

Solutions to #4

15 marks

4

(a) $V = \pi r^2 h$
 $= \pi (17.5)^2 (0.5)$

A1 M1

$= 481.056\dots, 153.125\pi$

$= 481 \text{ cm}^3$

A1

G2 max

(b) $\frac{4}{3} \pi r^3 = 481.056\dots$

M1 for equating answer in part (a)

$r^3 = \frac{3(481.056\dots)}{4\pi}$

M1

$r = 4.86074\dots$

A1 for correct unrounded answer shown

$r = 4.9 \text{ cm}$
as requested

A1

G3 max (FT)

(c) $P(t) = a(2.06)^{-t} + 19$ for $t \geq 0$

$230 = a(2.06)^{-t} + 19$

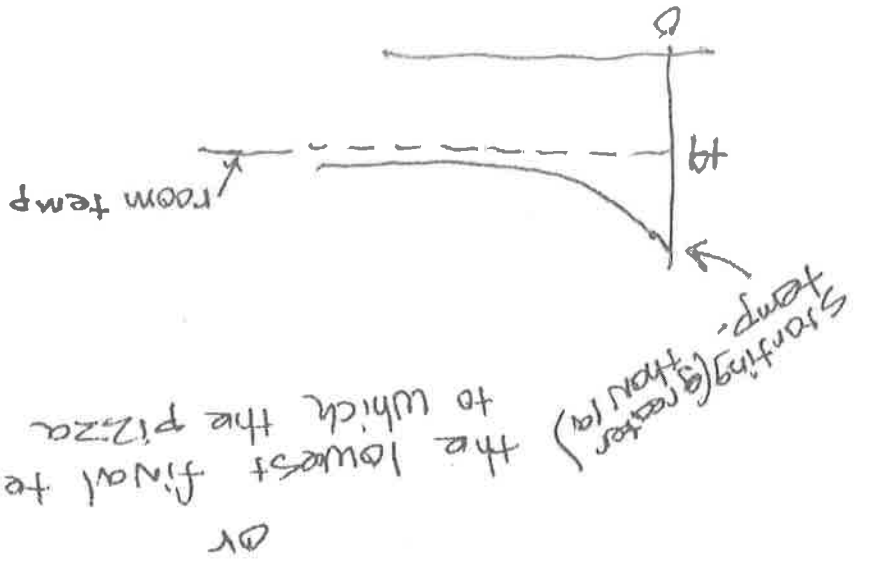
M1

$a = 211$

↑ can solve graphically or using logarithms

A1

total
15



or
the lowest final temperature to which the pizza will cool

(f) 19 represents the temperature of the dining room
A1

G2 only

A1

$$= \boxed{174 \text{ seconds}}$$

$$= 173.826 \dots \text{ seconds}$$

A1 (f) G1 only

$$(f) = 2.89711 \dots \text{ minutes}$$

M1 for equating

$$(g) \quad 45 = 211(2.06)^{-t} + 19$$

G2

A1

$$= 24.7^\circ \text{C} \quad (24.6878 \dots ^\circ \text{C})$$

question of M1

$$(d) \quad (P =) \quad 211(2.06)^{-5} + 19$$

$$\text{or } 211 \left(\frac{1}{2.06^5} \right) + 19$$