5. Find the domain of the function \( h(x) = \frac{1}{\sqrt{x^2 - 5x}} \).
Write your answer in the form of interval(s).

11. (a) Make a rough sketch of the graph of the function \( y = f(x) = -e^{-x} \). Show clearly where the graph intersects the coordinate axes, and the asymptotes, if any.

(b) True or False. (Circle T or F)

(i) \( f \) is a one-to-one function. 
(ii) \( f \) is an even function.
(iii) The range of \( f \) is \((-\infty, 0)\).
(iv) The domain of \( f^{-1} \) is \((0, \infty)\).
(v) \( f \) is increasing on \((-\infty, \infty)\).
(6) 3. If \( f(x) = 2x^3 + 3 \), find a formula for the inverse function \( f^{-1} \).

\[ f^{-1}(x) = \]

(8) 4. Find the exact value of each expression

(a) \( e^{2\ln 3} = \)

(b) \( \log_{10} 25 + \log_{10} 4 = \)

(c) \( \sin \frac{5\pi}{4} = \)

(d) \( \tan(-\pi e^{-\ln 4}) = \)

(6) 5. Find all values of \( x \) in the interval \([0, 2\pi]\) that satisfy the equation \( 2 \cos x + \sin 2x = 0 \).

(4) 6. If a ball is thrown straight up into the air with a velocity of 50 ft/sec, its height in feet after \( t \) seconds is given by \( y = 50t - 16t^2 \). Find the velocity when \( t = 3 \).

(7) 7. Circle the interval in which you are sure that the equation \( x^4 + 4x - 25 = 0 \) has a solution. State the name of the theorem you are using.

[0, 1]  
[1, 2]  
[2, 3]  
[3, 4]  

Theorem:
(10) 8. For each of the following, fill in the boxes below with a finite number, or one of the symbols $+\infty$, $-\infty$, or DNE (does not exist). It is not necessary to give reasons for your answers.

(a) \[ \lim_{x \to -4} \frac{\frac{1}{4} + \frac{1}{x}}{4 + x} = \]

(b) \[ \lim_{x \to 1} \frac{2 - x}{(x - 1)^2} = \]

(c) \[ \lim_{h \to 0} \frac{(4 + h)^2 - 16}{h} = \]

(d) \[ \lim_{x \to -2} \frac{2 - |x|}{2 + x} = \]

(e) \[ \lim_{x \to 0} \left( \frac{1}{x} - \frac{3}{x^2 + 3x} \right) = \]

(6) 9. Write the equations of the vertical and horizontal asymptotes, if any, of the graph of \[ y = \frac{x^2 + 1}{x^2 - 1}. \]

<table>
<thead>
<tr>
<th>Vertical asymptotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal asymptotes</td>
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</table>

(6) 10. Consider the function \[ f(x) = \begin{cases} \frac{x^2 - x}{x^2 - 1} & \text{if } x \neq 1, \\ A & \text{if } x = 1 \end{cases} \] where \( A \) is a constant.

Find the value of \( A \) for which \( f \) is continuous at \( x = 1 \).

\[ A = \]
11. Find the derivative of the function \( f(x) = x^3 + x \) using the definition of the derivative
\[
f'(x) = \lim_{h \to 0} \frac{f(x + h) - f(x)}{h}.
\]
(0 credit for using a formula for the derivative).

12. Find the equation of the tangent line to the curve \( y = 1 - x^3 \) at the point \((0, 1)\).

13. Find the derivatives of the following functions. Do not simplify.
   
   (a) \( y = \frac{x}{\sin x} \).

   (b) \( f(x) = \sqrt{x} \tan x \).

   (c) \( h(\theta) = \frac{\sec \theta}{1 + \sec \theta} \).