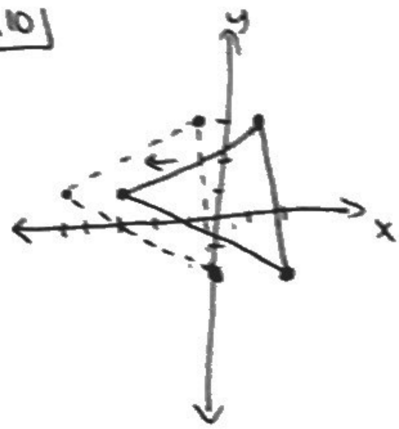
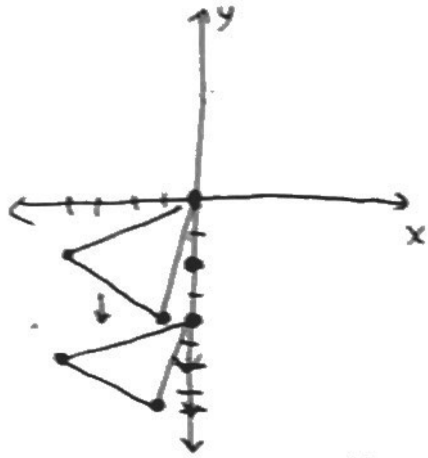
15.1.10

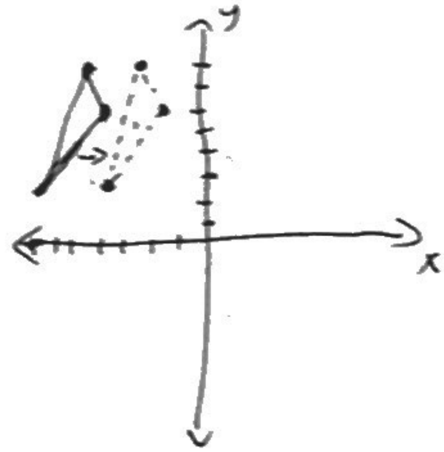
a)



b)

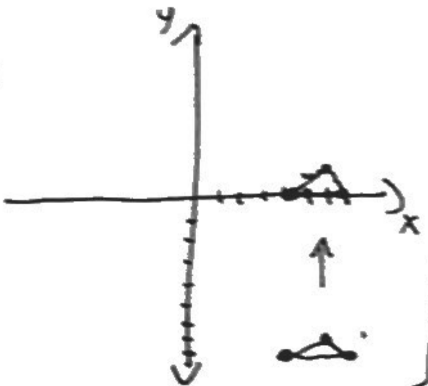


c)



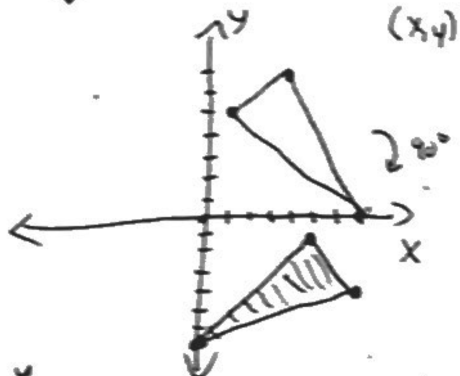
(x,y) becomes (y,-x).

d)

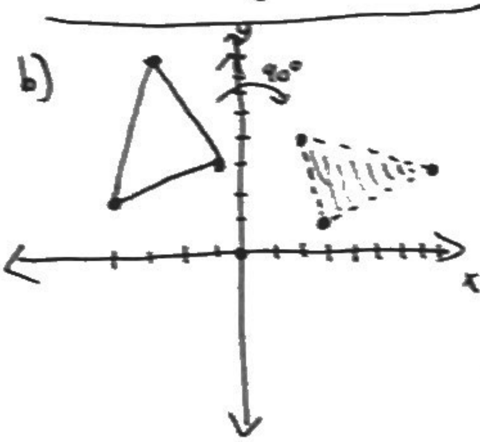


15.1.12

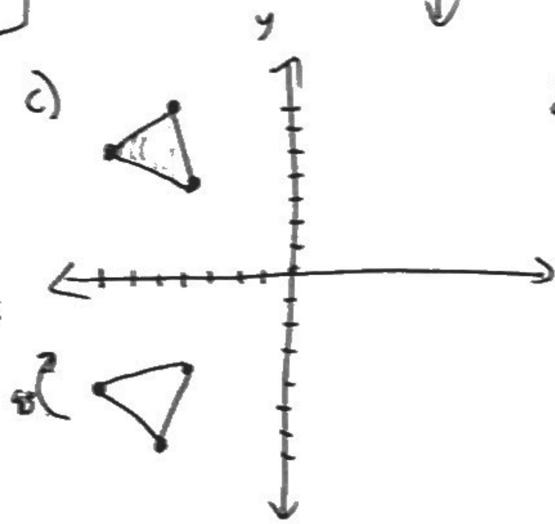
a)



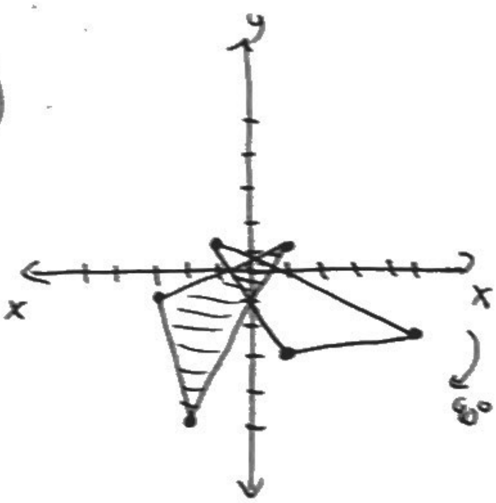
b)



c)

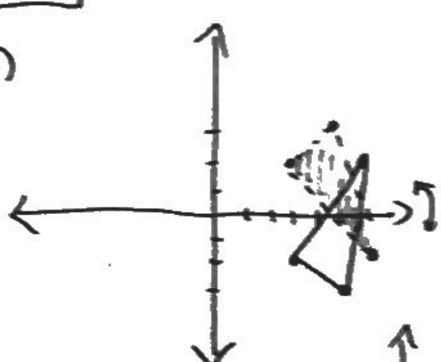


d)

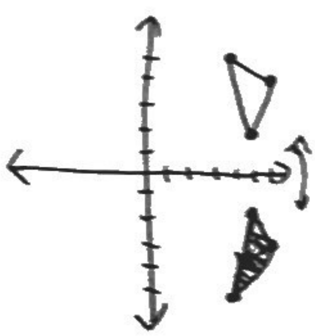


15.1.14

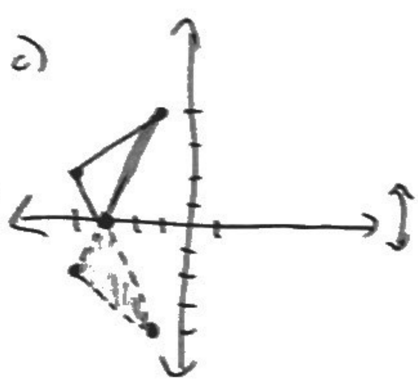
a)



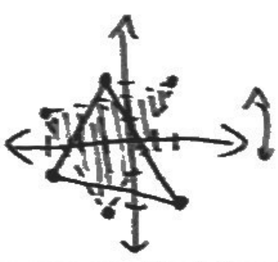
b)



c)

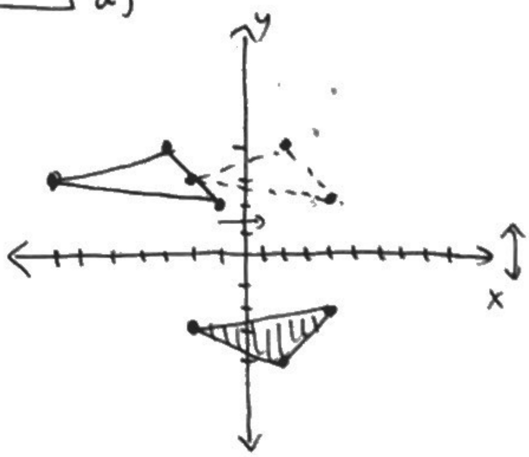


d)

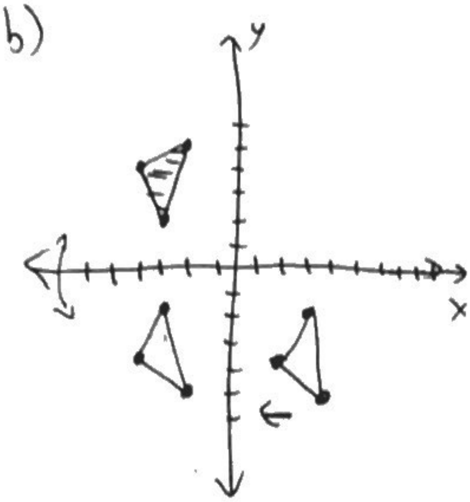


15.1.16

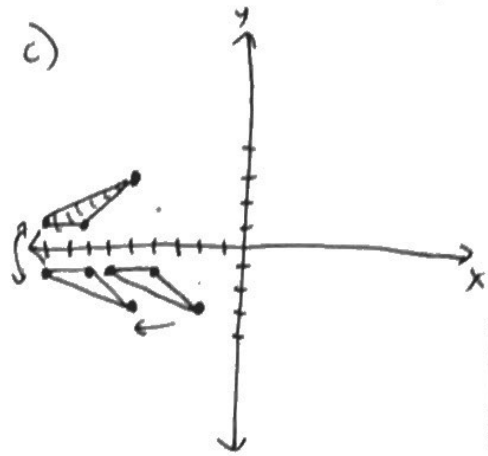
a)



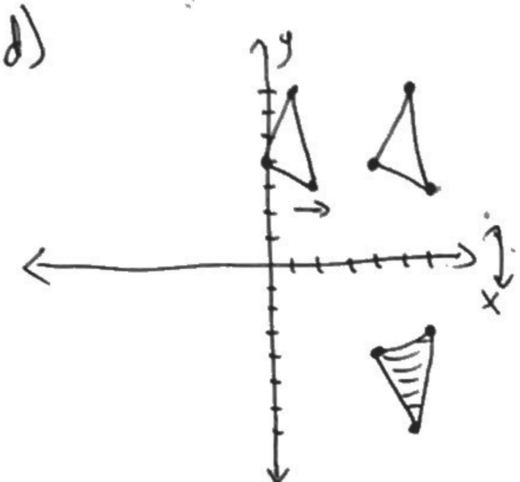
b)



c)



d)



15.1.18 $a^2+b^2=c^2$; , a and b given

a) $2^2+2^2=c^2$

$c^2=8$

$c=\sqrt{8}=2\sqrt{2}$

b) $5^2+10^2=c^2$

$25+100=c^2$

$c=\sqrt{125}$

$=5\sqrt{5}$

c) $12^2+9^2=c^2$

$144+81=c^2$

$225=c^2$

$c=15$

d) $7^2+24^2=c^2$

$49+576=c^2$

$625=c^2$

$c=25$

15.1.20 $a^2+b^2=c^2$, a and c given

a) $21^2+b^2=29^2$

$441+b^2=841$

$b^2=400$

$b=20$

b) $30^2+b^2=34^2$

$900+b^2=1156$

$b^2=256$

$b=16$

c) $24^2+b^2=30^2$

$576+b^2=900$

$b^2=324$

$b=18$

d) $10^2+b^2=26^2$

$100+b^2=676$

$b^2=576$

$b=24$

15.1.22 $d=\sqrt{(y_2-y_1)^2+(y_2-x_1)^2}$

a) $d=\sqrt{(5-11)^2+(5+3)^2}$

$=\sqrt{36+64}$

$=\sqrt{100}$

$=10$

b) $d=\sqrt{(-3+7)^2+(5-15)^2}$

$=\sqrt{16+100}$

$=\sqrt{116}$

$=2\sqrt{29}$

c) $d=\sqrt{(23-43)^2+(32-21)^2}$

$=\sqrt{400+121}$

$=\sqrt{521}$

d) $d=\sqrt{(-10+10)^2+(-32+22)^2}$

$=\sqrt{0+100}$

$=10$

15.1.24

a) $\bar{x}=\frac{x_1+x_2}{2}=\frac{4+0}{2}=2$

$\bar{y}=\frac{y_1+y_2}{2}=\frac{6+0}{2}=3$

$\boxed{(2,3)}$

b) $\bar{x}=\frac{x_1+x_2}{2}=\frac{3+7}{2}=5$

$\bar{y}=\frac{y_1+y_2}{2}=\frac{8+6}{2}=7$

$\boxed{(5,7)}$

c) $\bar{x}=\frac{x_1+x_2}{2}=\frac{9-5}{2}=2$

$\bar{y}=\frac{y_1+y_2}{2}=\frac{6+7}{2}=6.5$

$\boxed{(2,6.5)}$

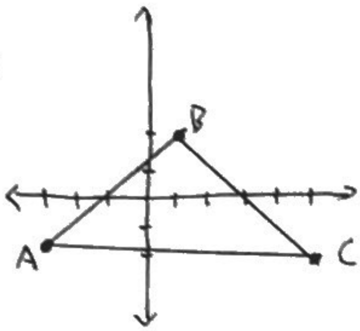
d) $\bar{x}=\frac{x_1+x_2}{2}=\frac{-12+6}{2}=-3$

$\bar{y}=\frac{y_1+y_2}{2}=\frac{0+1}{2}=0.5$

$\boxed{(-3,0.5)}$

15.1.26

a)



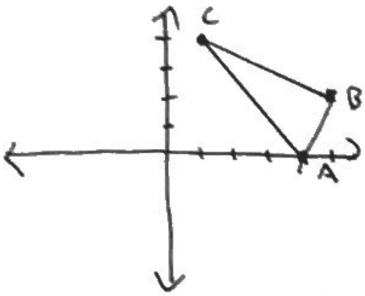
$\overline{AB} = \sqrt{(1+3)^2 + (2+2)^2} = \sqrt{16+16} = \sqrt{32}$

$\overline{BC} = \sqrt{(5-1)^2 + (2+2)^2} = \sqrt{16+16} = \sqrt{32}$

$\overline{AC} = 8$

$\overline{AB}^2 + \overline{BC}^2 = 32 + 32 = 64 = \overline{AC}^2$, so $\triangle ABC$ is a right triangle.

b)



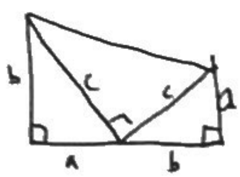
$\overline{AB} = \sqrt{(2-0)^2 + (5-4)^2} = \sqrt{5}$

$\overline{BC} = \sqrt{(5-1)^2 + (4-2)^2} = \sqrt{16+4} = \sqrt{20}$

$\overline{AC} = \sqrt{(4-1)^2 + (4-0)^2} = \sqrt{9+16} = \sqrt{25} = 5$

$\overline{AB}^2 + \overline{BC}^2 = 5 + 20 = 25 = \overline{AC}^2$, so $\triangle ABC$ is a right triangle.

15.1.27



The area of the trapezoid is $\frac{1}{2}(a+b)(a+b)$ by using the formula for the area of a trapezoid and is $\frac{1}{2}ab + \frac{1}{2}ab + \frac{1}{2}c^2$ by adding the areas of the triangles.

So $\frac{1}{2}(a+b)(a+b) = \frac{1}{2}(ab+ab+c^2)$

$(a+b)(a+b) = 2ab + c^2$

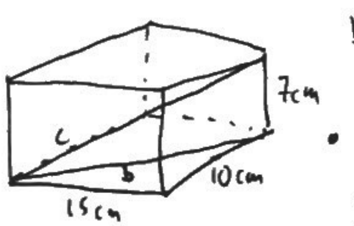
$a^2 + 2ab + b^2 = 2ab + c^2$

$a^2 + b^2 = c^2.$

15.1.36 One possible solution: $(3, \frac{1}{2})$

1) Translate the red figure down 3.5 units, then rotate it 90° clockwise around the midpoint of its lowest side.
2) Translate the green figure down 6 units.
3) Translate the purple figure down 4 units.
4) Reflect the yellow figure across the line $y = 8.75$ and translate the image down 6 units.
5) Reflect the blue figure across the line $x = 9.5$ and translate the image down 4 units.

15.1.38 ~~EA~~



- $b^2 = 10^2 + 15^2$

  $b = \sqrt{100+225}$

  $= \sqrt{325}$ cm

- $c^2 = b^2 + 7^2$

  $c^2 = 325 + 49$

  $\boxed{c = \sqrt{374} \text{ cm}}$