1A) Find the equation of the line through (-2, 4) tangent to the circle with the equation 
\[(x + 3)^2 + (y - 6)^2 = 5.\] Express your answer in \(Ax + By = C\) form, where \(A, B\) and \(C\) are integers and \(A > 0\).

2A) For integers \(A, B, C,\) and \(D, (5x + 2)(6x - 5) - 26 = (Ax + B)(Cx + D),\) where \(A > C > 0\). Determine the ordered quadruple \((A, B, C, D)\).

3A) For certain integer values of \(k, x = A\) satisfies the equation \(2 \cos^2 x = k \sin x + 1.\) If \(A\) is a quadrantal value in the range \(0 \leq x < 2\pi,\) compute all ordered pairs \((k, A)\).

4A) Given: \(x(5x + 4) = 3(2 - 3x)\)

Let \(D\) be the absolute value of the difference of the roots of the equation.

Let \(Q\) denote the larger quotient of the roots.

Compute the ordered pair \((D, Q)\).

5A) Given: \(\overline{DE} \parallel \overline{BC}, AD = 5, DB = k\)

If the area of \(\triangle ADE\) is 144, and the area of \(\triangle DECB\) is 297, compute \(k\).

6A) At the start of 2021, there was a total of $320 in Louie’s bank account. For \(n\) subsequent weeks, his take-home pay, which was deposited into his bank account, increased by $7 per week; unfortunately, his weekly expenses increased by $12. At the end of the \(n\) weeks, his bank account had lost \(62\frac{1}{2}\)% of its value. Then his luck changed. For the remaining weeks of the year, he was able to deposit enough money each week to build his bank account up to $432. How much did he deposit each week?

(Assume there are 52 weeks in a year.)

Team E) 
Given: \(\overline{GH} \perp \overline{BD}, DJ = 7, JI = 24, GH = 9.8\)

\(ABCD\) is a rectangle and \(AFGE\) is a square.

Compute the ratio of the area of trapezoid \(GIDE\) to the area of trapezoid \(BIJC\).
Answers:

1A) \( x - 2y = -10 \)

4A) \( \left( \frac{17}{5}, -\frac{2}{15} \right) \)

2A) \( (10, 9, 3, -4) \)

5A) \( \frac{15}{4} \)

3A) \( \left( -1, \frac{\pi}{2} \right), \left( 1, \frac{3\pi}{2} \right) \)

6A) $26$

Team E) 188 : 315

Let \( BF = l, BC = w \).

\[ \triangle DIJ \sim \triangle GIH \Rightarrow \frac{7}{9.8} = \frac{25}{w-(7+24)} \]

\[ \Rightarrow \frac{70}{98} = \frac{5}{w-31} \Rightarrow 5w = 175 + 155 \Rightarrow w = 66, GI = 35 \]

\[ \triangle DIJ \sim \triangle BIF \Rightarrow \frac{7}{l} = \frac{24}{w-24} = \frac{24}{42} = \frac{4}{7} \Rightarrow 4l = 49 \Rightarrow l = \frac{49}{4} \]

The areas of the trapezoids are:

\[ |GIDE| = \frac{1}{2} \cdot 7 \cdot (35 + 59) = 7 \cdot 47, \]

\[ |BJIC| = \frac{1}{2} \cdot \frac{49}{4} \cdot (24 + 66) = \frac{49 \cdot 90}{8}. \]

Thus, the required ratio is \( \frac{7 \cdot 47}{49 \cdot 90} = \frac{7 \cdot 8 \cdot 47}{49 \cdot 90} = \frac{4 \cdot 47}{7 \cdot 45} \Rightarrow 188 \text{ : } 315 \).