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Chapter 6 Problem Solving set B

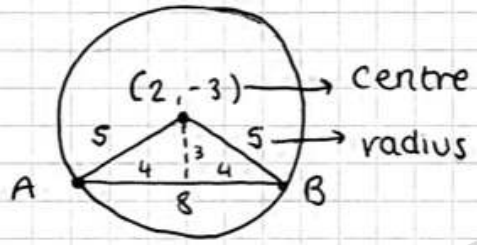
Bronze:

a) $(x-2)^2+(y+3)^2=25$

$P=(2,-3)$

b) $\sqrt{25}=5$

c) midpoint of A and B is parallel to P (same x-coordinate) = 2



Using pythagoras as the isosceles triangle can be split in half you can find the perpendicular height.

$5^2-4^2=\sqrt{9}=3$

Using vectors you can move (2,-3) down by 3 and 4 to the left.

$\begin{pmatrix}-4\\-3\end{pmatrix}$ ↲ this gives you A. (-2,-6) (A)

to find B move (-2,-6) to the right by 8. ↳ $\begin{pmatrix}8\\0\end{pmatrix}=(6,-6)$ (B)

d) $\frac{-2+6}{2}=2$

(2,-6) ↳ y value doesn't change.

e) $\frac{\sin(90)}{5}\times 4=0.8$

$\sin^{-1}(0.8)=53.1$ (1dp)

$=53.1°$

f) AQ is tangent

PAQ = 90°

AM = 4

AP = 5

APM = 53.1

$AQ=AP\tan^{-1}(53.1)=5\tan(53.1)$

↓

6.64

↓

6.6 (1dp)

Silver.

a) (4,-5)

b) $\frac{\sqrt{625}}{\sqrt{4}}=\frac{25}{2}=12.5$

c) $\sqrt{12.5^2-12^2}=3.5$

A (4-12, -5-3.5) = A (-8, -8.5)

B (4+12, -5-3.5) = B (16, -8.5)

d) $\sin\theta=\frac{12}{12.5}=\frac{24}{25}$

$\theta=73.739$

$2\theta=147.5°$

APB = 147.5

e) $AQ=\tan\theta\times r$

$AQ=12.5\times\tan(73.73)$

$AQ=42.9$

Problem Solving set B

Bronze

a) $(x-2)^2+(y+3)^2=25$

$2 \quad -3$

$P \cdot (2,-3)$

b) $\sqrt{25} = 5$

c)

A has vector $\begin{pmatrix}-4\\-3\end{pmatrix}$

B has vector $\begin{pmatrix}4\\-3\end{pmatrix}$

$A \cdot (-2,-6)$ $B \cdot (6,-6)$

d) $\left(-\frac{1+5}{2}, -3\right) = (2,-3)$

e) $4^2+3^2 = 5^2$

$\frac{\sin 90}{5} \times 4 = 0.8$

$\sin^{-1}(0.8) = 53.1301\ldots$

$53.1°$

f) $AP^2+PQ^2=AQ^2$

$AP = 5$

$APM: \tan\left(\frac{4}{3}\right) = \frac{16}{4}$

$AQ = \frac{16}{3} \approx 5.33 \rightarrow 5.3$

Silver

a) $(x-4)^2+(y+5)^2 = \frac{625}{4}$

$4 \quad -5$

$P \cdot (4,-5)$

b) $r = \frac{25}{2} = 12.5$

c) $h = \sqrt{12.5^2-12^2} = 3.5$

d) $\sin\theta \ \frac{12}{12.5} = \frac{24}{25}$

$\theta = 73.739°$

$2\theta = 147.5°$

e) $r\tan\theta$

$AQ = 12.5\tan(73.739)$

$AQ = 42.9$

Gold

a) $(x-3)^2+(y+2)^2 = \frac{289}{4}$

$r^2 = \sqrt{\frac{289}{4}}$

$r = \frac{17}{2} = 8.5$

$r^2 = 8\left(\frac{15}{2}\right)^2+(y+2)^2$

$(8.5)^2 = (7.5)^2+(y+2)^2$

$(y+2)^2 = 16$

$y+2 = \pm 4$

$y = 2, y = -6 \rightarrow$ negative value

$3+\frac{15}{2} = 10.5$

B $A \cdot (-4.5,-6)$ $B = (10.5,-6)$

b) $\frac{(8.5)^2}{4} = \frac{72.25}{4} = 18.0625$

$AQ = \sqrt{18.0625^2-8.5^2} = 16.2$