Written Assignment Unit 7
Math 1201- College Algebra.

Instructor - Casmir Onyeneke

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PART 1

QUESTION
Find the length of an arc in a circle of radius 10 centimeters subtended by the central angle of 50°. Show your work.

SOLUTION
The length of an arc, l is given by the formula (Abramson, 2017).

$$l = \frac{\theta}{360} \times 2\pi r$$

where:
θ is the angle subtended by the arc, and
r is the radius of the arc. Now, from the question $\theta = 50°$, and r = 10cm
Substituting into the formula,

$$l = \frac{50}{360} \times 2 \times \pi \times 10$$

$$l = \frac{5}{36} \times 20 \times \pi$$

$$l = \frac{100}{36} \times \pi$$

$$l = 2.78\ times 3.142$$

$$l = 8.73476$$

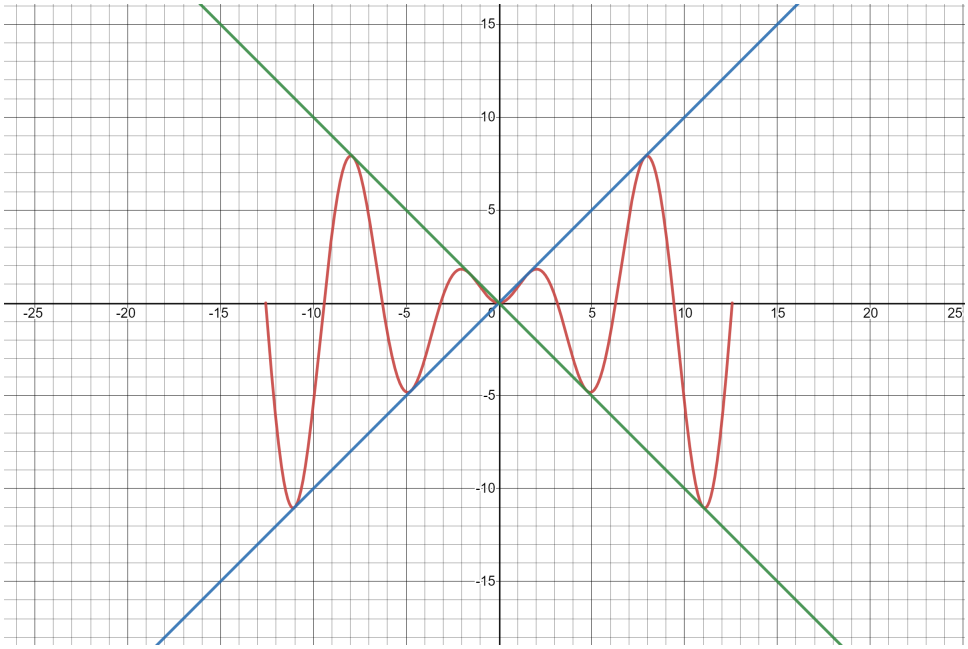
Therefore the length of the arc, l is approximately $8.73cm$

PART 2

QUESTION
Graph $f(x) = xsinx$ on $[-4\pi, 4\pi]$ and verbalize how the graph varies from the

graphs of $f(x) = \pm x$
Graph $f(x) = \frac{sinx}{x}$ on the window $[-5\pi, 5\pi]$ and describe freely what the graph shows. You can use www.desmos.com/calculator to obtain the graphs.

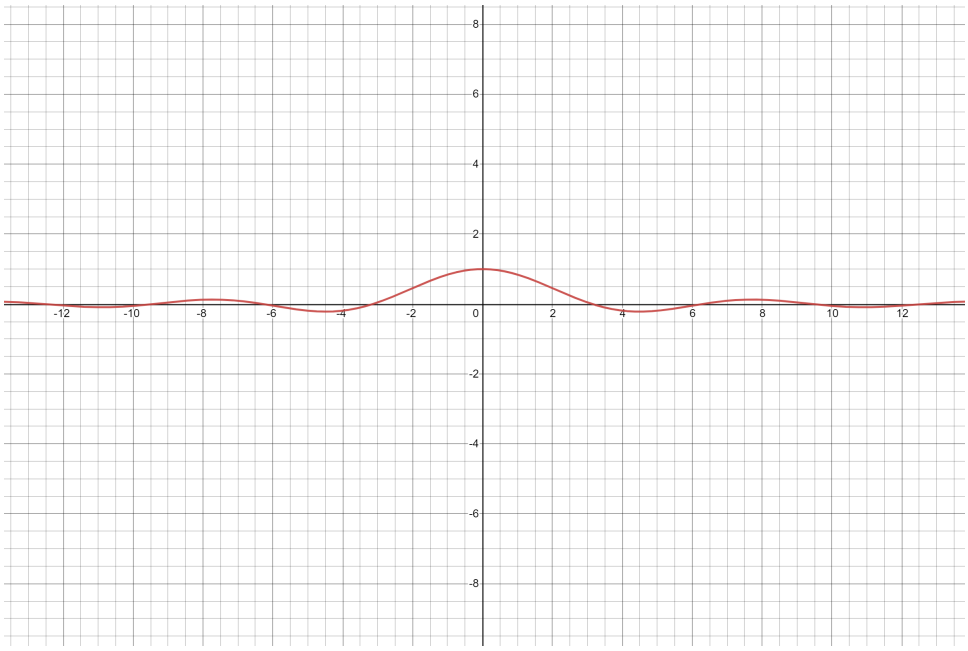
2a Solution
The graph of $f(x) = xsinx$ on $[-4\pi, 4\pi]$ and $f(x) = \pm x$



Below are my observations of about both graphs

1. The graph of $f(x) = xsinx$ is non-linear and sinusoidal, while the graph of $f(x) = \pm x$ is linear (Abramson, 2017).
2. The graph of $f(x) = xsinx$ when $-4\pi \leq x \leq 0$ is reflected when $0 \leq x \leq 4\pi$
3. The turning points of the graph of $f(x) = xsinx$ lies at the points of intersection with the graph $f(x) = \pm x$ (Abramson, 2017).

2b Solution
The graph of $f(x) = \frac{sinx}{x}$ on the window $[-5\pi, 5\pi]$



Below are my observations of the graph of $f(x) = \frac{sinx}{x}$

1. The graph of $f(x) = \frac{sinx}{x}$ when $-5\pi \leq x \leq 0$ is reflected when $0 \leq x \leq 5pi$ (Abramson, 2017).
2. As the value of x tends to 0 from both ends (i.e. -5π or 5π) the value of $f(x)$ increases.
3. As the value of x moves away from 0, the value of $f(x)$ decreases.

PART 3

QUESTION

A 23-ft ladder leans against a building so that the angle between the ground and the ladder is 80°. How high does the ladder reach up the side of the building? show the steps of your reasoning(Abramson, 2017).

Solution

From the question, the angle formed between the building and the ground is a right-angle, and also since the ladder is slanted in such a way that it touches both the ground and the building we can construct a right-angled triangle(Abramson, 2017).

To calculate how high the ladder reaches up the side of the building I would be making use of SOH from the SOH CAH TOA method of solving trigonometric

problems(Abramson, 2017).
Now SOH is given as

$$sin\theta = \frac{opposite}{hypotenuse}$$

Where,

- θ is the angle between the ladder and the ground, which is given as $80°$.
- The Hypotenuse is the length of the ladder, which is given as $23ft$.
- The Opposite is how high the ladder reaches the side of the building, thus the unknown which is represented as xft.

Substituting these values into the SOH formula,

$$sin\theta = \frac{opposite}{hypotenuse}$$

$$sin80° = \frac{x}{23}$$

Multiply both sides by 23

$$sin80° \times 23 = \frac{x}{23} \times 23$$

$$23 \times 0.9848 = x$$

$$x = 22.65ft$$

Therefore the height the ladder reaches on the side of the building is $22.65ft$.

References

Abramson, J. (2017). *Algebra and trigonometry.* OpenStax, TX: Rice University. Retrieved from https://openstax.org/details/books/algebra-and-trigonometry