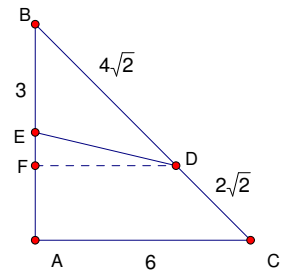
Name: Date:

1. Draw AD. Then DM is the height of $\triangle ABD$ and DN is the height of ACD. Then we know that $[ABD]+[ACD]=[ABC]=140$, so $\frac{1}{2}\cdot 20\cdot MD+\frac{1}{2}\cdot 20\cdot ND=140 \Rightarrow 10(MD+ND)=140 \Rightarrow DM+ND=\boxed{14\text{ m}}$

2. Redraw the diagram as a right isosceles triangle as shown.



Then we can easily find $[BED]$, because the base is clearly 3, and the height DF can be found using similar triangles, and we have $DF=4$. So $[BED]=\frac{1}{2}\cdot 3\cdot 4=6$. Thus the area of the quadrilateral is $18-6=\boxed{12\text{ cm}^2}$.

3. If P were in the center, then we could see clearly that the shaded area is $\frac{1}{4}$ the area of the square. The area of the square is 16, so $\frac{1}{4}$ of this area is $\boxed{4}$.

4. $\angle A$ is the right angle, $AB=6$, $AC=8$, $BC=10$. We can find that $[ABC]=\frac{1}{2}\cdot 6\cdot 8=24$, but $[ABC]=\frac{1}{2}\cdot 10\cdot AD$, which gives us $AD=4.8$. Then $ED=\frac{1}{3}\cdot 4.8=1.6$. $[BEC]=\frac{1}{2}\cdot 10\cdot 1.6=8$, so the shaded area is $24-8=\boxed{16\text{ cm}^2}$

5. Remember $[AOD]=[BOC]$. The height of AOD is 3 and the base is 5, so the area of $BOC=\frac{1}{2}\cdot 5\cdot 3=\boxed{\frac{15}{2}=7.5}$

6. $BE=\frac{1}{2}(BC-AD)=6$, so $EC=30$. Then $[CDE]=\frac{1}{2}\cdot 20\cdot 30=\boxed{300}$

7. $BE=\frac{1}{2}(BC-AD)=3$, so $[BED]=\frac{1}{2}\cdot 3\cdot 5=7.5$. The area of the trapezoid is $\frac{4+10}{2}\cdot 5=35$, so the shaded area is $35-7.5=\boxed{\frac{55}{2}=27.5}$

8. $FC=30-25=5$. $CFE\sim CBA$ with a ratio of 1:6, so since $AB=18$, $EF=\frac{18}{6}=3$. So $[DEC]=[DFC]-[CEF]=\frac{1}{2}\cdot 18\cdot 5-\frac{1}{2}\cdot 3\cdot 5=45-7.5=\boxed{\frac{75}{2}=37.5}$

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