gradient of 4 soi B1

 *y* – 7 = 4(*x* – 2)

 Attempts equation of straight line through (2, 7) with any gradient M1

 *y =* 4*x* *–* 1 A1 3

(ii)  M1

 Use of correct formula for *d* or *d2* (3 values correctly substituted) M1

 = 

 =  A1

 = 

 = 

Correct simplified surd A1 3

(iii) Gradient of AB = 3 B1

 Gradient of perpendicular line = –

**SR** Allow B1 for – B1 ft

 Midpoint of AB =  B1

 *y* –  = – B1

 Attempts equation of straight line through their midpoint with any
non-zero gradient M1

 *x* + 3*y* – 8 = 0

y –  = – A1

x + 3y – 8 = 0 A1 6

[12]

**8.** (i) *y* = 

 gradient = 

 or 1.33 or better B1 1

(ii) gradient of *r = –*

– seen or implied B1ft

 *y* – 2 = –**(*x* – 1)

 Attempts equation of straight line through (1, 2) with any
gradient M1

 4*y* + 3*x* = 11

y – 2 = – (x – 1) A1

3x + 4y – 11 = 0 (not aef) A1 4

(iii) *P*

seen or implied B1

 *Q*

seen or implied (from a straight line
equation in (ii)) B1ft

  B1ft 3

aef

(iv)  A1

 Correct method to find line length using Pythagoras’ theorem M1

  A13

[11]

**9.** (i) (*x* – 5)(*x* + 2)(*x* + 5) B1

x2 – 3x –10 or x2 + 7x + 10 or x2 – 25 seen

 = (*x*2 – 3*x* – 10)(*x* + 5) M1

Attempt to multiply a quadratic by a linear factor

 = *x*3 +2*x*2 – 25*x* – 50 A1

(ii)



 B1

+ve cubic with 3 roots (not 3 line segments)

 B1√

(0, –50) labelled or indicated on y-axis

 B1

(–5, 0), (–2, 0), (5, 0) labelled or indicated on x-axis
and no other x- intercepts

[6]

**10.** (i)


Excellent curve in one quadrant or roughly correct
curves in correct 2 quadrants B1

Completely correct B1 2

(ii) *y* = 

 M1

y =  A1 2

(iii) (1, 4)

Correct x coordinate B1
Correct y coordinate B1 2

[6]

**11.** (i)  M1

Multiply numerator and denom by 3 **– **

 =  A1

(3 **+ **)(3 – ****) **=** 9 – 5

 **=** 9 – 3 A1 3

(ii)  M1

Attempt to express **** as k****

 **=** 2 A1 2

[5]

**12.** 

Multiply numerator and denominator by conjugate M1

 = 

Numerator correct and simplified A1
Denominator correct and simplified A1

 = –3 + 2 A1 4

cao

[4]