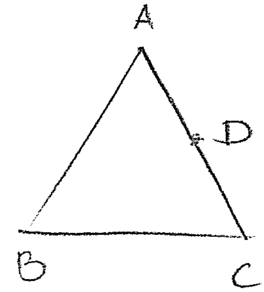
~~2 pts E.C~~

Geo Hns

Unit 2 Test Review



1.) $\overline{AB} \cong AC$ $\quad AD + DC = AC$

$3x - 1 + 2x + 2 = x^2 + 2x + 1$

$5x + \cancel{1} = x^2 + 2x + \cancel{1}$

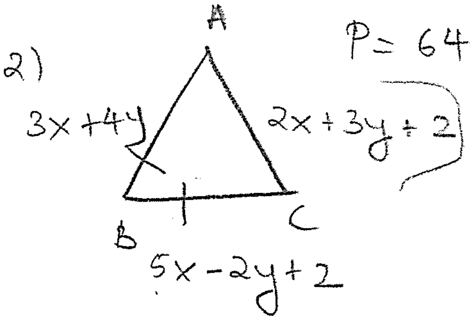
$x^2 - 3x = 0$

$x = \cancel{0}$ or 3

$x = 3 \rightarrow AD = 3(3) - 1 = 8$ $\qquad DC = 2(3) + 2 = 8$

$AD = DC$ so yes D is a midpoint!

2)



$P = 64 = AB + BC + AC = 3x + 4y + 5x - 2y + 2 + 2x + 3y + 2$

$64 = 10x + 5y + 4$

$10x + 5y = 60$

$2x + y = 12$

$y = 12 - 2x \quad -(1)$

$AB = BC$

$3x + 4y = 5x - 2y + 2$

$6y - 2 = 2x$

$3y - 1 = x \quad -(2)$

Substituting (1) in (2) $\Rightarrow 3(12 - 2x) - 1 = x$

$36 - 6x - 1 = x$

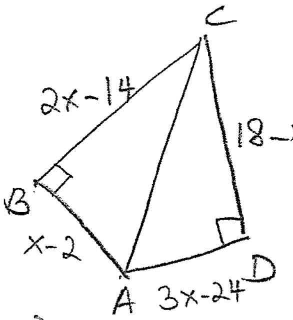
$35 = 7x$

$\boxed{x = 5}$

$y = 12 - 2(5)$

$\boxed{y = 2}$

3.) Area $= \frac{1}{2}bh$



$\triangle ABC = \left(\frac{1}{2}\right)(BC)(AB)$

$= \left(\frac{1}{2}\right)(2x-14)(x-2) = 24$

$2x^2 - 4x - 14x + 28 = 48$

$2x^2 - 18x - 20 = 0$

$x^2 - 9x - 10 = 0$

$(x-10)(x+1) = 0$

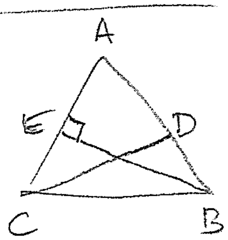
$x = 10$ ✓ or -1 ✗ since this would make $x-2$ negative

If $\overline{BC} \cong \overline{CD}$, then you can prove $\triangle ABC \cong \triangle ADC$ by HL since $\overline{AC} \cong \overline{AC}$ & the 2 △s are right.

Check

$AB = x-2 = 8$
$AD = 3x-24 = 6$ $\Big\} \neq$ ∴ the two △s are not ≅

4.) $m\angle AEB = 3x+15 = 90$



$x = \frac{75}{3} = 25$

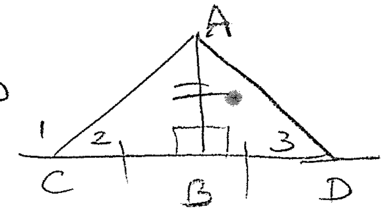
If D is a midpoint, then $AD = BD$

$AD = 2x-8 = 2(25)-8 = 42$

$BD = x+15 = 25+15 = 40$

Since $AD \neq BD$, D not a midpoint.

5.)



Since $\triangle ABC \cong \triangle ABD$ by SAS, using CPCTC, $\angle 2 \cong \angle 3$

$m\angle 2 = m\angle 3$

$m\angle 1 + m\angle 2 = 180°$

$\boxed{m\angle 2 = 180 - m\angle 1}$

$m\angle 1 + m\angle 3 = 180°$

$2x+40 + x+20 = 180°$

$3x = 120$

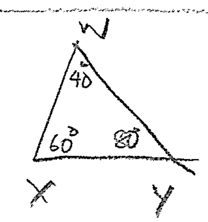
$x = 40$

$m\angle 2 = m\angle 3 = x + 20 = \boxed{60}$

6.) $5.2 < 6.8 < 8.9$

$\boxed{m\angle J < m\angle L < m\angle K}$

7.) XY has the least measure



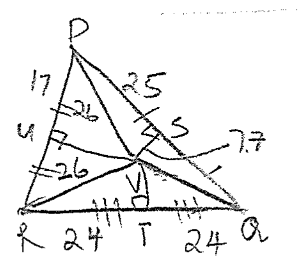
8.) $22-12 < x < 22+12$

$\boxed{10 < x < 34}$

9.) $RV = 26$

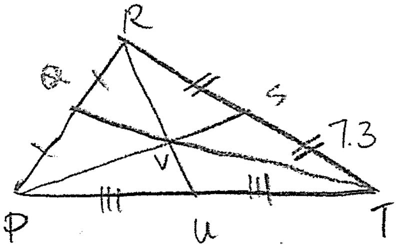
10.) $TR = 24$

11.) $VT = \pm\sqrt{26^2 - 24^2}$
$= 10$



12.) $UV = \pm\sqrt{26^2 - 17^2} = \sqrt{387} = 3\sqrt{43}$

PS = 12 cm
UV = 2.7 cm
ST = 7.3 cm



13.) $RV = (2)\,UV = (2)(2.7)$

$= \boxed{5.4 \text{ cm}}$

14.) $RS = ST = \boxed{7.3 \text{ cm}}$

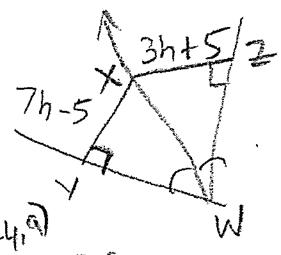
15) $PS = 12$ cm

$PV = \left(\frac{2}{\cancel{3}}\right) \cancel{12}\, 4 = \boxed{8 \text{ cm}}$

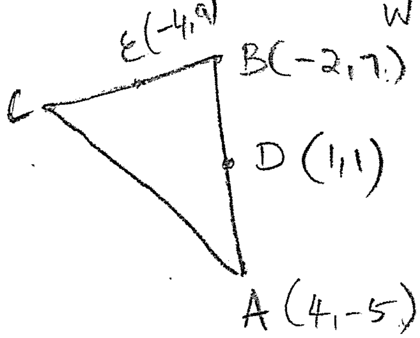
16.) $7h - 5 = 3h + 5$

$4h = 10$

$h = \frac{5}{2}$



17) $(-6, 11)$



$M_{AB}\ (1,1)$
$(\cdot D)$

$m_{AB} = \frac{-5-7}{4+2} = \frac{-12}{6} = -2$

$m_{\perp AB} = \frac{1}{2}$

$1 = \left(\frac{1}{2}\right)(1) + b$

$b = 1 - \frac{1}{2} = \frac{1}{2}$

Eqn of ⊥ bisector of $\overline{AB}$: $\boxed{y = \frac{1}{2}x + \frac{1}{2}}$

$M_{\overline{BC}}\ (\cdot E) = (-4, 9)$

$m_{\overline{BC}} = \frac{4}{-4} = -1$

$m_{\perp \overline{BC}} = 1$

$9 = (1)(-4) + b$

$b = 9 + 4 = 13$

Eqn of ⊥ bisector of $\overline{BC}$

: $\boxed{y = x + 13}$

Solve! $\frac{1}{2}x + \frac{1}{2} = x + 13$

$\frac{1}{2} - 13 = \frac{1}{2}x$

$-\frac{25}{\cancel{2}} = \frac{1}{\cancel{2}}x$

$x = -25$

$y = x + 13 = -25 + 13 = -1$

$\boxed{\text{Circumcenter: } (-25, -12)}$

18.) Centroid. Intersection of median

$M_{\overline{AB}}\ (1,1)$

$m_{\overline{DC}} = \frac{10}{-7}$

$1 = \left(-\frac{10}{7}\right) + b$

$b = 1 + \frac{10}{7} = \frac{17}{7}$

$\boxed{y = -\frac{10}{7}x + \frac{17}{7}}$

$M_{\overline{BC}}$ (.E): $(-4, 9)$

$m_{\overline{AE}} = \frac{-5-9}{4+4} = \frac{-14}{8} = \frac{-7}{4}$

$9 = \left(\frac{-7}{4}\right)(-4) + b$

$b = 2$

$\boxed{y = -\frac{7}{4}x + 2}$

Solving: $-\frac{10}{7}x + \frac{17}{7} = -\frac{7}{4}x + 2$

$\frac{7}{4}x - \frac{10}{7}x = 2 - \frac{17}{7}$

$\frac{49-40x}{\cancel{28}\,4} = \frac{14-17}{\cancel{7}}$

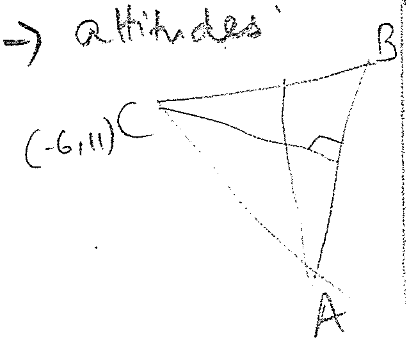
$\frac{9}{4}x = -3$

$x = \frac{(-\cancel{3})4}{\cancel{9}\,3} = -\frac{4}{3}$

$y = \left(\frac{-7}{\cancel{4}}\right)\left(\frac{-\cancel{4}}{3}\right) + 2 = \frac{7}{3} + 2 = \frac{13}{3}$

$\boxed{\text{Centroid: } \left(-\frac{4}{3}, \frac{13}{3}\right)}$

19.) Orthocenter → altitudes



$m_{AB} = -2$

$m_{\perp AB} = \frac{1}{2}$

$11 = \left(\frac{1}{2}\right)(\overset{-3}{\cancel{-6}}) + b$

$b = -14$

$\boxed{y = \frac{1}{2}x + 14}$

$m_{\overline{BC}} = -1$

$m_{\perp \overline{BC}} = 1$

$-5 = (1)(4) + b$

$b = -9$

$\boxed{y = x - 9}$

Solve:

$\frac{1}{2}x + 14 = x - 9$

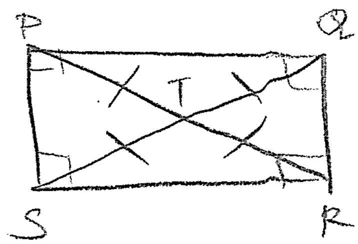
$23 = \frac{1}{2}x$

$x = 46$

$y = x - 9 = 46 - 9 = 57$

$\boxed{\text{Orthocenter: } (46, 57)}$

20.)



$PT = 3x - y$

$ST = x + y$

$TQ = 5$

$PT = ST = TQ$

$3x - y = x + y$

$2x = 2y$

$x = y$

$x + y = 5$

$2x = 5$

$\boxed{x = \frac{5}{2} = y}$

21) $PS = y$

$QR = x + 7$

$PQ = y - 2x$

$SR = x + 1$

$PS = QR$

$y = x + 7$

$PQ = SR$

$y - 2x = x + 1$

$\cancel{x} + 7 - 2x = \cancel{x} + 1$

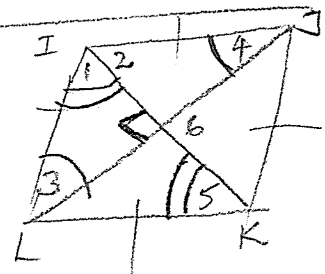
$6 = 2x$

$\boxed{x = 3}$

$\boxed{y = x + 7 = 10}$

22) $m\angle 3 = 2x + 30$

$m\angle 4 = 3x - 1$



$2x + 30 = 3x - 1$

$\boxed{31 = x}$

23) $m\angle 3 = 4(x+1)$, $m\angle 5 = 2(x+1)$

$m\angle 1 + m\angle 3 = 90^\circ$

$m\angle 1 = m\angle 5$

$m\angle 5 + m\angle 3 = 90^\circ$

$2(x+1) + 4(x+1) = 90^\circ$

$6x + 6 = 90$

$x = \frac{90-6}{6} = \frac{84}{6} = \boxed{14}$

24.)

$\frac{(n-2)180^\circ}{n} = 176.25$

$180n - 360 = 176.25n$

$3.75n = 360$

$\boxed{n = 96}$

25.) Interior ∠ measure of a regular hexagon = 120°

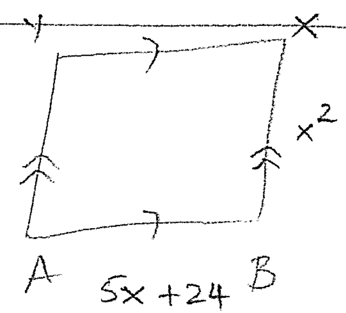
Each int. ∠ measure of an equilateral triangle = 60°

Int ∠ measure of 4 triangles = (4)(60) = 240

$240 + 120 = 360^\circ$

Will tile!

26.)



$AB = BX$

$5x + 24 = x^2$

$x^2 - 5x - 24 = 0$

$(x - 8)(x + 3) = 0$

$\boxed{x = 8 \text{ or } -3}$

Sum of int ∠s = 4 · Sum of ext ∠s

27.) $(n-2)\cancel{180} = (4)(\cancel{360})2$

$n - 2 = 8$

$\boxed{n = 10}$

28.)

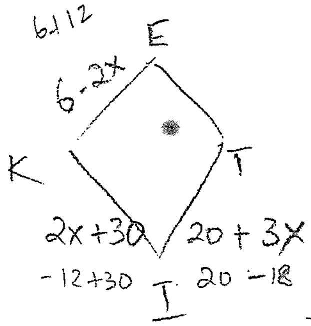
Setting

KE = KI

$6 - 2x = 2x + 30$

$-24 = 4x$

$x = -6$ will give all + values



Setting KI = IT,

$2x + 30 = 20 + 3x$

$10 = x$ will make KE negative

So $\overline{KE}$ must be $\cong \overline{KI}$

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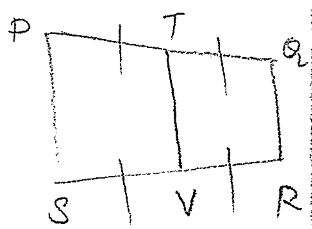
new

28.) QR = 14.3

TV = 23.2

PS ?

$TV = \dfrac{QR + PS}{2}$



$2TV - QR = PS$

$2(23.2) - 14.3 = PS = \boxed{32.1}$

29.) $TV = x + 7$, $PS + QR = 5x + 2$

$TV = x + 7 = \frac{1}{2}(PS + QR)$

$2(x + 7) = PS + QR$

$2x + 14 = 5x + 2$

$12 = 3x$

$\boxed{x = 4}$

30.) $m\angle VTP = a$, find $m\angle TPS = \boxed{180-}$

31.) $QM = 13$, $FY = (2)13 = \boxed{26}$

32.) $m\angle YBQ = 52$, $m\angle YBF = (2)52 = \boxed{104^{\circ}}$

33.) $QM = MY$

$3x - 7 = x + 3$

$2x = 10$

$x = 5$

$QB = 2QM = 2(3x - 7)$

$= 6x - 14$

$= 30 - 14$

$= \boxed{16}$

34.) $AM = MC$

$2x + 2 = y + 3$ — 1

$y = 2x - 1$

$MN = \frac{1}{2} AB$

$2MN = AB$

$2(3x) = 4y - 2$

$6x = 4y - 2$

Substituting

$6x = 4(2x - 1) - 2$

$6x = 8x - 4 - 2$

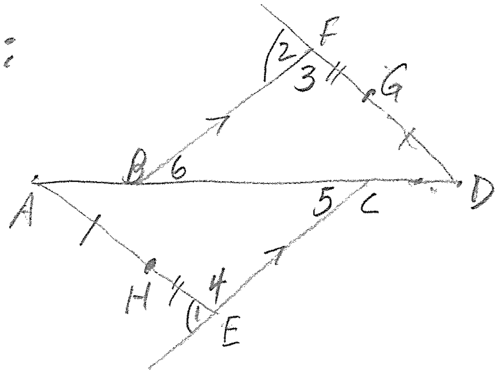
$6 = 2x$

$x = 3$

$\boxed{MN = (3)x = 9}$; $\boxed{AB = 18}$

Proofs:

(1)



*Note: Cannot use common segment thm to show FD = AE.

Note: Only $\overleftrightarrow{AD}$ (or also known as $\overline{BC}$) is a transversal.

(1) $AH = DG$, $HE = GF$ → (2) $AH + HE = DG + GF$

(3) $AE = AH + HE$, $FD = FG + GD$ → (4) $AE = FD$ → (5) $\overline{AE} \cong \overline{FD}$

*These steps saves you time & work.

(6) $\angle 1$ & $\angle 4$ are linear pair. → (7) $\angle 1$ supp $\angle 4$

$\angle 2$ & $\angle 3$ are lin. pr. → $\angle 2$ supp $\angle 3$

(8) $\angle 1 \cong \angle 2$ → (9) $\angle 3 \cong \angle 4$

(10) $\overline{BF} \parallel \overline{CE}$ → (11) $\angle 5 \cong \angle 6$

(12) $\triangle BFD \cong \triangle CEA$ → (13) $\overline{AC} \cong \overline{BD}$ → (14) $\overline{AB} \cong \overline{CD}$

Common Segment Thm.

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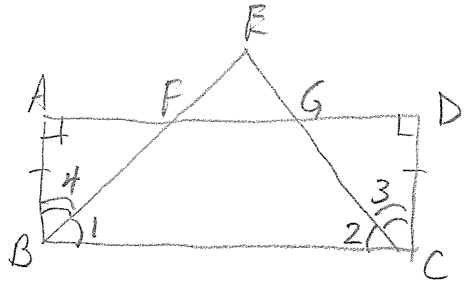
(2) (1) $\angle 1$ and $\angle 2$ are complematary. → (2) $m\angle 1 + m\angle 2 = 90$

(3) $m\angle 1 + m\angle 2 + m\angle W = 180$ → (4) $m\angle W = 90$

(5) $\angle W$ is a right $\angle$

(6) ▱ WXYZ → (7) WXYZ is a rectangle

③



① $\overline{BE} \cong \overline{CE}$ → ② $\angle 1 \cong \angle 2$ →

③ $\angle ABC$ & $\angle DCB$ are right $\angle$s. → ④ $m\angle ABC = 90$, $m\angle DCB = 90$ → ⑤ $\angle 1$ compl. $\angle 4$, $\angle 2$ compl. $\angle 3$ → ⑥ $\angle 3 \cong \angle 4$

⑦ Rectangle ABCD → ⑧ $\angle A$ & $\angle D$ Rt. $\angle$s. → ⑨ $\angle A \cong \angle D$

⑦ Rectangle ABCD → ⑩ $\overline{AB} \cong \overline{CD}$

→ ⑪ $\triangle ABF \cong \triangle DCG$ → ⑫ $\overline{AF} \cong \overline{DG}$

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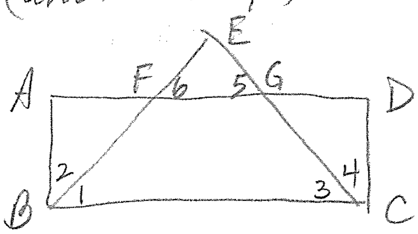
③ (another way)



① $\overline{BE} \cong \overline{CE}$ → ② $\angle 1 \cong \angle 3$ →

③ Rect. ABCD → ④ ABCD is a $\boxed{\square}$ → ⑤ $\overline{AD} \parallel \overline{BC}$ → ⑥ $\angle 1 \cong \angle 6$, $\angle 3 \cong \angle 5$ → ⑦ $\angle 6 \cong \angle 5$

→ ⑧ $\overline{FE} \cong \overline{EG}$ → ⑫ $FE = EG$

⑨ $BF + FE = BE$, $CG + GE = CE$

① → ⑩ $BE = CE$

⑨, ⑩ → ⑪ $BF + \cancel{FE} = CG + \cancel{GE}$

⑫, ⑪ → ⑬ $BF = CG$ → ⑭ $\overline{BF} \cong \overline{CG}$

③ → ⑮ $\angle A$ & $\angle D$ are rt $\angle$s. → ⑯ $\triangle BAF$ rt. $\triangle$, $\triangle CDG$ rt $\triangle$

③ → ⑰ $\overline{AB} \cong \overline{CD}$

→ ⑱ $\triangle BAF \cong \triangle CDG$ → ⑲ $\overline{AF} \cong \overline{DG}$

④ ① $\triangle SQR$ is isosceles. → ② $\overline{SQ} \cong \overline{RQ}$

③ $SQ = SP + PQ$
$RQ = RT + TQ$

→ ④ $SP + PQ = RT + TQ$

⑤ $\triangle PQT$ is isos. → ⑥ $\overline{PQ} \cong \overline{QT}$ → ⑦ $PQ = QT$

→ ⑧ $SP = RT$ → $\overline{SP} \cong \overline{RT}$

⑨ $\overline{TP} \parallel \overline{RS}$ → ⑩ RSPT is a trapezoid →

⑪ RSPT is an isos. trapezoid.

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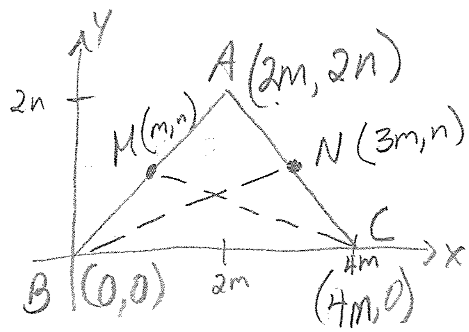
⑥



a) Find M & N.

$$M = \left(\frac{0+2m}{2}, \frac{0+2n}{2}\right)$$

$$M = (m, n)$$

$$N = \left(\frac{2m+4m}{2}, \frac{2n+0}{2}\right)$$

$$N = (3m, n)$$

b) Find MC.

$$MC = \sqrt{(4m-m)^2 + (0-n)^2}$$

$$MC = \sqrt{9m^2 + n^2}$$

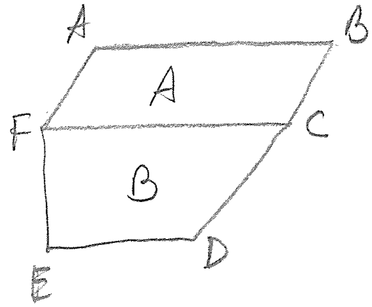
c) Find NB.

$$NB = \sqrt{(3m-0)^2 + (n-0)^2}$$

$$NB = \sqrt{9m^2 + n^2}$$

Since the measures of MC and NB are equal, $\overline{MC} \cong \overline{NB}$.

(7) various ways of dividing up the figure.



A(−3, 4)   D(0, −1)

B(4, 4)   E(−4, −1)

C(3, 1)   F(−4 1)

(I) verify this is a ▱.

Slope $\overline{AF} = \frac{4-1}{-3+4} = \frac{3}{1}$ slope $\overline{BC} = \frac{4-1}{4-3} = \frac{3}{1}$

Since $\overline{AF}$ & $\overline{BC}$ have same slope, $\overline{AF} \parallel \overline{BC}$.

Since $\overline{AB}$ & $\overline{FC}$ are horizontal, $\overline{AB} \parallel \overline{FC}$.

ABCF is a ▱.

$$\left.\begin{array}{l}\text{base } FC = 7 \\ ht = 3\end{array}\right\} \rightarrow \begin{array}{l} A = bh \\ = 3(7) \\ = 21 \text{ sq. units.}\end{array}$$

(II) B is a trapezoid.

$b_1 = 4$ $A = \frac{1}{2}h(b_1 + b_2)$

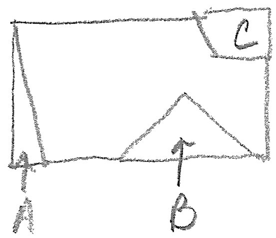
$b_2 = 7$ $= \frac{1}{2}(2)(4+7)$

$ht = 2$ $= 11$ sq. units.

(III) total area = 21 + 11 = 32 sq units

8 I Form large rectangle:

Area of rectangle



$b = 8$

$h = 5$

$A = 40$ sq. units

II Find areas of ΔA, ΔB, and trapezoid C:

$$A_{\Delta A} = \frac{1}{2}(1)5 = \frac{5}{2} = 2.5$$

$$A_{\Delta B} = \frac{1}{2}(5)(2) = 5$$

$$A_{Trap C} = \frac{1}{2}(2)(3+2) = 5$$

III

$$A_{figure} = 40 - (5 + 5 + 2.5)$$

$$= \boxed{27.5 \text{ sq. units}}$$