

Math 63 Chapter 3 Review

- Calculators are allowed but show your steps and box your final answer.
- Include the correct unit with your answer.

1. Use the Pythagorean Theorem to calculate the height (b) of the steel plate. Use trigonometry to calculate the angle A. Round both measures to one decimal place.

$$35^2 + b^2 = 74^2$$

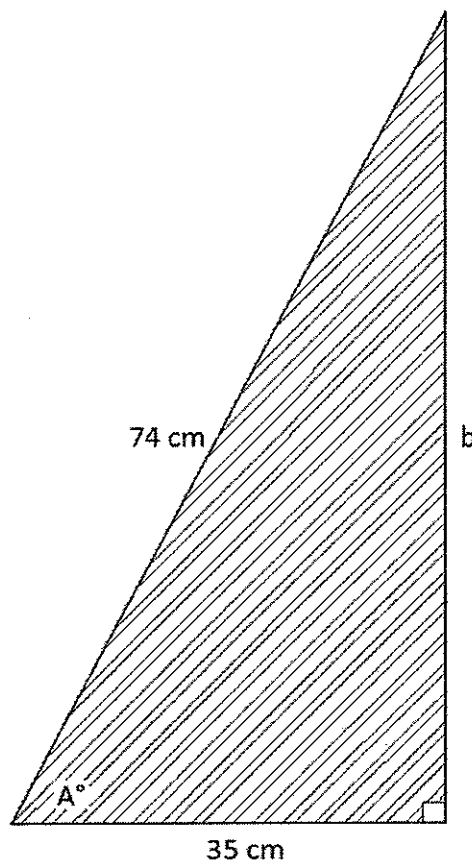
$$1225 + b^2 = 5476$$

$$b^2 = 4251$$

$$b = \sqrt{4251} \approx 65.2 \text{ cm}$$

$$\cos A = \frac{35}{74}$$

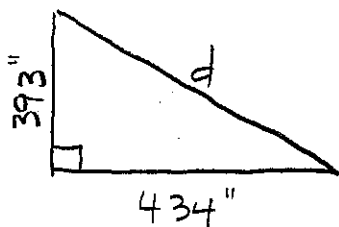
$$A = \cos^{-1}\left(\frac{35}{74}\right) \approx 61.8^\circ$$



2. Calculate the diagonal distance d for the rectangular house rounded to the nearest 16th of an inch.

$$32 \times 12 + 9 = 393''$$

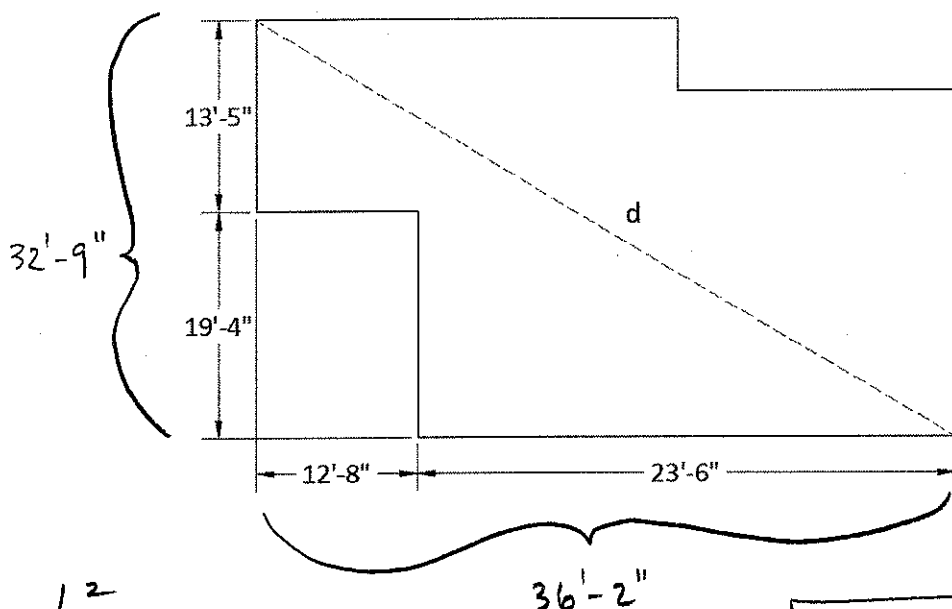
$$36 \times 12 + 2 = 434''$$



$$393^2 + 434^2 = d^2$$

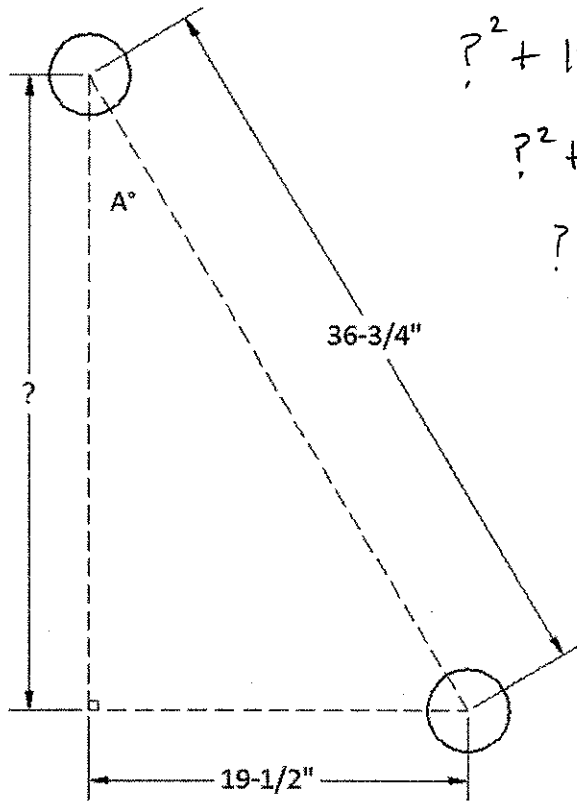
$$154449 + 188356 = d^2$$

$$342805 = d^2$$



$$d = \sqrt{342805} \approx 585.496 \quad \boxed{585 \frac{1}{2}''}$$

3. Two holes are to be drilled $36\frac{3}{4}$ inches apart. If they are spaced $19\frac{1}{2}$ inches apart horizontally, use the Pythagorean Theorem to find the distance between them vertically rounded to the nearest 16^{th} of an inch. Use trigonometry to find angle A rounded to one decimal place.



$$?^2 + 19.5^2 = 36.75^2$$

$$?^2 + 380.25 = 1350.56$$

$$?^2 = 970.31$$

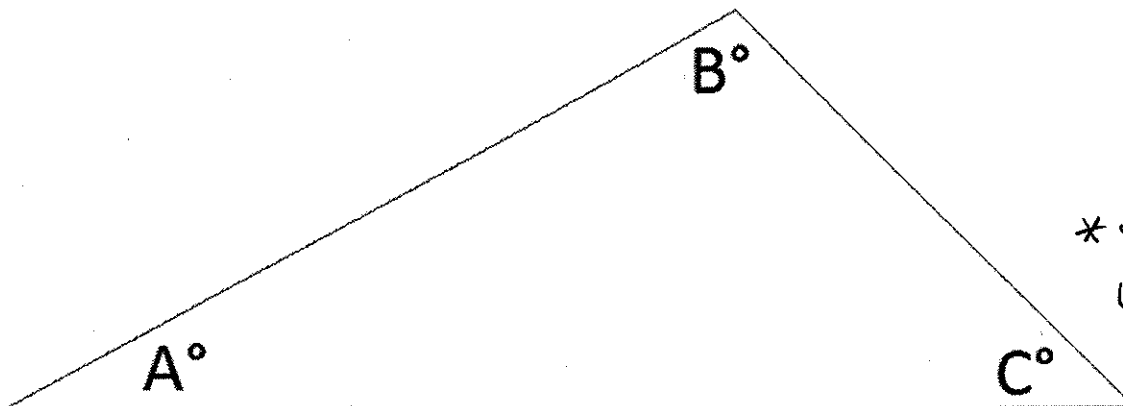
$$? = \sqrt{970.31} \approx 31.15 \text{ or } \boxed{31\frac{1}{8}''}$$

$$\sin A = \frac{19.5}{36.75}$$

$$A = \sin^{-1}\left(\frac{19.5}{36.75}\right)$$

$$\boxed{A \approx 32.0^\circ}$$

4. Measure angles A, B & C in the triangle rounded to the nearest degree.



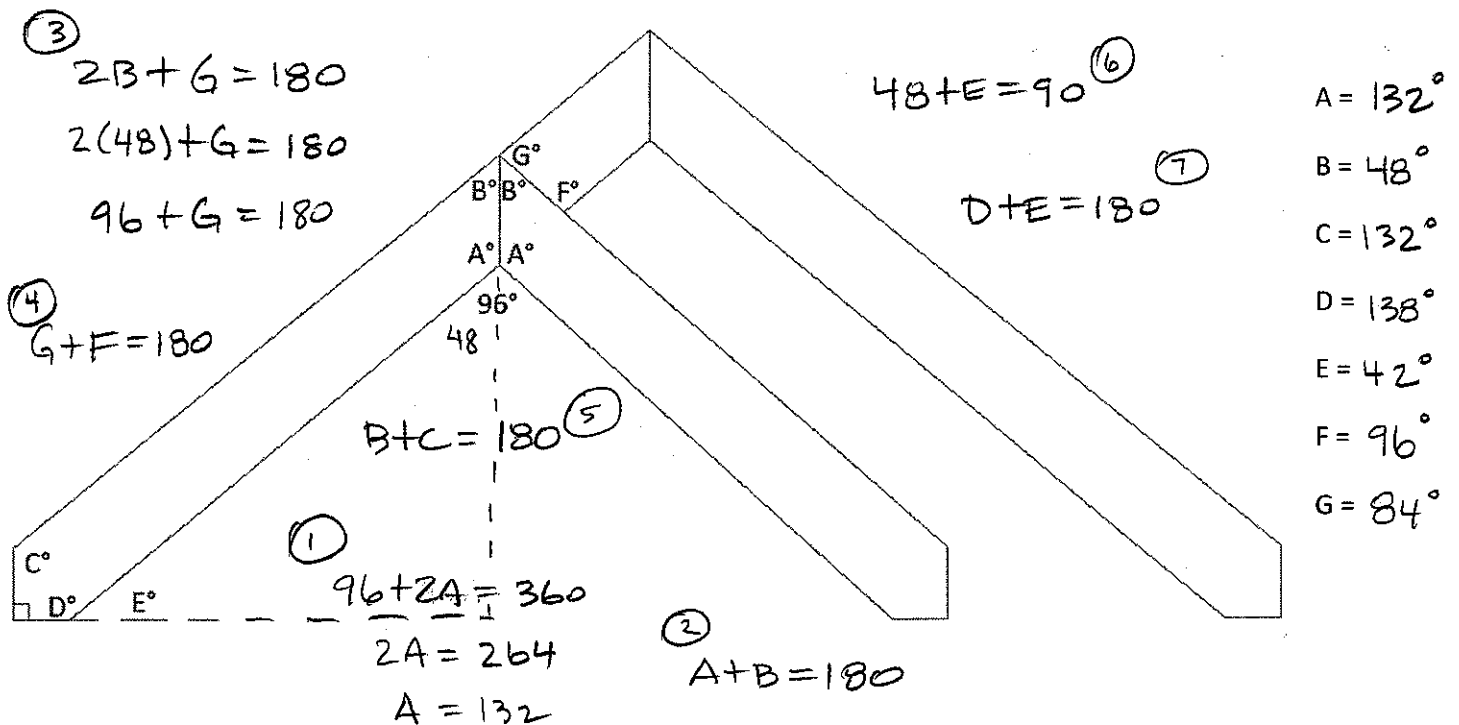
$$A = 28^\circ$$

$$B = 106^\circ$$

$$C = 45^\circ$$

* SHOULD ADD
UP TO APPROX.
 180°

5. Calculate the angles in roof (lines that appear parallel are parallel).



6. Use trigonometry to calculate angle A and length c in the plate steel brace rounded to one decimal place.

$$\tan A = \frac{32}{24}$$

$$A = \tan^{-1}\left(\frac{32}{24}\right)$$

$$A \approx 53.1^\circ$$

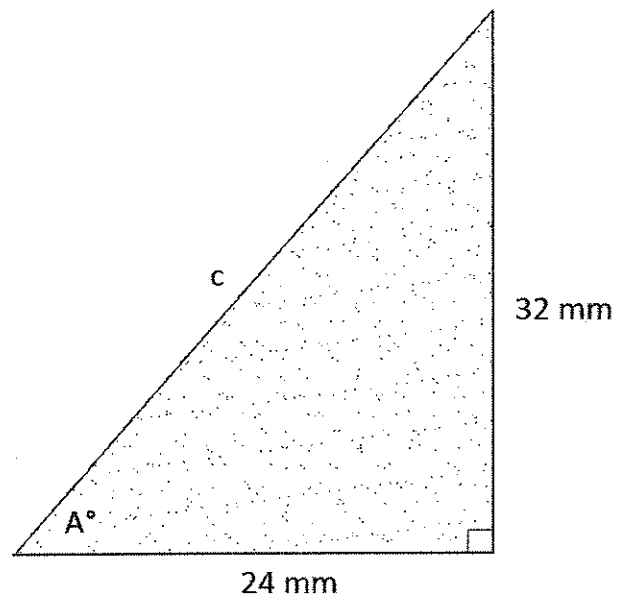
$$\cos 53.1 = \frac{24}{c}$$

$$.6004 = \frac{24}{c}$$

$$c \cdot .6004 = 24$$

$$c = \frac{24}{.6004}$$

$$c \approx 40.0 \text{ mm}$$



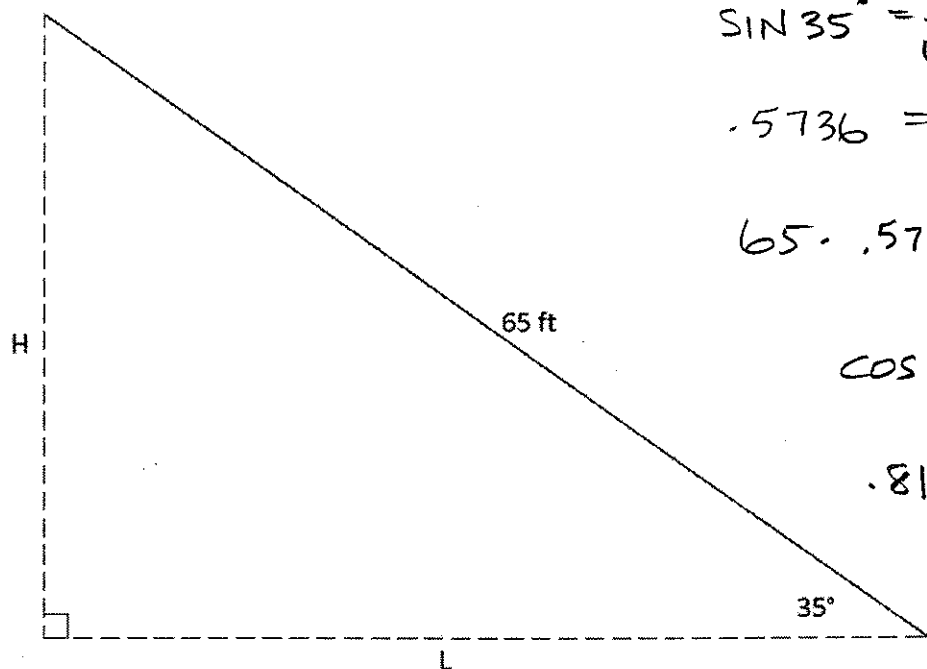
CHECK!

$$32^2 + 24^2 = 1600$$

$$40^2 = 1600$$



7. A 65 foot crane is raised to an angle of 35° . Find the length (L) and height (H) for the reach of the crane, rounded to one decimal place. You don't need to convert to inches.



$$\sin 35^\circ = \frac{H}{65}$$

$$.5736 = \frac{H}{65}$$

$$65 \cdot .5736 = H$$

$$H \approx 37.3 \text{ FT}$$

$$\cos 35^\circ = \frac{L}{65}$$

$$.819 = \frac{L}{65}$$

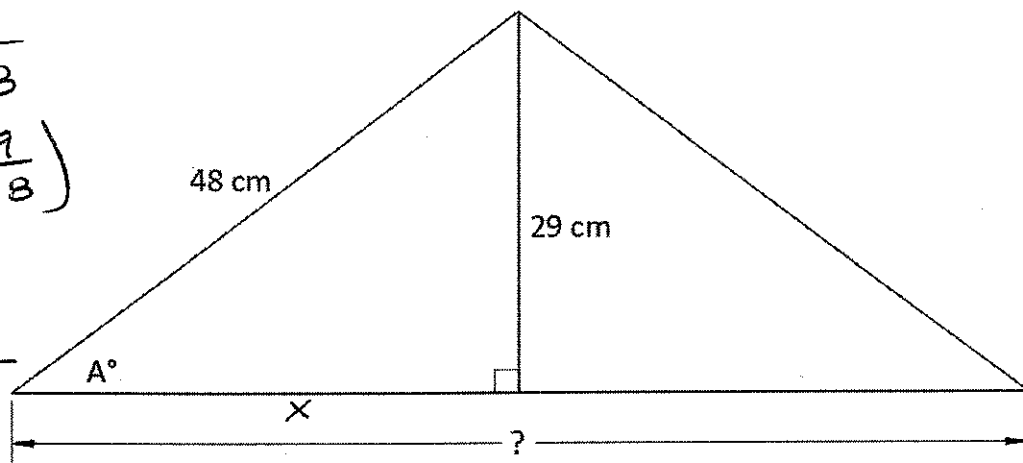
$$L \approx 53.2 \text{ FT}$$

8. Calculate angle A and the width in the welded truss roof rounded to one decimal place.

$$\sin A = \frac{29}{48}$$

$$A = \sin^{-1}\left(\frac{29}{48}\right)$$

$$A \approx 37.2^\circ$$



$$X^2 + 29^2 = 48^2$$

$$X^2 + 841 = 2304$$

$$X^2 = 1463$$

$$X = \sqrt{1463} \approx 38.25$$

$$\text{WIDTH} = 76.5 \text{ cm}$$

9. In a regular nonagon the 9 angles at the center are all equal. Calculate angle A then use trigonometry to find lengths m & n rounded to one decimal place.

$$\frac{360}{9} = 40^\circ$$

$$A = 40^\circ$$

$$\tan 20^\circ = \frac{7}{m}$$

$$.364 = \frac{7}{m}$$

$$.364 \cdot m = 7$$

$$m = \frac{7}{.364}$$

$$m \approx 19.2 \text{ mm}$$

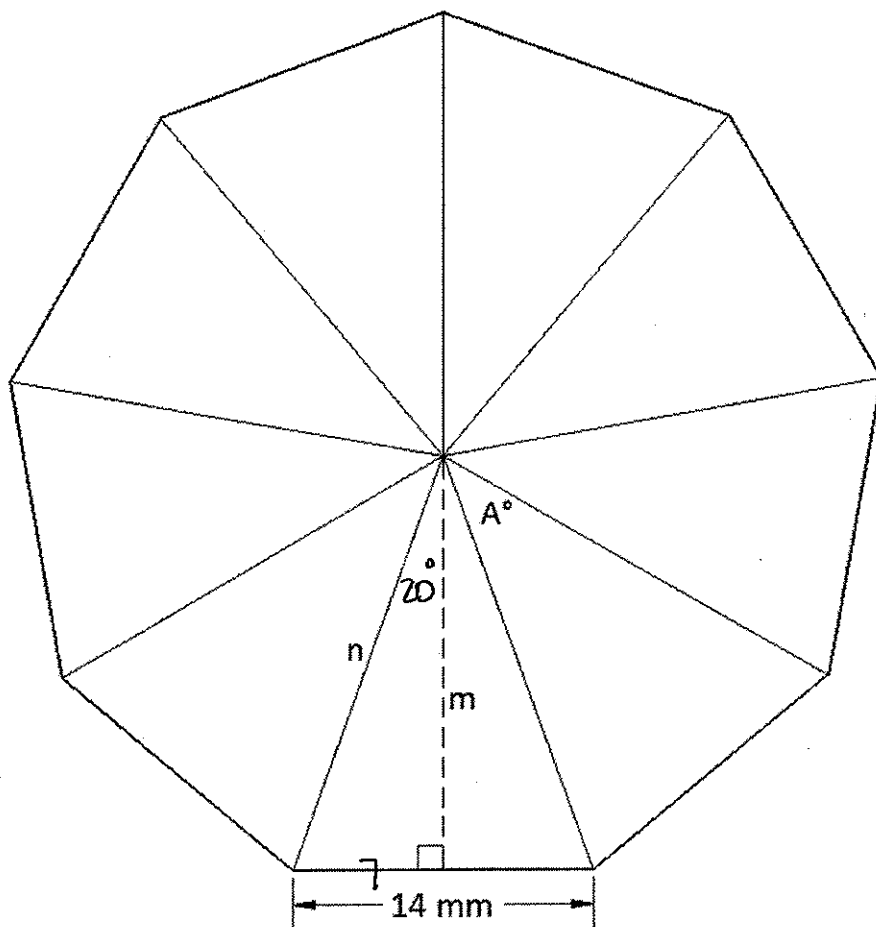
$$\sin 20^\circ = \frac{7}{n}$$

$$.342 = \frac{7}{n}$$

$$.342 \cdot n = 7$$

$$n = \frac{7}{.342}$$

$$n \approx 20.5 \text{ mm}$$



CHECK

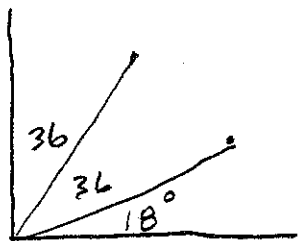
$$19.2^2 + 7^2 = 417.64$$

$$20.5^2 = 420.25$$

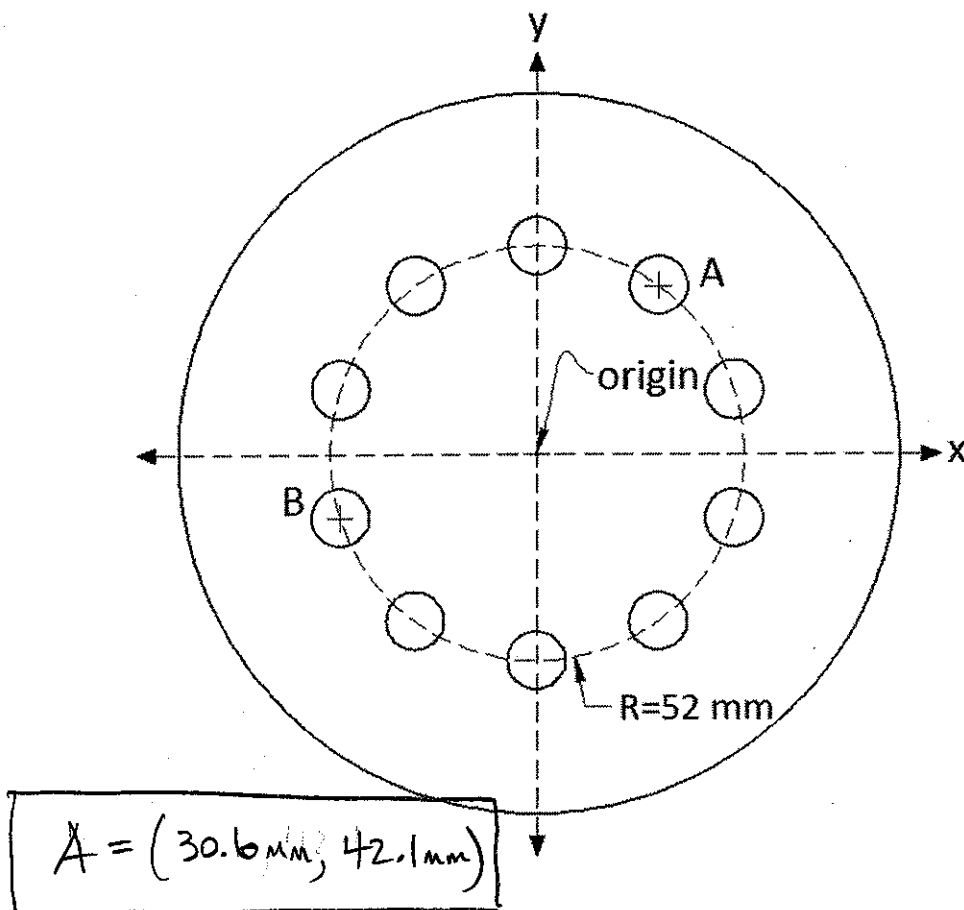
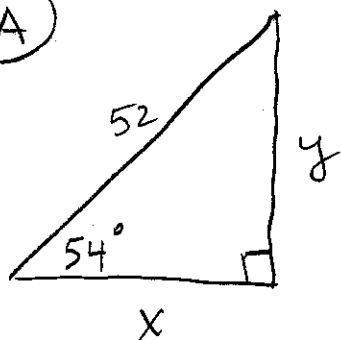
CLOSE!

10. There are 10 holes equally spaced 52 millimeters from the center on the disc brake. Use trigonometry to calculate the (x,y) coordinates for holes A & B. Round your answers to one decimal place.

$$\frac{360}{10} = 36^\circ$$



(A)



$$A = (30.6 \text{ mm}, 42.1 \text{ mm})$$

$$\sin 54 = \frac{y}{52}$$

$$\cdot 809 \cdot 52 = y$$

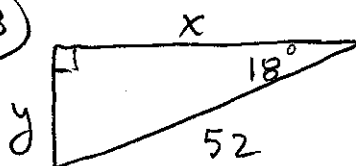
$$y \approx 42.1$$

$$\cos 54 = \frac{x}{52}$$

$$\cdot 5878 \cdot 52 = x$$

$$x \approx 30.6$$

(B)



$$B = (-49.5 \text{ mm}, -16.1 \text{ mm})$$

$$\cos 18 = \frac{x}{52}$$

$$\cdot 951 \cdot 52 = x$$

$$x = 49.5$$

$$\sin 18 = \frac{y}{52}$$

$$\cdot 309 \cdot 52 = y$$

$$y = 16.1$$