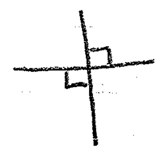
1)

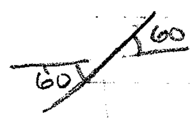
[4] a) sometimes true (+2)

(+1) If lines are in the same plane & never intersect they are $\parallel$

(+1) Skew lines never intersect and are not $\parallel$

[4] b) sometimes true (+2)

(+1) true if the angles are right 

(+1) false if not  $60+60 \neq 180$

[4] c) true (+2)

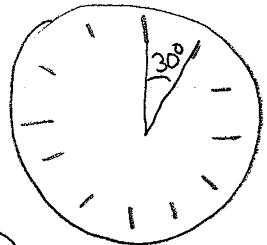
An isosceles must have 2 sides that are the same length. An equilateral Δ has this property.

[4] d) false (+2)

justify (+1)
stmt right (+1)

For any vertex not at the beginning or end of a traversing path, there must be an equal # of 'entrance arcs' as 'exit arcs'. Thus every arc not at the beginning or end of a traversing path is even. This implies there are a maximum number of 2 odd vertices in a traversable network.

[6] 2) a)



(+2) • hours: $\frac{360}{12} = 30°$ every hour
6pm => hr hand has traveled
$6 \cdot 30° = 180°$

split up (+1)

(+2) • minutes: $\frac{360}{12 \cdot 60} = .5°$ every min
50 min => hour hand has traveled
$50 \cdot .5° = 25°$

Total then the hour hand has traveled $180° + 25° = 205°$ (+1)

[9] b) Let x (+1) be the minutes after noon

(+1) Angle between hands = Angle between 12 & minute hand − Angle between 12 & hr hand.

min passed	min hand angle
15	90
30	180
60	360

(+2) If x mins has passed, the min hand has ~~swept out~~ $6x°$ ~~.5x~~

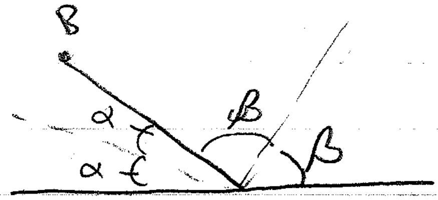
(+2) If x min has passed, from above hr. hand has swept $.5x°$

So 90 (+1) $= 6x - .5x = (6 - \frac{1}{2})x = \frac{11}{2}x$

=> $\frac{180}{11} = x$ (+1) about 16 minutes and 22 seconds

$11\sqrt{180}$ = 16.36
11
70
66
40
33
70

[5/4] 3)



Note $2\alpha + 2\beta = 180$ (+2)
=> $2(\alpha + \beta) = 180$
=> $\alpha + \beta = 90$ (+1)

$.36 \text{ min} \times \frac{60 \text{ sec}}{1 \text{ min}}$

logic proof (+2)

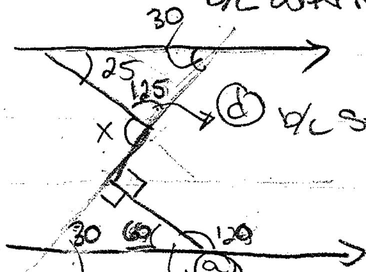
60
.36
360
1800
21.60

#4

[4] 4)

$180 - 125 = 55$

$90 - 55 = 35$



ⓒ b/c alternative interior angles

ⓓ b/c sum of angles in $\triangle$ is 180

ⓐ supplementary angle

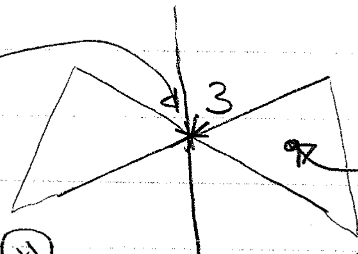
ⓑ b/c sum of angles in $\triangle$ is 180

(+1) extended segment

(x) all angles

$x = \underline{55}$

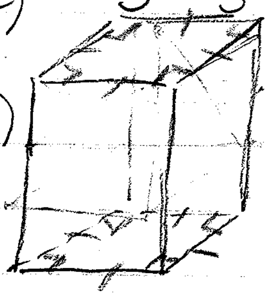
5) a) (+2)



b) (+2)

c) 3×3 (+1) note $\frac{2}{3} + 1 + \frac{2}{6} = 2$ ✓ (+1)

[2] 6) a)



b) 2 faces for the top + bottom
+ n faces - one for each side of the polygon

explain (+2)

$n+2$ (+1)

c) 2n vertices for the bottom polygon
+ n vertices for the top polygon

Explain (+2)

$2n$ (+1)

~~d)~~ n edges in the bottom polygon
n edges in the top polygon
+ n to connect the vertices from the top to the bottom

explain (+2)

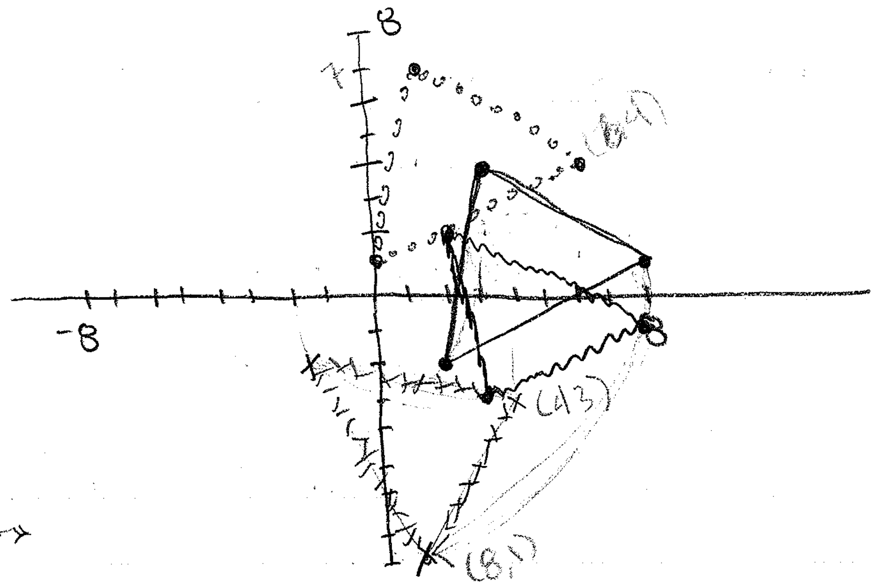
$3n$ (+1)

e) [4] (+1) $V - e + f = 2$ (+1)

$2n - e + n + 2 = 2 \Rightarrow 3n - e = 0$

$\Rightarrow$ the # of edges is $3n$ (+2)

11) [1]



[2] a) ooooo

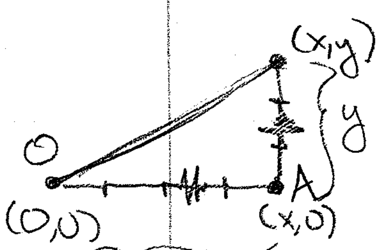
[3] b) ××>>

[3] c)

[8] 12) Consider the right triangle associated with the pt (x,y) formed with the line segments between $(0,0)$ & $(x,0)$ and between $(x,0)$ & (x,y). +3

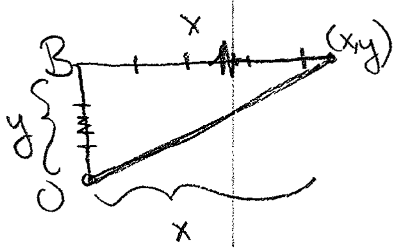
Start +2

sense +2

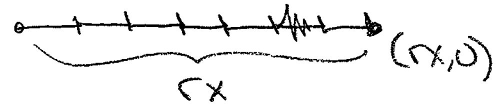


A size transformation acts on the entire plane, so it acts on the line segment $\overline{OA}$ and stretches the distance (x) to $r \cdot x$.

Thus A' is at $(rx,0)$.



Similarly we could consider the triangle $OB(x,y)$ an let the size transformation act on it.



Note OB is stretched to OB' & the distance (y) to $r \cdot y$ so B' is at $(0,ry)$. These 2 △ provide us with the coordinates of the image of (x,y) as (rx,ry)