

Solution of 2006 Year 11 Ass. Task 2 -

Marks.

Question 1: (19)

(a) (i) $3\alpha + 2\alpha + 2\alpha + 2\alpha + \alpha = 360^\circ$ ($\angle$ s at a point)

$$10\alpha = 360^\circ$$

$$\alpha = 36^\circ$$

(ii) $\angle UTS = 60^\circ$ (RS // TU, co-interior $\angle$ s are suppl.)

$$\alpha = \angle QPT = 180^\circ - (60 + 15)$$

$$= 180^\circ - 75^\circ = 105^\circ$$
 (PQ // TU, co-int.)

(iii) $3\alpha - 15 + 2\alpha + 23 = 118^\circ$ (Ext. $\angle$ of Δ = sum of opp. interior)

$$5\alpha = 110^\circ$$

$$\alpha = 22^\circ$$

or: $3\alpha - 15 + 2\alpha + 23 + 62^\circ = 180^\circ$ ($\angle$ sum of Δ)

(b) $\frac{360}{45} = 8^\circ$ (Ext. $\angle$).

$$\text{Int. } \angle = 180 - 8 = 172^\circ$$

or: sum of $\angle$ s = $180(45 - 2) = 7740^\circ$.

$$\text{Int. } \angle = \frac{7740}{45} = 172^\circ$$

Question 2: (18)

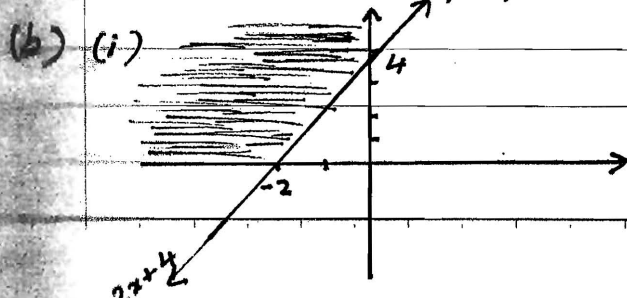
(a) A (-5, 6) B (1, -2)
3 : -2.

$$x = \frac{3(1) + (-2)(-5)}{3 - 2} = \frac{13}{1} = 13$$

$$y = \frac{3(-2) + (-2)(6)}{3 - 2} = -18$$

$\therefore$ the pt (13, -18)

N.B: For internal division) pt $(-\frac{7}{5}, \frac{6}{5})$
award 1 mark only for its correct answer.



(a)

(i)

✓ for reason or working.

✓ for answer.

(ii)

✓ for stating co-interior.

✓ for answer

(iii)

✓ for reason

✓ for working

✓ for answer

(b)

✓ for exterior $\angle$ or $\angle$ sum.

✓ for correct answer.

✓ for correct x

✓ for correct formula working.

✓ for correct y.

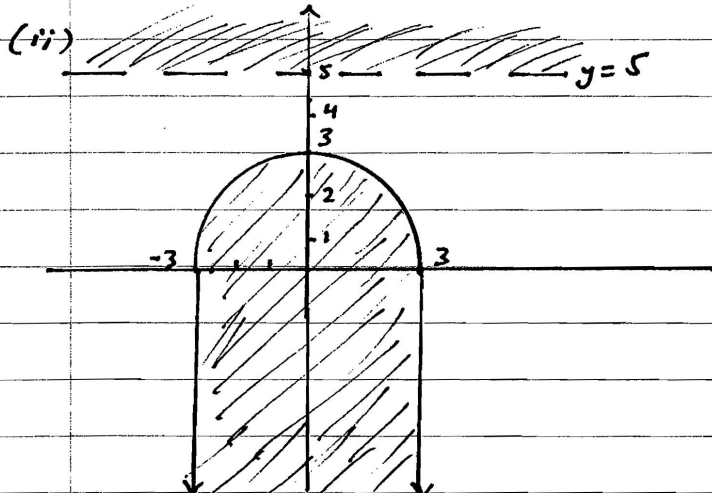
✓ for showing region above $y = 2x + 4$

✓ for showing 2nd quadrant.

Solution of Ext 1 Task 2 - 2006. - Yr 11

marks.

Q2 (cont'd).

✓ for $y > 5$.

✓ for inside semi-circle.

✓ for $\ln$ between $y = -3$ and $y = 3$.

Question 3 (11)

(a) $4 \log_6 8 = 4 \times 1.160558 \dots$
 $= 4.64$

(a)

✓ for correct answer

✓ for 2 dec. places

(b) (i) $\frac{a^4 b^6}{a^3 b^{10}} = \frac{a}{b^4}$ or $a b^{-4}$

(b)

(i) ✓ for b^6 .

✓ for answer.

(ii) $\log_a \frac{p}{q}$

(ii)

✓ for answer.

(c) (i) $\log_3 x = 4 \Rightarrow x = 3^4 = 81$

(c)

(i)

✓ for 4^3 or 64.

(ii) $\log_5 3^2 = \log_5 \frac{x}{6}$

(ii) ✓ for simplification

$\therefore 9 = \frac{x}{6} \Rightarrow x = 54$

✓ for answer.

(iii) $6^{5x+7} = \frac{1}{216} = 6^{-3}$

(iii)

✓ for changing equation to simpler index of base

$5x+7 = -3$

✓ for $5x+7 = -3$.

$5x = -10 \Rightarrow x = -2$

✓ for answer.

or: $5x+7 = \log_6 \frac{1}{216} = -3$

Question 4: (11)

(a) (i) $m_{AB} = \frac{7-5}{1-0} = 2$

✓ for m_{AB} or m_{BC}

$m_{BC} = m_{AB} = 2$

$y = 2x$

✓ for equation

Solution of Ext 1 2006 Task 2 - Yr 11

Marks.

(ii) $m_{BC} = -\frac{1}{m_{AB}} = -\frac{1}{2}$.

$y - 7 = -\frac{1}{2}(x - 1)$

$y = -\frac{x}{2} + 7\frac{1}{2} = -\frac{x}{2} + \frac{15}{2}$.

(ii)

✓ for m_{BC} .

✓ for correct equation in any form

(iii) $y_{BC} = y_{OC}$

$-\frac{x+15}{2} = 2x$.

$-x + 15 = 4x$

$15 = 5x$

$3 = x$

$y = 2x = 6$.

$C(3, 6)$.

(iii)

✓ for correct working

✓ for both correct x and y .

(iv). $AB = \sqrt{(7-5)^2 + (1)^2} = \sqrt{5}$.

$BC = \sqrt{(3-1)^2 + (6-7)^2} = \sqrt{5}$.

Area of $\Delta ABC = \frac{AB \times BC}{2} = \frac{\sqrt{5} \times \sqrt{5}}{2} = 2.5$.

N.B: Follow through errors should be considered in marking.

(iv)

✓ for correct AB or BC.

✓ for correct area.

(b) Take a point on one of the 2 lines.

i.e: $6x - 8y + 6 = 0$ such as $y = 0, x = -1$.

from $(-1, 0)$ to $3x - 4y - 12 = 0$.

$d = \frac{|3x_1 - 4y_1 - 12|}{\sqrt{3^2 + 4^2}}$

$= \frac{|3(-1) - 4(0) - 12|}{5}$

$= \frac{15}{5} = 3$.

✓ for taking a correct point.

✓ for $\perp$ distance formula used correctly.

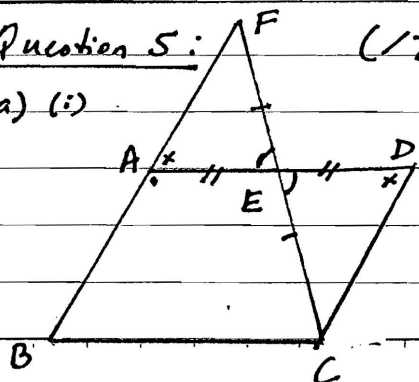
✓ for answer of 3.

Solution of Ext 1. Task 2 - 2006.

marks

Question 5: (17)

(a) (i)



(1)

✓ for diagram.

(ii) $AE = ED$ (given - mid-pt)

S

(ii)

✓ for any side = .

$\angle AEF = \angle CED$ (vertically opp. $\angle$ s are =)

A

✓ for angle reason

$FE = EC$ (given)

S

✓ for test SAS

$\therefore \triangle AEF \equiv \triangle DEC$ by SAS

(iii) $AF = DC$ (corresp. sides of $\equiv \Delta$ s are =).

(iii)

✓ for 1st reason.

$AB = DC$ (opp. sides of $\square$ are =).

✓ for 2nd reason.

$\therefore AF = AB$.

(iv) $\angle FAE = \angle CDE$ (corr. $\angle$ s in $\equiv \Delta$ s)

(iv)

But $DC \parallel AB$ (opp. sides of $\parallel$ gram)

✓ for co-int. $\angle$ s.

$\angle BAE + \angle CDE = 180^\circ$ (co-int. $\angle$ s).

✓ for showing with reason why

$\therefore \angle BAE + \angle FAE = 180^\circ$

$\angle BAE + \angle FAE = 180^\circ$

$\therefore$ Hence B, A and F are collinear.

Question 6: (17)

$$(a) \frac{5^n - 5^{n+2}}{5^{n+1} - 5^{n+2}} = \frac{5^n - 5^n \cdot 5^2}{5^n \cdot 5^1 + 5^n \cdot 5^2}$$

✓ for simplifying

$$= \frac{5^n (1 - 5^2)}{5^n (5^1 + 5^2)} = \frac{-24}{150}$$

✓ for $\frac{24}{20}$ or $\frac{6}{5}$.

$$(b) (i) 3x + 17y - 11 + 13kx - 5ky + 7k = 0.$$

$$3x + 13kx + 7k - 11 = 5ky - 17y.$$

$$(13k + 3)x + 7k - 11 = (5k - 17)y.$$

$$\therefore y = \left(\frac{13k + 3}{5k - 17} \right)x + \frac{7k - 11}{5k - 17}$$

✓ for correct expansion.

$$\therefore m = \frac{13k + 3}{5k - 17}$$

✓ for making y the subject or getting the given gradient

Solution of Task 2 - 2006 - Ext 1 Yr 11

Question 6 cont'd.

(ii) $y = x + 3 \Rightarrow m = 1.$

$\therefore \frac{13k + 3}{5k - 17} = 1$

$13k + 3 = 5k - 17$

$8k = -20 \Rightarrow k = -\frac{20}{8} = -\frac{5}{2}.$

$3x + 17y - 11 - \frac{5}{2}(13x - 5y + 7) = 0.$

$3x + 17y - 11 - \frac{65x}{2} + \frac{25y}{2} - \frac{35}{2} = 0.$

$6x + 34y - 22 - 65x + 25y - 35 = 0.$

$-59x + 59y - 57 = 0.$

or $59x - 59y + 57 = 0.$

✓ for
in k equation

✓ for general form.
correct expression.

Question 7: (1/9)

(a)

(i) $\frac{b}{c} = \frac{BG}{GF} = \frac{1}{4}$ (CG || DF, ratio of intercepts)

$\frac{a+b}{c} = \frac{AG}{GE} = \frac{3}{2}$ (CG || DE, ratio of intercepts)

✓ for answer.
✓ for justification.
of ratio of intercepts

✓ for answer.

(ii) $c = 4b$ (1)

$\frac{c}{a+b} = \frac{2}{3} \Rightarrow c = \frac{2}{3}(a+b)$... (2)

$c = c \Rightarrow 4b = \frac{2}{3}(a+b) \times \frac{3}{2}$

$6b = a + b \Rightarrow 5b = a$

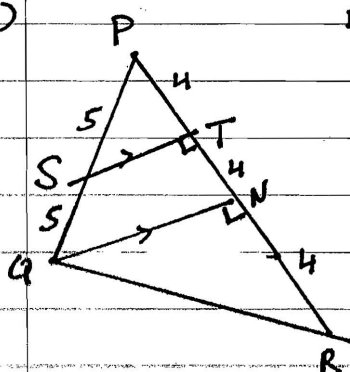
$\Rightarrow a : b : c = 5b : b : 4b = 5 : 1 : 4.$

✓ for $c = 4b$.
(one unknown in terms
of the chosen one i.e b)

✓ for obtaining $a = 5b$
(other in terms of chosen one)

✓ for obtaining 5:1:4

(b)



Draw QN || ST and $\perp$ PR.

$\therefore PT = TN = NR = 4.$

$\Delta PQN: QN = \sqrt{10^2 - 8^2}$
 $= 6.$

$\therefore QR = \sqrt{6^2 + 4^2}$
 $= \sqrt{52}$
 $= 2\sqrt{13}.$

✓ for construction

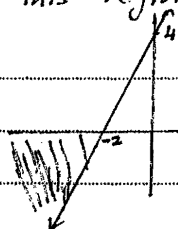
✓ for QN.

✓ for QR.

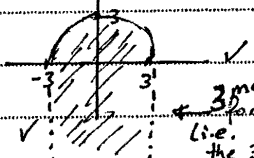
Trigonometry & similarity not be used
in this question.

More comments on 2006 yr 11 Ass. Task 2.

Q2-(b) If students draw this region, Award 1 mark:



Q2-(ii) ✓



3 marks for dotted line. give the 3 marks.

Q3-(c) $x = 3^4 = 81$.

Q5-(iii) Another method is: (Award 2 marks for clear solution).

$$AE = \frac{AD}{2}$$

but $AD = BC$.

and $AE \parallel BC$.

$$\therefore AE = \frac{BC}{2}$$

Line AE to base of Δ and $= \frac{1}{2}$ of it should pass through mid-pts.

Q5-(iv) Another method or methods evolve from:

proving $AF \parallel DC$ (see below) ✓

but $AB \parallel DC$

$\therefore A, F$ and B have to be collinear. ✓

x to prove $AF \parallel DC$:

$$\angle EDC = \angle ABC \text{ (opp. } \angle \text{ s of } \Delta \text{ are =)}$$

$$\angle EDC = \angle EAF \text{ (corresp. } \angle \text{ s of } \Delta \text{ s are =)}$$

$$\therefore \angle EAF = \angle ABC \Rightarrow AF \parallel DC.$$

all as mentioned 1 mark.

Q6(a) Correction:
$$\frac{5^n - 5^{n+2}}{5^{n+3} + 5^{n+2}} = \frac{5^n(1-5^2)}{5^n(5^3+5^2)} = \frac{-24}{150}$$

6(b)(ii) 1 mark for getting the pt of $\cap$:

$$\text{pt } \left[-\frac{16}{59}, \frac{41}{59} \right] \quad \checkmark$$

$$y = \frac{41}{59} = 1 \left(x + \frac{16}{59} \right) \quad \checkmark$$

$$59x - 59y + 57 = 0 \text{ (general sln)} \quad \checkmark$$

Q7-(a) (ii) For writing correct answer 5:1:4 only award 3 marks.

Another way: $\frac{a+b}{c} = \frac{3}{2} \Rightarrow \frac{a}{c} + \frac{b}{c} = \frac{3}{2}$

$$\frac{a}{c} + \frac{1}{4} = \frac{3}{2} \Rightarrow \frac{a}{c} = \frac{5}{4} \Rightarrow a = \frac{5}{4}c \quad \checkmark$$

$$\frac{b}{c} = \frac{1}{4} \Rightarrow b = \frac{c}{4} \quad \checkmark \therefore a:b:c = \frac{5}{4}c : \frac{c}{4} : c$$

$$= 5:1:4 \quad \checkmark$$

Q7-(b)

Q7-(b) No marks for:

Similarity for construction of a $\perp$ line and correct answer award full marks.

- Finding ST $\times$ 0 marks.

- Finding SR and then using Pythagoras to get QR [not right-angled Δ] $\times$

- $\Delta PST \parallel \Delta PQR \rightarrow$ 0 marks

0 marks.