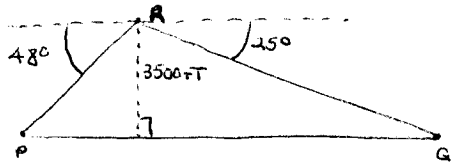
MATH 12

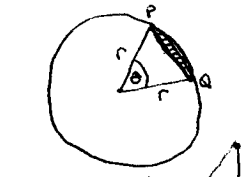
EXTRA PROBLEMS - SEC. 6.2, 7.1, 7.3

① AN AIRPLANE LOCATED AT POINT R IS FLYING AT 3500 FT DIRECTLY ABOVE THE LINE BETWEEN 2 SHIPS LOCATED AT THE POINTS P AND Q. IF THE ANGLES OF DEPRESSION TO P AND Q ARE 48° AND 25°, RESPECTIVELY, FIND THE DISTANCE BETWEEN THE 2 SHIPS. (ROUND OFF YOUR ANSWER TO THE NEAREST 10 FT.)

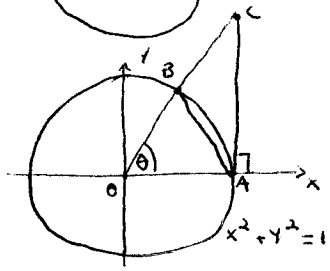


② FROM A POINT ON THE GROUND, YOU MEASURE THE ANGLE OF ELEVATION TO THE TOP OF A MOUNTAIN TO BE 38°. AFTER WALKING 200 M FARTHER AWAY FROM THE MOUNTAIN, YOU FIND THAT THE ANGLE OF ELEVATION IS NOW 20°. DETERMINE THE HEIGHT OF THE MOUNTAIN. (ROUND OFF YOUR ANSWER TO THE NEAREST METER.)

③ a) FIND THE AREA OF THE SHADED REGION BELOW (IN TERMS OF r AND θ).



b)



IN THE FIGURE SHOWN, FIND THE DOUBLE INEQUALITY THAT FOLLOWS FROM THE FACT THAT

$\text{AREA}(\Delta OAB) < \text{AREA}(\text{SECTOR } \overset{\frown}{OAB}) < \text{AREA}(\Delta OAC)$ FOR $0 < \theta < \frac{\pi}{2}$,

AND THEN MULTIPLY THROUGH BY 2.

④ a) FIND $\sin 15^\circ$ USING AN ADDITION FORMULA.

b) FIND $\sin 15^\circ$ USING A HALF-ANGLE FORMULA.

c) SHOW THAT YOUR ANSWERS TO PARTS a) AND b) ARE EQUAL.

⑤ a) FIND $\cos\frac{\theta}{2}$ GIVEN THAT $\frac{3\pi}{2} < \theta < 2\pi$ AND $\cos\theta = \frac{7}{25}$.

b) FIND $\sin\frac{\theta}{2}$ GIVEN THAT $\pi < \theta < \frac{3\pi}{2}$ AND $\cos\theta = -\frac{1}{8}$.

⑥ EXPRESS $\sin^2\left(\frac{\theta}{12}\right)\cos^2\left(\frac{\theta}{12}\right)$ IN A FORM THAT DOES NOT INVOLVE POWERS OR PRODUCTS OF TRIG FUNCTIONS.

⑦ FIND THE MAXIMUM AREA FOR A CIRCULAR SECTOR WITH A PERIMETER OF 20 CM.