1	$7^2 - (10 \div 2)^2 \, (= 24)$ or $\dfrac{\sin\left(\frac{1}{2}x\right)}{5} = \dfrac{\sin 90}{7}$ oe or $\cos x = \dfrac{7^2 + 7^2 - 10^2}{2 \times 7 \times 7}$ oe or $\sin\left(\frac{1}{2}x\right) = \dfrac{5}{7}$ oe or $\cos y = \dfrac{5}{7}$ oe		5	M1	or use of sine rule or cosine rule to find angle (x) of the apex or angle y $\left(= 90 - \dfrac{1}{2}x\right)$
	$\sqrt{7^2 - (10 \div 2)^2} \; (= \sqrt{24} = 2\sqrt{6} = 4.898...)$ or $(x =) 2 \times \sin^{-1}\left(\dfrac{5 \times \sin 90}{7}\right) (= 91.169...)$ oe or $(x =) 2 \times \sin^{-1}\left(\dfrac{5}{7}\right) (= 91.169...)$ oe or $(x =) \cos^{-1}\left(\dfrac{7^2 + 7^2 - 10^2}{2 \times 7 \times 7}\right) (= 91.169...)$ oe or $(x =) 2\left(90 - \cos^{-1}\left(\dfrac{5}{7}\right)\right) (= 2(90 - 44.415)... = 91.169...)$ Allow 5 from correct working			M1	for complete method to find height of triangle or the angle (x) of the apex $\cos^{-1}\left(\dfrac{5}{7}\right)(= 44.415...)$ **and** $5 \times \tan'44.415...'(= 4.898...)$ or $7 \times \sin'44.415...'(= 4.898...)$ **or** $\sin^{-1}\left(\dfrac{5}{7}\right)(= 45.584...)$ **and** $\dfrac{5}{\tan'45.584...'}(= 4.898...)$ or $7 \times \cos'45.584...'(= 4.898...)$
	E.g. $6 \times 10 + \dfrac{(10 \div 2) \times '\sqrt{24}'}{2} \times 2 \; (= 60 + 10\sqrt{6} = 84.494...)$ **or** $5 \times (6 + 6 + '\sqrt{24}') (= 60 + 10\sqrt{6} = 84.494...)$ **or** $\left(\dfrac{1}{2} \times 7 \times 7 \times \sin'91.169...' + 10 \times 6\right) (= 60 + 10\sqrt{6} = 84.494...)$			M1	for method to find the total area of the pentagon allow answers in the range $84.49 - 85$
	E.g. '84.494' $\div 16 \; (= 5.28...)$ or $\left(60 + 10\sqrt{6}\right) \div 16 \; (= 5.28...)$			M1	for method to find the number of tins required using their area
			6	A1	dep on at least M2
					Total 5 marks

2	$2 \times \pi \times 7 \; (= 43.982... \text{ or } 14\pi)$ **or** $(2 \times \pi \times 7) \div 2 \; (= 21.991... \text{ or } 7\pi)$ **or** $2 \times \pi \times 9 \; (= 56.548... \text{ or } 18\pi)$ **or** $(2 \times \pi \times 9) \div 2 \; (= 28.274... \text{ or } 9\pi)$		3	M1	for finding the circumference of either the full circle or the length of the arc for either semicircle
	e.g. "21.991" + "28.274" $(= 50.26...)$ **or** "7π" + "9π" $(=16\pi)$ **or** "21.991" + "28.274" + 2 $(= 52.26...)$ **or** "7π" + "9π" + 2 $(= 52.26...)$ **or** "21.991" + "28.274" + 2 + 2 **or** "7π" + "9π" + 2 + 2			M1	for a method to find the length of the two arcs with intention to add
		54.3		A1	accept $54.2 - 54.3$
					Total 3 marks

3	$\frac{1}{2} \times 4.8 \times 2.5 \ (= 6)$ oe **or** $3 \times 4.8 \ (= 14.4)$ oe or $4.8 \times (3 + 2.5) \ (= 26.4)$		5	M1
	$\frac{1}{2} \times 4.8 \times 2.5 \ (= 6)$ oe **and** $3 \times 4.8 \ (= 14.4)$ oe or $[4.8 \times (3 + 2.5)] - [0.5 \times 2.4 \times 2.5 + 0.5 \times 2.4 \times 2.5]$ or "26.4" − 6 (= 20.4) or			M1
	("6" + "14.4") ÷ 1.8 (= 11.3…) or "20.4" ÷ 1.8 (= 11.3…) or $\dfrac{"6"}{1.8} + \dfrac{"8"}{1.8} \ (3.3... + 8 = 11.3...)$			M1 dep on M1 for a method to find the number of tins for their area
	"12" × 16.4(0) (= 196.8(0)) or 190 ÷ 16.4 (=11.58…) and "12"			M1 dep on previous M1 for a method to calculate the cost for their number of tins (their number of tins must be rounded up to the next integer) or the number of tins that can be bought compared with their number of tins
	Working required	No and 196.8(0) or 11.58 and 12 seen		A1 dep on M2 SC B1 for 190 ÷ 16.4(0) if M0 scored
				Total 5 marks

4	eg 7.5 × 5 (= 37.5) oe **or** 8 × (10 − 7.5) (= 20) oe **or** 10 × 5 (= 50) oe **or** (10 − 7.5) × (8 − 5) (= 7.5) oe **or** 10 × 8 (= 80) oe **or** 7.5 × (8 − 5) (= 22.5) oe	eg 8 ÷ 0.5 (= 16) **or** (10 − 7.5) ÷ 0.5 (= 5) **or** (8 − 5) ÷ 0.5 (= 6) **or** 10 ÷ 0.5 (= 20) **or** 5 ÷ 0.5 (= 10) **or** 7.5 ÷ 0.5 (= 15)		5	M1 for a method to find a relevant area **OR** a method to find the number of tiles along one 'row'
	eg "37.5" + "20" (= 57.5) oe **or** "50" + "7.5" (= 57.5) oe **or** "80" − "22.5" (= 57.5) oe	eg "16" × "5" (= 80) **or** "10" × "15" (= 150) **or** "5" × "6" (= 30) **or** "10" × "20" (= 200)			M1 for a method to find the total area of the shape **OR** a method to find the number of tiles needed for one rectangle
	"57.5" ÷ 0.5^2 (= 230) oe or "575 000" ÷ 10 000 ÷ 0.5^2 oe or "57.5" ÷ "0.25" (= 230) oe or "57.5" ÷ ("2500" ÷ 10 000) (= 230) oe	eg "80" + "150" (= 230) **or** "30" + "200" (= 230)			M1 dep on M1 for a method to find the total number of tiles required (consistent units)
	"230" × 4 (= 920)				M1 dep on previous M1 for multiplying the total number of tiles by 4
	Correct answer scores full marks (unless from obvious incorrect working)		15 hours 20 minutes		A1 SCB1 for 0.5 × 0.5 (= 0.25) if no other marks are awarded
					Total 5 marks

4 ALT	eg 750 × 500 (= 375 000) oe **or** 800 × (1000 − 750) (= 200 000) oe **or** 1000 × 500 (= 500 000) oe **or** (1000 − 750) × (800 − 500) (= 75 000) oe **or** 1000 × 800 (= 800 000) oe **or** 750 × (800 − 500) (= 225 000) oe	eg 800 ÷ 50 (= 16) **or** (1000 − 750) ÷ 50 (= 5) **or** (800 − 500) ÷ 50 (= 6) **or** 1000 ÷ 50 (= 20) **or** 500 ÷ 50 (= 10) **or** 750 ÷ 50 (= 15)		5	M1	for a method to find a relevant area **OR** a method to find the number of tiles along one 'row'
	eg "375 000" + "200 000" (= 575 000) oe **or** "500 000" + "75 000" (= 575 000) oe **or** "800 000" − "225 000" (=575 000) oe	eg "16" × "5" (= 80) **or** "10" × "15" (= 150) **or** "5" × "6" (= 30) **or** "10" × "20" (= 200)			M1	for a method to find the total area of the shape **OR** a method to find the number of tiles needed for one rectangle
	"575 000" ÷ 50^2 (= 230) oe or "57.5" × 10 000 ÷ 50^2 oe or "575 000" ÷ "2500" (= 230) or oe "575 000" ÷ ("0.25" × 10 000) (= 230) oe	eg "80" + "150" (= 230) **or** "30" + "200" (= 230)			M1	dep on M1 for a method to find the total number of tiles required (consistent units)
	"230" × 4 (= 920)				M1	dep on previous M1 for multiplying the total number of tiles by 4
	Correct answer scores full marks (unless from obvious incorrect working)		15 hours 20 minutes		A1	SCB1 for 50 × 50 (= 2500) if no other marks are awarded
						Total 5 marks

5	(a)	8 + 8 + 12 (= 28) oe **or** $\frac{8+8+12-2\times5}{2}$ (= 9) oe		3	M1	for a method to find the perimeter of the triangle **or** for a method to find the length of the rectangle (check the diagram)
		("28" − 5 − 5) ÷ 2 × 5 oe eg "9" × 5			M1	for a complete method to find the area of the rectangle
		Correct answer scores full marks (unless from obvious incorrect working)	45		A1	