# 1.1 using standard form\_P\_2

**1a.** *[3 marks]*

## Markscheme

\* This question is from an exam for a previous syllabus, and may contain minor differences in marking or structure.

(Area of EAD =)     ***(M1)(A1)***

**Note:** Award ***(M1)*** for substitution into area of a triangle formula, **(A1)** for correct substitution. Award ***(M0)(A0)(A0)*** if EAD or AED is considered to be a right-angled triangle.

= 9.06 m  (9.05866… m)     ***(A1)   (G3)***

***[3 marks]***

**1b.** *[3 marks]*

## Markscheme

(10 × 5 × 16) + (9.05866… × 16)     ***(M1)(M1)***

**Note:** Award ***(M1)*** for correct substitution into volume of a cuboid, ***(M1)*** for adding the correctly substituted volume of their triangular prism.

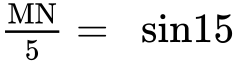
= 945 m  (944.938… m)     ***(A1)*(ft)*(G3)***

**Note:** Follow through from part (a).

***[3 marks]***

**1c.** *[2 marks]*

## Markscheme

     ***(M1)***

**Note:** Award ***(M1)*** for correct substitution into trigonometric equation.

(MN =) 1.29(m) (1.29409… (m))     ***(A1) (G2)***

***[2 marks]***

**1d.** *[3 marks]*

## Markscheme

(AE =) 10 + 7 − 2 × 10 × 7 × cos 15     ***(M1)(A1)***

**Note:** Award ***(M1)*** for substitution into cosine rule formula, and ***(A1)*** for correct substitution.

(AE =) 3.71(m)  (3.71084… (m))     ***(A1) (G2)***

***[3 marks]***

**1e.** *[3 marks]*

## Markscheme

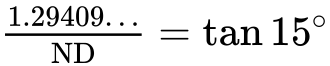
ND = 5 − (1.29409…)     ***(M1)***

**Note:** Award ***(M1)*** for correct substitution into Pythagoras theorem.

(ND =) 4.83  (4.82962…)     ***(A1)*(ft)**

**Note:** Follow through from part (c).

**OR**

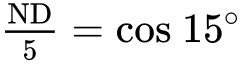
     ***(M1)***

**Note:** Award ***(M1)*** for correct substitution into tangent.

(ND =) 4.83  (4.82962…)     ***(A1)*(ft)**

**Note:** Follow through from part (c).

**OR**

     ***(M1)***

**Note:** Award ***(M1)*** for correct substitution into cosine.

(ND =) 4.83  (4.82962…)     ***(A1)*(ft)**

**Note:** Follow through from part (c).

**OR**

ND = 1.29409… + 5 − 2 × 1.29409… × 5 × cos 75°     ***(M1)***

**Note:** Award ***(M1)*** for correct substitution into cosine rule.

(ND =) 4.83  (4.82962…)     ***(A1)*(ft)**

**Note:** Follow through from part (c).

4.82962… ≠ 3.5   (ND ≠ 3.5)     ***(R1)*(ft)**

**OR**

4.82962… ≠ 2.17038…   (ND ≠ NE)     ***(R1)*(ft)**

(hence Farmer Brown is incorrect)

**Note:** Do not award ***(M0)(A0)(R1)*(ft)**. Award ***(M0)(A0)(R0)*** for a correct conclusion without any working seen.

***[3 marks]***

**1f.** *[4 marks]*

## Markscheme

(EM =) 1.29409… + (7 − 4.82962…)     ***(M1)***

**Note:** Award ***(M1)*** for their correct substitution into Pythagoras theorem.

**OR**

(EM =) 5 + 7 − 2 × 5 × 7 × cos 15     ***(M1)***

**Note:** Award ***(M1)*** for correct substitution into cosine rule formula.

(EM =) 2.53(m) (2.52689...(m))     ***(A1)(*ft) *(G2)*(ft)**

**Note:** Follow through from parts (c), (d) and (e).

(Total length =) 2.52689… + 3.71084… + 1.29409… +10 + 7     ***(M1)***

**Note:** Award ***(M1)*** for adding their EM, their parts (c) and (d), and 10 and 7.

= 24.5 (m)    (24.5318… (m))     ***(A1)*(ft) *(G4)***

**Note:** Follow through from parts (c) and (d).

***[4 marks]***

**2a.** *[1 mark]*

## Markscheme

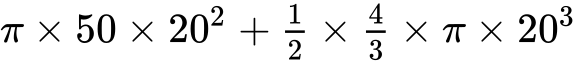
\* This question is from an exam for a previous syllabus, and may contain minor differences in marking or structure.

50 (cm)      ***(A1)***

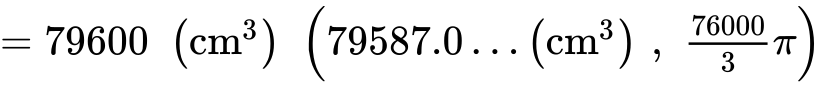
***[1 mark]***

**2b.** *[4 marks]*

## Markscheme

     ***(M1)(M1)(M1)***

**Note:** Award ***(M1)*** for their correctly substituted volume of cylinder, ***(M1)*** for correctly substituted volume of sphere formula, ***(M1)*** for halving the substituted volume of sphere formula. Award at most ***(M1)(M1)(M0)*** if there is no addition of the volumes.

     ***(A1)*(ft) *(G3)***

**Note:** Follow through from part (a).

***[4 marks]***

**2c.** *[2 marks]*

## Markscheme

*h = H − r* (or equivalent) ***OR*** *H* = 110 − 2*r*     ***(M1)***

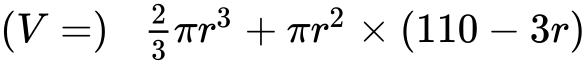
**Note:** Award ***(M1)*** for writing h in terms of *H* and *r* or for writing *H* in terms of *r*.

(*h* =) 110 *−* 3*r****(A1) (G2)***

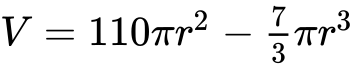
***[2 marks]***

**2d.** *[3 marks]*

## Markscheme

    ***(M1)(M1)(M1)***

**Note:** Award ***(M1)*** for volume of hemisphere, ***(M1)*** for correct substitution of their h into the volume of a cylinder, ***(M1)*** for addition of two correctly substituted volumes leading to the given answer. Award at most ***(M1)(M1)(M0)*** for subsequent working that does not lead to the given answer. Award at most ***(M1)(M1)(M0)*** for substituting *H* = 110 − 2*r* as their *h*.

    ***(AG)***

***[3 marks]***

**2e.** *[2 marks]*

## Markscheme

(r =) 31.4 (cm)  (31.4285… (cm))     ***(G2)***

**OR**

      ***(M1)***

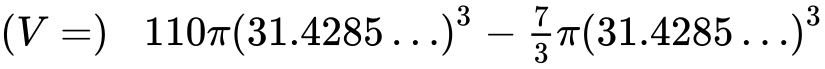
**Note:** Award ***(M1)*** for setting the correct derivative equal to zero.

(r =) 31.4 (cm)  (31.4285… (cm))     ***(A1)***

***[2 marks]***

**2f.** *[4 marks]*

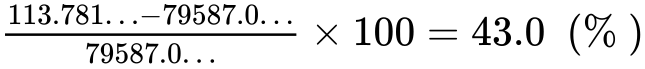
## Markscheme

     ***(M1)***

**Note:** Award ***(M1)*** for correct substitution of their 31.4285… into the given equation.

= 114000 (113781…)     ***(A1)*(ft)**

**Note:**Follow through from part (e).

(increase in capacity =)      ***(R1)*(ft)**

**Note:** Award ***(R1)*(ft)** for finding the correct percentage increase from their two volumes.

**OR**

1.4 × 79587.0… = 111421.81…     ***(R1)*(ft)**

**Note:** Award ***(R1)*(ft)** for finding the capacity of a trash can 40% larger than the original.

Claim is correct ***(A1)*(ft)**

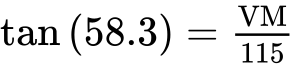
**Note:** Follow through from parts (b), (e) and within part (f). The final ***(R1)(A1)*(ft)** can be awarded for their correct reason and conclusion. Do not award ***(R0)(A1)*(ft)**.

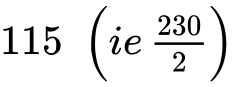
***[4 marks]***

**3a.** *[3 marks]*

## Markscheme

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   **OR**               ***(A1)(M1)***

**Note:** Award ***(A1)*** for    seen, ***(M1)*** for correct substitution into trig formula.

        ***(A1)***

           ***(AG)***

**Note:** Both the rounded and unrounded answer must be seen for the final ***(A1)*** to be awarded.

**3b.** *[2 marks]*

## Markscheme

  **OR**        **(M1)**

Note: Award ***(M1)*** for correct substitution into Pythagoras formula. Accept alternative methods.

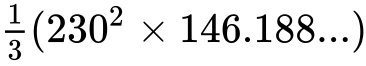
       ***(A1)(G2)***

**Note:** Use of full calculator display for  gives .

**3c.** *[2 marks]*

## Markscheme

**Units are required in part (c)**

       ***(M1)***

**Note:** Award ***(M1)*** for correct substitution in volume formula. Follow through from part (b).

       ***(A1)*(ft)*(G2)***

**Note:** The answer is  , the units are required. Use of  gives  

Use of  gives  

**3d.** *[2 marks]*

## Markscheme

       ***(A1)*(ft)*(A1)*(ft)**

**Note:** Award ***(A1)*(ft)** for  and ***(A1)*(ft)** for 

Award ***(A0)(A0)*** for answers of the type: 

Follow through from part (c).

**3e.** *[4 marks]*

## Markscheme

the volume of a wall would be        ***(M1)***

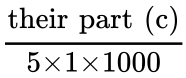
**Note:** Award ***(M1)*** for correct substitution into volume formula.

       ***(A1)(G2)***

which is less than the volume of the pyramid       ***(R1)(ft)***

Ahmad is correct.       ***(A1)(ft)***

**OR**

the length of the wall would be        ***(M1)***

**Note:** Award ***(M1)*** for dividing their part (c) by 

          ***(A1)*(ft)*(G2)***

which is more than the distance from Paris to Amsterdam       ***(R1)(ft)***

Ahmad is correct.       ***(A1)(ft)***

**Note:** Do not award final ***(A1)*** without an explicit comparison. Follow through from part (c) or part (d). Award ***(R1)*** for reasoning that is consistent with their working in part (e); comparing two volumes, or comparing two lengths.

**3f.** *[6 marks]*

## Markscheme

**Units are required in part (f)(ii).**

i)            ***(M1)(A1)***

**Note:** Award ***(M1)*** for substitution into cosine rule formula, ***(A1)*** for correct substitution.

       ***(A1)(G2)***

Note: Award ***(M0)(A0)(A0)*** if  or   is considered to be a right angled triangle.

ii)             ***(M1)(A1)***

**Note:** Award ***(M1)*** for substitution into area formula, ***(A1)*** for correct substitutions.

       ***(A1)(G2)***

**Note:** The answer is  , the units are required.

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