Revised Scaffolded Questions for Algebra 2 Assessment (Questions 25–28)

This document provides revised scaffolded questions to help students prepare for questions 25 through 28 of the enVision Algebra 2 Progress Monitoring Assessment Form C. Each question includes four scaffolded steps to build understanding from basic concepts to the level required by the assessment, with clear guidance for concept-naive students.

Question 25: Quadratic Formula and Simplifying Radicals

The original question asks to solve $x^2 + 10x + 6 = 0$ using the quadratic formula. The following questions build understanding of the quadratic formula and radical simplification.

25.1 **Identifying Coefficients**: For $ax^2+bx+c = 0$, identify a, b, c to use in $x = \frac{-b\pm\sqrt{b^2-4ac}}{2a}$:

   a) $x^2 + 3x + 2 = 0$: $a = 1$, $b = 3$, $c = 2$

   b) $2x^2 - 5x + 1 = 0$: $a =$ ______, $b =$ ______, $c =$ ______

   c) Why identify coefficients? __________________

25.2 **Calculating Discriminant**: The discriminant $b^2 - 4ac$ determines the number of roots (positive: two real, zero: one, negative: complex):

   a) $x^2 + 4x + 3 = 0$: $b^2 - 4ac = 4^2 - 4(1)(3) = 16 - 12 = 4$

   b) $x^2 + 6x + 2 = 0$: $b^2 - 4ac =$ ______ $-$ ______ $=$ ______

   c) What does a positive discriminant mean? __________________

25.3 **Simplifying Radicals**: Simplify square roots for the quadratic formula:

   a) $\sqrt{28} = \sqrt{4 \cdot 7} = 2\sqrt{7}$

   b) $\sqrt{76} = \sqrt{4 \cdot 19} =$ ______

   c) Practice: $\sqrt{80} =$ ______. Why simplify radicals? __________________

25.4 **Applying to the Original Problem**: Solve $x^2 + 10x + 6 = 0$:

   a) Coefficients: $a = 1$, $b = 10$, $c = 6$

   b) Discriminant: $b^2 - 4ac = 10^2 - 4(1)(6) = 100 - 24 = 76$

   c) Simplify: $\sqrt{76} = \sqrt{4 \cdot 19} = 2\sqrt{19}$

   d) Solve: $x = \frac{-10\pm\sqrt{76}}{2} = \frac{-10\pm2\sqrt{19}}{2} = -5 \pm \sqrt{19}$

Question 26: Cosine Functions and Midlines

The original question asks for the midline of a cosine function with period 3π, amplitude 4, and local maximum at $f(0) = 6$. The following questions build understanding of midlines.

26.1 **Cosine Properties**: For $y = A\cos(Bx) + D$, amplitude = $|A|$, period = $\frac{2\pi}{|B|}$, midline = $y = D$:

a) $y = 2\cos(x) + 1$: Amplitude = 2, period = 2π, midline = $y = 1$

b) $y = \cos(3x)$: Amplitude = ______, period = ______, midline = ______

c) What does the midline represent? __________________

26.2 **Finding Midlines**: Midline = $\frac{\text{max}+\text{min}}{2}$:

a) Max = 7, Min = 1: Midline = $\frac{7+1}{2} = 4$, so $y = 4$

b) Max = 5, Min = -1: Midline = ______

26.3 **Amplitude and Midline**: Max = midline + amplitude, Min = midline - amplitude:

a) Amplitude = 3, midline = $y = 2$: Max = $2 + 3 = 5$, Min = $2 - 3 = -1$

b) Amplitude = 5, midline = $y = 1$: Max = ______, Min = ______

26.4 **Applying to the Original Problem**: Given amplitude = 4, max = 6:

a) Midline = Max - Amplitude = $6 - 4 = 2$, so $y = 2$

b) Verify: Min = $2 - 4 = -2$. Midline = $\frac{6+(-2)}{2} = 2$

c) Practice: Amplitude = 3, max = 7: Midline = ______.

Question 27: Arc Length and Radian Measure

The original question asks for the arc length on a Ferris wheel with diameter 175 feet through $\frac{\pi}{3}$ radians, rounded to the nearest foot. The following questions build understanding of arc length.

27.1 **Radian Angles**: Radians measure angles where arc length equals radius for 1 radian:

a) $\frac{\pi}{6}$: Angle = $\frac{\pi}{6} \approx 0.5236$ radians

b) $\frac{\pi}{4}$: Angle = ______ radians

c) Why use radians for arc length? __________________

27.2 **Arc Length Formula**: $s = r\theta$, where θ is in radians:

a) $r = 6$, $\theta = \frac{\pi}{4}$: $s = 6 \cdot \frac{\pi}{4} = \frac{3\pi}{2} \approx 4.71$

b) $r = 10$, $\theta = \frac{\pi}{6}$: $s =$ ______ $\approx$ ______

27.3 **Diameter to Radius**: Radius = $\frac{\text{diameter}}{2}$:

a) Diameter = 100 feet: $r = 50$ feet

b) Diameter = 150 feet, $\theta = \frac{\pi}{4}$: $r =$ ______, $s =$ ______ $\approx$ ______

c) Why use radius? __________________

27.4 **Applying to the Original Problem**: Diameter = 175 feet, $\theta = \frac{\pi}{3}$:

a) Radius: $r = \frac{175}{2} = 87.5$ feet

b) Arc length: $s = 87.5 \cdot \frac{\pi}{3} = \frac{87.5\pi}{3} \approx 91.63$ feet

c) Round: $s \approx 92$ feet

Question 28: Statistics Terminology

The original question asks whether 45 (average points for the first 3 games) is a variable, parameter, sample, or statistic, given a season average of 42. The following questions build understanding of statistical terms.

28.1 **Population vs. Sample**: Population is the entire group; sample is a subset:

a) Population: All basketball games in a season.
Sample: First 5 games.

b) Population: All students in a school.
Sample: ______.

28.2 **Parameter vs. Statistic**: Parameter describes population; statistic describes sample:

a) Average score of all games: 50 points (parameter).
Average of 10 games: 52 points (statistic).

b) Average height of all students: 5'6" (______).
Average of 30 students: 5'7" (______).

28.3 **Identifying Terms**: Classify numbers:

a) Average points of all games: 48 (parameter).
Average of first 4 games: 50 (statistic).

b) Average points of first 3 games: 55 (______).

28.4 **Applying to the Original Problem**: Season average = 42, first 3 games average = 45:

a) Population: All season games. Sample: First 3 games.

b) 42: Parameter (entire season). 45: Statistic (sample).

c) Practice: Season average = 80, first 5 games average = 85.
85 is a ______.