Math Formula Sheet for Advanced Functions and Modeling, Discrete Mathematics, and Precalculus

Arithmetic Sequence and Series
\[ a_n = a_1 + (n - 1)d \]
\[ S_n = \frac{n}{2}(a_1 + a_n) \]

Geometric Sequence and Series
\[ a_n = a_1 \cdot r^{(n - 1)} \]
\[ S_n = \frac{a_1(1 - r^n)}{1 - r}, \text{ where } r \neq 1 \]
\[ S = \frac{a_1}{1 - r}, \text{ where } |r| < 1 \]

Law of Sines
\[ \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c} \]

Law of Cosines
\[ a^2 = b^2 + c^2 - 2bc \cdot \cos A \]
\[ b^2 = a^2 + c^2 - 2ac \cdot \cos B \]
\[ c^2 = a^2 + b^2 - 2ab \cdot \cos C \]

Conic Sections

Parabola

Focal Length
\[ |a| = \frac{1}{4c} \]

Ellipse

Pythagorean Relationship
\[ c^2 = a^2 - b^2 \]

Hyperbola with Center \((h,k)\)

Pythagorean Relationship
\[ c^2 = a^2 + b^2 \]

Foci
\((h \pm c, k) \text{ or } (h, k \pm c)\)
Precalculus Final Exam Review

1. Anna and Zach each have $600 to invest. Anna’s investments earn a rate of 10.5%, and Zach’s investments earn a rate of 6.5%. Approximately, how much more money will Anna have than Zach when Zach’s investments are worth $900? (Assume continuous compounding.)

   A $184
   B $241
   C $255
   D $264

   Anna: \[ y = 600(1.05)^t \]
   \[ y = 600(1.105)^{0.4385} \]
   \[ y = 1141.14 \]

   Zach: \[ 900 = 600(1.065)^t \]
   \[ 1.5 = 1.065^t \]
   \[ \log_{1.065} 1.5 = t \]
   \[ t = 6.4385 \]
2. A solution’s pH is given by the function \( p(t) = -\log(t) \), where \( t \) is the hydronium ion concentration, in moles per liter. A sample of coffee has a pH of 5.0. What is the **approximate** hydronium ion concentration of the sample?

   A  0.000001
   B  0.00001
   C  0.0001
   D  0.001

\[
5 = -\log t \\
5 = 10\log t^{-1} \\
10^5 = t^{-1} \\
100,000 = \frac{1}{t}
\]

3. A sequence is shown below.

   \[1, 0.1, 0.01, 0.001, 0.0001, \ldots\]

What is the sum of the sequence?

   A  \( \frac{1}{10} \)
   B  \( \frac{1}{9} \)
   C  \( \frac{2}{9} \)
   D  \( \frac{9}{10} \)

\[
S = \frac{1}{1-r} \\
S = \frac{1}{1-0.1} \\
S = \frac{10}{9}
\]
4. Which statement is true about the sequence shown below?

0, 4.5, 12, 22.5, . . .

A The series converges because the limit of the sequence as \( n \) approaches infinity is infinity.

B The series converges because the limit of the sequence as \( n \) approaches infinity is 30.

C The series diverges because the limit of the sequence as \( n \) approaches infinity is infinity.

D The series diverges because the limit of the sequence as \( n \) approaches infinity is 30.

5. Which function results by shifting the graph of \( y = \ln(x + 3) - 6 \) to the left 4 units and down 3 units?

A \( y = \ln(x + 7) - 9 \)

B \( y = \ln(x - 1) - 9 \)

C \( y = \ln(x + 7) - 3 \)

D \( y = \ln(x - 1) - 3 \)
Which piecewise function is graphed below?

6.

A \( f(x) = \begin{cases} 
-2x - 7 & \text{for } x \leq -5 \\
-(x + 2)^2 + 6 & \text{for } -5 < x < 0 \\
\sqrt{x} - 1 & \text{for } x \geq 0
\end{cases} \)

B \( f(x) = \begin{cases} 
-2x - 7 & \text{for } x \leq -5 \\
-(x - 2)^2 + 6 & \text{for } -5 < x < 0 \\
\sqrt{x} - 1 & \text{for } x \geq 0
\end{cases} \)

C \( f(x) = \begin{cases} 
-2x - 7 & \text{for } x \leq -5 \\
-(x - 2)^2 + 6 & \text{for } -5 < x \leq 0 \\
\sqrt{x} - 1 & \text{for } x > 0
\end{cases} \)

D \( f(x) = \begin{cases} 
-2x - 7 & \text{for } x \leq -5 \\
-(x + 2)^2 + 6 & \text{for } -5 < x \leq 0 \\
\sqrt{x} - 1 & \text{for } x > 0
\end{cases} \)

\( \text{not } \neq \text{ to } 0 \)
7. A function, \( f(x) \), is shown below.

\[
f(x) = \begin{cases} 
  x - 4 & \text{for } 0 \leq x < 2 \\
  x^2 - 3x + 4 & \text{for } 2 \leq x < 4 \\
  5 & \text{for } 4 \leq x < 7
\end{cases}
\]

What is the range of \( f(x) \)?

A. \([-4, 5)\)
B. \([-4, 8)\)
C. \([-4, -2) \cup [2, 5)\)
D. \([-4, -2) \cup [2, 8)\)

8. A water tower is located 410 feet from a building. From a window in the building, it is observed that the angle of elevation to the top of the tower is 42 degrees and the angle of depression to the bottom of the tower is 25 degrees. Approximately how tall is the water tower?

A. 191 feet
B. 369 feet
C. 448 feet
D. 560 feet

\[\tan 42 = \frac{x}{410} = 3.69165\]

\[\tan 25 = \frac{y}{410} = 1.91186\]

\[x + y = 560.3517 \text{ ft}\]
9. Given the table below:

<table>
<thead>
<tr>
<th>$x$</th>
<th>$\frac{\pi}{2}$</th>
<th>$\frac{3\pi}{4}$</th>
<th>$\pi$</th>
<th>$\frac{5\pi}{4}$</th>
<th>$\frac{3\pi}{2}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y$</td>
<td>0.5</td>
<td>0</td>
<td>-0.5</td>
<td>0</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Which function fits the data?

A $y = 0.5\cos(2x - \pi)$  
B $y = 0.5\cos(x - \pi)$  
C $y = 0.5\cos(2x + \frac{\pi}{2})$  
D $y = 0\cos(2x + \frac{\pi}{2})$

10. How does the graph of $g(x) = 0.5\cos(2x)$ differ from the graph of its parent function, $f(x) = \cos(x)$, over the interval $-\pi \leq x \leq \pi$?

A The amplitude is smaller, and the period is shorter.  
B The amplitude is smaller, and the period is longer.  
C The amplitude is larger, and the period is shorter.  
D The amplitude is larger, and the period is longer.
11. A bathroom floor has tiles arranged in 9 circles. The innermost circle contains 9 tiles. Each successive circle contains 9 more tiles than the previous circle. How many total tiles are on the bathroom floor?

A 81
B 396
C 405
D 729

12. Write an equation for the power function, in \( y = ax^b \) form, that passes through the points (2, 1) and (5, 6).

- Use your power function to predict the value of \( y \) when \( x = 9 \).

\[
\begin{align*}
l &= ab^2 \\
a &= \frac{1}{b^2} \\
a &= .303 \\
l &= ab^5 \\
l &= \frac{1}{b^3} \\
l &= .61 \\
l &= \frac{b^5}{b^2} \\
l &= b^3 \\
b &= 1.817
\end{align*}
\]

\[
y = .303(1.817)^x
\]

(9, 45.4089)
13. The table below shows the estimated average hours each person in a city spent playing video games in different years.

<table>
<thead>
<tr>
<th>Years since 2002</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>71</td>
</tr>
<tr>
<td>1</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>82</td>
</tr>
<tr>
<td>3</td>
<td>78</td>
</tr>
<tr>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>91</td>
</tr>
<tr>
<td>6</td>
<td>107</td>
</tr>
<tr>
<td>7</td>
<td>121</td>
</tr>
<tr>
<td>8</td>
<td>125</td>
</tr>
<tr>
<td>9</td>
<td>131</td>
</tr>
<tr>
<td>10</td>
<td>142</td>
</tr>
</tbody>
</table>

Write an equation for the best fit exponential model for the data.

- What is the meaning of the base of the model in the context of the problem? **The y-intercept/the starting point**
- What is the meaning of the coefficient of the model in the context of the problem?

Every year, the average hours a person spent on video games increased by 7.4%.
14. Suppose the function \( H(t) = 8.5 \sin(0.017t - 1.35) + 12 \) models the hours of sunlight for a town in Alaska, where \( t = 1 \) is the first day of the year. Based on the function, what is the \textit{approximate} range of daylight hours for the town?

\[
8.5 \sin(0.017t - 1.35) + 12 = 11.802 \text{ hrs}
\]

A. 3.5 to 20.5
B. 4 to 20
C. 4.5 to 19.5
D. 5 to 19

15. What is the meaning of the base of the function \( y = -\log(x) \)?

A. As \( y \) decreases by 1, \( x \) increases by a factor of 10.
B. As \( y \) decreases by 1, \( x \) increases by 10.
C. As \( y \) increases by 1, \( x \) increases by a factor of 10.
D. As \( y \) increases by 1, \( x \) increases by 10.
A Ferris wheel has a diameter of 80 feet. Riders enter the Ferris wheel at its lowest point, 5 feet above the ground, at time $t = 0$ seconds. One complete rotation takes 65 seconds.

Which function models a rider's vertical height, $h(t)$, at $t$ seconds?

- **A** $h(t) = -80 \cos \left( \frac{2\pi t}{65} \right) + 5$
- **B** $h(t) = -40 \cos \left( \frac{2\pi t}{65} \right) + 45$
- **C** $h(t) = -45 \cos \left( \frac{65}{2\pi} t \right) + 40$
- **D** $h(t) = -5 \cos \left( \frac{65}{2\pi} t \right) + 80$

$$\frac{2\pi}{b} = 65 \quad \Rightarrow \quad \frac{2\pi}{65} = b$$
17. A piecewise function is shown below.

\[ h(x) = \begin{cases} 
-2x^2 + 5x + 10 & \text{for } -4 \leq x < 3 \\
2x + 3p & \text{for } 3 \leq x \leq 5 
\end{cases} \]

For what value of \( p \) will the function be continuous?

A \( \frac{10}{3} \)  
B \( \frac{1}{3} \)  
C \( -\frac{25}{3} \)  
D \( -\frac{34}{3} \)

18. What is the explicit form of the equation \( a_n = a_{n-1} + 2(n - 1); a_1 = 1 \)?

A \( a_n = 2n - 1 \)  
B \( a_n = n^2 - n + 1 \)  
C \( a_n = n^2 - 2n + 2 \)  
D \( a_n = 2n^2 - 2n - 1 \)

\[ \begin{align*}
\text{A2} & = 1 + 2(1) \\
\text{A3} & = 1 + 2 = 3 \\
\text{A3} & = 3 + 2(2) \\
\text{A4} & = 3 + 4 = 7 \\
\text{A4} & = 7 + 2(3) \\
\text{A4} & = 7 + 6 = 13
\end{align*} \]
19. The equation \( y = 4.7x^{\frac{1}{5}} \) is graphed on the coordinate plane. How does increasing the denominator of the exponent transform the graph?

A. The transformed graph will approach a horizontal asymptote while the original graph will not.
B. The transformed graph will not approach a horizontal asymptote while the original graph will.
C. The transformed graph will go to \( \infty \) slower than the original graph as the value of \( x \) gets larger.
D. The transformed graph will go to \( \infty \) faster than the original graph as the value of \( x \) gets larger.

20. Which function has an amplitude that is twice the size and a period that is three times the size of the function \( y = 3\cos\left(\frac{x}{4} - 1\right) + 2 \)?

\[ \text{A. } y = 6\sin\left(\frac{x}{12} - 3\right) + 1 \]
\[ \text{B. } y = \frac{3}{2}\cos\left(\frac{3x}{4} + 1\right) - 3 \]
\[ \text{C. } y = 6\cos\left(\frac{3x}{4} - 1\right) + 3 \]
\[ \text{D. } y = \frac{3}{2}\sin\left(\frac{x}{12} + 3\right) - 1 \]
Which function correctly represents the graph below?

21.

A. \( y = \sin\left(x - \frac{\pi}{3}\right) + 4 \)

B. \( y = \sin\left(x + \frac{\pi}{3}\right) + 4 \)

C. \( y = \cos\left(x - \frac{\pi}{3}\right) + 4 \)

D. \( y = \cos\left(x + \frac{\pi}{3}\right) + 4 \)
22. A plane takes off and travels at an angle of 40° north of east at 110 mph for 2 hours. It then adjusts its path to head 10° west of north and travels in that direction for half an hour at a speed of 100 mph. Approximately how far away is the plane from its starting point?

A 182 miles  
B 200 miles  
C 238 miles  
D 249 miles

23. Which statement is true about the series shown below?

\[ -4 + \frac{-2}{2} + \frac{-1}{4} + \frac{-1}{8} + \ldots \]

A The series converges because \(|r| < 1\).
B The series diverges because \(|r| < 1\).
C The series converges because \(|r| > 1\).
D The series diverges because \(|r| > 1\).
24. Which statement is true about the fifth terms of the two sequences below?

\[ a_n = 3n^2 - 6 \quad a_5 = 3(5)^2 - 6 = 69 \]
\[ b_n = 3(b_{n-1} - 6); b_1 = 10 \quad b_3 = 18 \quad b_5 = 90 \]

A. The fifth term of the recursive sequence exceeds the fifth term of the explicit sequence by 63.
B. The fifth term of the explicit sequence exceeds the fifth term of the recursive sequence by 63.
C. The fifth term of the recursive sequence exceeds the fifth term of the explicit sequence by 21.
D. The fifth term of the explicit sequence exceeds the fifth term of the recursive sequence by 21.

25. Two sides of a triangle measure 14 ft and 17 ft, respectively. The included angle is 72°. Approximately how long is the third side of the triangle?

A. 18.4 ft
B. 20.3 ft
C. 25.1 ft
D. 30.7 ft

\[ x^2 = 14^2 + 17^2 - 2(14)(17)\cos 72 \]
\[ x^2 = 196 + 289 - 147.09 \]
\[ x^2 = 337.9 \]
\[ x = 18.38 \]
26. A series is shown below.
\[ \sum_{n=1}^{\infty} (2n - 1) \]
1, 3, 5, 9, 17, 33
Which is true about the series?
A  The series converges to 1.
B  The series converges to 1.
C  The series converges to 2.
D  The series diverges.

27. A sequence is shown below.
\[ 36, -6, 1, -\frac{1}{6}, -\frac{1}{36}, \ldots \]
\[ r = -\frac{1}{6} \]
What is the sum of the sequence?
A  \( \frac{-36}{5} \)
B  \( \frac{36}{7} \)
C  \( \frac{216}{7} \)
D  \( \frac{216}{5} \)
28. What are the **approximate** rectangular coordinates for the point with polar coordinates \((5, 30^\circ)\)?

- A \((2.5, 2.89)\)
- B \((2.5, 4.33)\)
- C \((2.89, 4.33)\)
- D \((4.33, 2.5)\)

\[
x = r \cos \theta \\
y = r \sin \theta
\]

\[
(5, 30^\circ) \\
(5 \cos (30^\circ), 5 \sin (30^\circ)) \\
(4.33, 2.5)
\]

29. A sequence is shown below.

\[6, 12, 20, 30, 42, 56, \ldots\]

Which is the recursive formula for this sequence?

- A \(t_n = n + 2(t_{n-1} + 1)\)
- B \(t_n = (t_{n-1} + 1)(n - 2)\)
- C \(t_n = 2(t_{n-1} + 2) - (n + 2)\)
- D \(t_n = t_{n-1} + 2(n + 1)\)
A series is shown below.

$$1 + \frac{2}{5} + \frac{4}{25} + \frac{8}{125} + \ldots$$

$$r = \frac{2}{5}$$

Which statement is true about the sum of the series?

A  The series converges to $\frac{7}{3}$.

B  The series converges to $\frac{5}{2}$.

C  The series converges to $\frac{5}{3}$.

D  The series diverges.

$$S = \frac{1}{1 - \frac{2}{5}} = \frac{5}{3}$$

31. Lucy invested $6,000 into an account that earns 6% interest compounded continuously. **Approximately** how long will it take for Lucy's investment to be valued at $25,000?

A  52.7 years

B  46.9 years

C  24.5 years

D  23.8 years

$$25000 = 6000 \cdot e^{.06t}$$

$$\frac{25}{6} = e^{.06t}$$

$$\ln \frac{25}{6} = \ln e^{.06t}$$

$$\ln 4.1667 = .06t$$

$$t = \frac{\ln 4.1667}{.06} = 23.78$$
32. A lamppost is located 418 feet from a building. The angle of elevation from the base of the lamppost to the top of the building is 32.3°. **Approximately** how tall is the building?

- A 223 feet
- B 264 feet
- C 510 feet
- D 661 feet

![Diagram of lamppost and building]

\[ \tan 32.3^\circ = \frac{x}{418} \]

\[ x = 244.25 \]

33. Two functions are shown below.

\[ T(x) = -x \]
\[ P(x) = 10x + 2 \]

What is the value of \( P(T(3)) - T(P(3)) \)?

- A 8
- B 4
- C 0
- D -4

\[ T(3) = -3 \]
\[ P(3) = 10(3) + 2 \]
\[ = 30 + 2 = 32 \]

\[ P(-3) - T(32) \]
\[ 10(-3) + 2 - (-32) \]
\[ = -30 + 2 + 32 = 4 \]
34. A piecewise function is shown below.

\[ f(x) = \begin{cases} 
  cx + 1, & x \leq 2 \\
  cx^2 - 1, & x > 2
\end{cases} \]

For what value of \( c \) does \( \lim_{{x \to 2}} f(x) \) exist?

A. -2
B. -1
C. 1
D. 4

\[
\begin{align*}
  cx + 1 &= cx^2 - 1 \\
  c(2) + 1 &= c(2)^2 - 1 \\
  2c + 1 &= 4c - 1 \\
  2 &= 2c \\
  c &= 1
\end{align*}
\]

35. What are the polar coordinates of \((4, 9)\)?

A. \((\sqrt{97}, 66^\circ)\)
B. \((\sqrt{97}, 114^\circ)\)
C. \((\sqrt{13}, 66^\circ)\)
D. \((\sqrt{13}, 114^\circ)\)

\[
\begin{align*}
  r &= \sqrt{x^2 + y^2} \\
  r &= \sqrt{9^2 + 4^2} \\
  \theta &= \tan^{-1}\left(\frac{9}{4}\right) \\
  \theta &\approx 66.037^\circ
\end{align*}
\]
36. A sequence is shown below.

\[ 1, 3, 3^2, 3^3, \ldots \]

How many terms of the sequence must be added together for the sum to equal 3,280?

A 6  
B 7  
C 8  
D 9

37. The first term of an infinite geometric sequence is 2. The sum of the sequence is 6. What is the common ratio of the sequence?

A \( \frac{1}{3} \)  
B \( \frac{2}{3} \)  
C \( \frac{3}{3} \)  
D \( \frac{4}{3} \)
38. Which is true of the series shown below?

\[ \pi + \frac{3\pi}{4} + \frac{9\pi}{16} + \frac{27\pi}{64} + \ldots \]

\[ r = \frac{\frac{3}{4}}{1} \]

A. The series diverges.
B. The series converges to \( \frac{3\pi}{2} \).
C. The series converges to \( \frac{4\pi}{3} \).
D. The series converges to \( 4\pi \).

\[ S = \frac{\pi}{1 - \frac{3}{4}} = \frac{4\pi}{1} = 4\pi \]

39. Karen recursively generated a sequence of five positive integers by starting with a positive integer, \( a_1 \), and then applying the recursive formula \( a_n = a_{n-1} + 3n - 1 \) to generate \( a_n \) for \( n = 2, 3, 4, \) and \( 5 \).

If the value of \( a_5 \) was 407, what was the value of Karen's starting term, \( a_1 \)?

A. 366
B. 367
C. 368
D. 369

\[ 407 = a_4 + 15 - 1 \]
\[ 407 = a_4 + 14 \]
\[ a_4 = 393 \]
\[ 393 = a_3 + 12 - 1 \]
\[ 393 = a_3 + 11 \]
\[ 382 = a_3 \]
\[ 382 = a_2 + 9 - 1 \]
\[ 382 = a_2 + 8 \]
\[ a_2 = 374 \]
\[ 374 = a_1 + 6 - 1 \]
\[ 374 = a_1 + 5 \]
\[ a_1 = 369 \]
40. What is the distance between y-intercepts of the graph of \( x + 8 = 2(y + 3)^2 \)?

A 4
B 6
C 11
D 15

\[
\frac{1}{2}x + 4 = (y+3)^2
\]
\[
\pm \sqrt{\frac{1}{2}x + 4} = y + 3
\]
\[
0+8 = 2(y+3)^2
\]
\[
y = (y+3)^2
\]
\[
\pm 2 = y + 3
\]
\[
2-3 = y = -1
\]
\[
-2-3 = y = -5
\]

41. Which is a solution set to \( x + \frac{3x}{x-1} = \frac{x+2}{x-1} \)?

A \{-1\}
B \{-2\}
C \{-2, 1\}
D \{2, -1\}

\[
\frac{x(x-1)}{x-1} + \frac{3x}{x-1} = \frac{x+2}{x-1}
\]
\[
x^2 - x + 3x = x + 2
\]
\[
x^2 + 2x = x + 2
\]
\[
x^2 + x - 2 = 0
\]
\[
(x + 2)(x - 1)
\]
\[
x = -2 \quad x = 1
\]
42. What is the range of the inverse of \( y = \tan x \)?

A \( \frac{-\pi}{2} < y < \frac{\pi}{2} \)

B \( \frac{-\pi}{2} \leq y \leq \frac{\pi}{2} \)

C \( 0 < y < \pi \)

D \( 0 \leq y \leq \pi \)

43. James is standing 10 meters away from Samantha.
   - A bird is located in the sky at a point between where James and Samantha are standing.
   - James is looking up at the bird at an angle of elevation of 74°.
   - Samantha is looking up at the bird at an angle of elevation of 47°.

**Approximately** how far is the bird from Samantha?

A 7.6 meters

B 8.5 meters

C 11.2 meters

D 13.1 meters

\[
\frac{\sin 59}{10} = \frac{\sin 74}{x}
\]

\[
9.6126 = \sin 59 \times x
\]

\[
x = 11.214
\]
44. What is the inverse function of \( f(x) = \log_5 (2x - 1) \)?

A \( f^{-1}(x) = 5^x - 1 \)

B \( f^{-1}(x) = \frac{5^x + 1}{2} \)

C \( f^{-1}(x) = \log_2 (5x - 1) \)

D \( f^{-1}(x) = \log_5 \frac{5x + 1}{2} \)

45. What is the value of the limit shown below?

\[
\lim_{n \to \infty} \left( \frac{3^n - 1}{3^n} \right) = 0
\]

A \( \frac{1}{3} \)

B \( \frac{2}{3} \)

C \( 1 \)

D \( +\infty \)
46. What type of conic section is represented by \( r = \frac{8}{16 + 125 \sin \theta} \)?

A circle
B ellipse
C hyperbola
D parabola

47. Which expression is equivalent to \((\sec \theta)(\frac{\sin \theta}{\tan \theta})\)?

A \( \cos^2 \theta - \sin^2 \theta \)
B \( \sin^2 \theta - \cos^2 \theta \)
C \( \cot^2 \theta - \csc^2 \theta \)
D \( \csc^2 \theta - \cot^2 \theta \)
James had a rectangular piece of cardboard that was four times as long as it was wide. He wanted to use the cardboard to make a box with no lid. To do this, he first cut a 3-by-3-inch square out of each of the four corners of the piece of cardboard, as shown in the picture below.

Then James folded the cardboard along the four dotted lines shown in the picture. This created an open box with a volume of 336 cubic inches.

What was the width of the sheet of cardboard that James started with?

A  10.5 inches
B  9.5 inches  \(x\)
C  8.5 inches
D  7.5 inches

\[
\begin{align*}
12x^2 - 90x + 108 &= 336 \\
3(4x^2 - 24x + 36) &= 336 \\
12x^2 - 90x + 108 &= 336 \\
x &= \frac{3}{2}, 9.5
\end{align*}
\]
49. Suppose that for each foot of land along the street, the annual tax is $25 per foot. The diagram below shows a plot of land.

About how much is the annual tax for the plot?

A $1,238  
B $1,293  
C $1,321  
D $1,411

\[
x^2 = 28^2 + 46^2 - 2(28)(46) \cos 80^\circ \\
x^2 = 784 + 2116 - 2576 \cos 80^\circ \\
x^2 = 2452.68 \\
x = 49.52
\]

\[49.52 \times $25 = $1238.11\]
50. The function \( C(x) = \frac{2.50x + 1.00}{x} \) models the cost per item for a company to produce \( x \) items after the first item is made. What is the inverse function of \( C(x) \)?

A \( C^{-1}(x) = \frac{1.00}{x - 2.50} \)

B \( C^{-1}(x) = \frac{x - 2.50}{1.00} \)

C \( C^{-1}(x) = \frac{x - 1.00}{2.50} \)

D \( C^{-1}(x) = \frac{2.50}{x - 1.00} \)

51. From a point 100 feet from the base of a building, Angie looks up at a 40° angle to the top of a building. She walks 20 feet closer to the building. At approximately what angle must Angie now look up to see the top of the building?

A 32°

B 46°

C 60°

D 77°

\[ \tan x = \frac{83.90}{80} \]

\[ x = 46.36° \]
A computer rental company charges $50 to rent a computer for one week. The table below shows the daily late fees the company charges if a computer is returned late.

<table>
<thead>
<tr>
<th>Days Late</th>
<th>Daily Late Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>days 1 through 10</td>
<td>$5</td>
</tr>
<tr>
<td>days 11 through 20</td>
<td>$8</td>
</tr>
<tr>
<td>days 21 through 30</td>
<td>$10</td>
</tr>
</tbody>
</table>

What would be the total cost of renting a computer for one week and returning it 15 days late?

A $120
B $125
C $140
D $170

$50 + $5(10) + $8(5)
$50 + $50 + $40