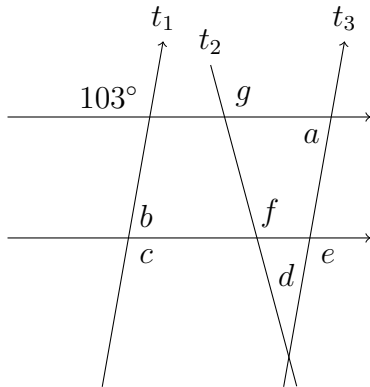


Quiz 3

Show all your work

Name: _____
 Number: _____
 Signature: _____
 Score: ____/20

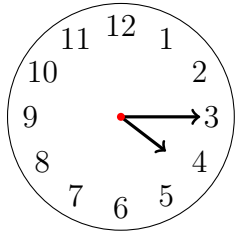
Problem 1: Euclid drew two pairs of parallel lines, the horizontal pair, and the pair, t_1 and t_3 . Suppose $\angle g \cong 112^\circ$, find angles: $\angle a$ and $\angle d$.



- $\angle a \cong 77^\circ,$
- $\angle b \cong 77^\circ,$
- $\angle c \cong 103^\circ,$
- $\angle d \cong 35^\circ,$
- $\angle e \cong 103^\circ,$
- $\angle f \cong 112^\circ.$

Score: /3

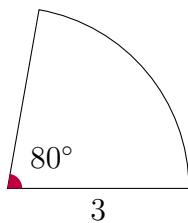
Problem 2: Find the smaller angle formed by the hour hand and the minute hand at four fifteen on a twelve-hour analogue clock. Show your work.



The minute hand moves 6° per minute, so at 4:15 it is $15 \times 6^\circ = 90^\circ$ from vertical. The hour hand moves 0.5° per minute, so at 4:15 it is $(4 \times 60 + 15) \times 0.5^\circ = 255 \times 0.5^\circ = 127.5^\circ$ from vertical. Therefore the angle between the hands is $127.5^\circ - 90^\circ = 37.5^\circ$.

Score: /3

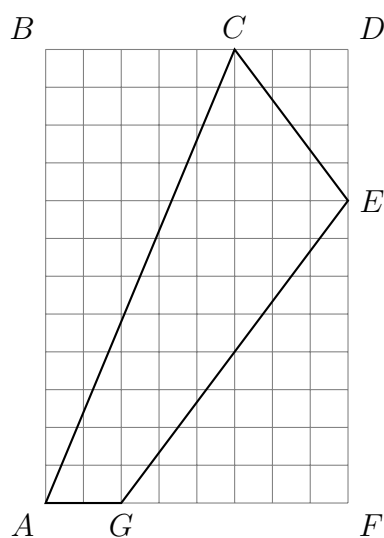
Problem 3: Find the area and perimeter of the given sector given that the sector angle is 80° with a radius of 3.



The area is $\frac{80}{360}$ of the full circle, so $\frac{2}{9} \cdot \pi 3^2 = 2\pi$.
 Similarly, the length of the arc is $\frac{80}{360} \cdot 2\pi 3 = \frac{4}{3}\pi$. Therefore the perimeter is $3 + 3 + \frac{4}{3}\pi = 6 + \frac{4}{3}\pi$.

Score: /4

Problem 4: Find the area and perimeter of the quadrilateral $ACEG$ enclosed in the given rectangle $ABDF$.

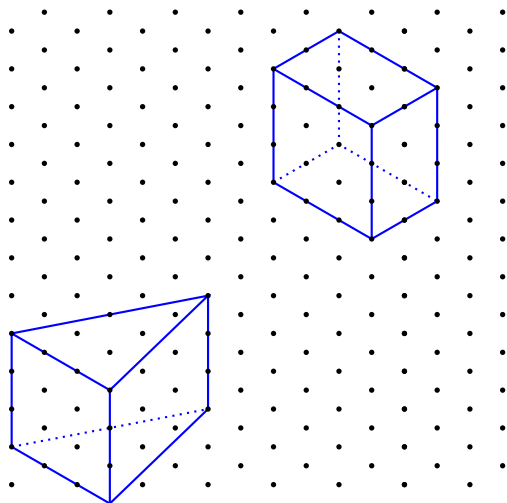


- The the rectangle $ABDF$ has area $12 \times 8 = 96$,
- the area of $\triangle ABC$ is $\frac{5 \times 12}{2} = 30$,
- the area of $\triangle CDE$ is $\frac{3 \times 4}{2} = 6$, and
- the area of $\triangle EFG$ is $\frac{6 \times 8}{2} = 24$.

Therefore the area of $ABDF$ is $96 - (30 + 6 + 24) = 36$.

Score: /4

Problem 5: Draw a triangular prism and a rectangular prism both of base area 6 square units, and height of 3 units. Which one has a bigger volume? Which one has a bigger surface area?



The volume of each prism is base area \times height $= 6 \times 3 = 18$.

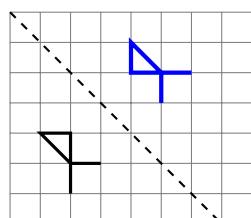
The surface area of each prism depends on the perimeter of the base. Say the perimeter is p , then the surface area of each prism is $3p + 2 \times \text{base area} = 3p + 12$.

For the triangular prism, the drawn solid has area $3(3 + \sqrt{17} + \sqrt{20}) + 12 = 21 + 3\sqrt{17} + 5\sqrt{5} \approx 46.8$. The smallest area happens when the triangle is equilateral (with side $\frac{2}{3}\sqrt[4]{972}$). In that case the area is $6\sqrt[4]{972} + 12 \approx 45.5$.

For the rectangular prism, the drawn solid has area $2(6 + 2 \times 3 + 3 \times 3) = 42$. The smallest area happens when the base is a square (with side $\sqrt{6}$). In that case the area is $3 \times 4\sqrt{6} + 12 = 12\sqrt{6} + 12 \approx 41.4$.

Score: /4

Problem 6: Reflect the figure along the dashed diagonal.



Score: /2