1. (1 pt) 
\( e \) is defined as the value of \( a \) such that the slope of the tangent line at \( x = 0 \) on the graph of \( y = a^x \) is exactly 1. What is the approximate value of \( e \) accurate to five decimal places?

2. (1 pt) 
Which of the following explains how to obtain the graph of \( y = 4^{x-3} \) from the graph of \( y = 4^x \)?

(a) Shift the graph of \( y = 4^x \) up 3 units.
(b) Shift the graph of \( y = 4^x \) down 3 units.
(c) Shift the graph of \( y = 4^x \) to the left 3 units.
(d) Shift the graph of \( y = 4^x \) to the right 3 units.

3. (1 pt) 
Which of the following explains how to obtain the graph of \( y = -2^{-x} \) from the graph of \( y = 2^x \)?

(a) Reflect the graph of \( y = 2^x \) about the y-axis and then reflect this result about the x-axis.
(b) Reflect the graph of \( y = 2^x \) about the y-axis.
(c) None of the above.

4. (1 pt) 
Find the domain of each function. If the answer is all real numbers, enter "r" below.
(a) \( f(x) = \frac{1}{1+x} \)
(b) \( f(x) = \frac{1}{x} \)

(a) \( x = \) ________________________  (b) \( x \neq \) ________________________

5. (1 pt) 
Find the domain of each function. If the answer is all real numbers, enter "r" below.
(a) \( g(t) = \sin \left( -t \right) \)
(b) \( g(t) = \sqrt{1-2t} \)

(a) \( x = \) ________________________  (b) \( x \leq \) ________________________

6. (1 pt) 
Find the exponential function \( f(x) = Ca^x \) whose graph is given below.

\[ f(x) = \text{[diagram]} \]

7. (1 pt) 
If \( f(x) = 5^x \), find \( \frac{f(x+h) - f(x)}{h} \).

8. (1 pt) 
How can you tell from the graph of a function whether it is one-to-one?

(a) Use the Vertical Line Test.
(b) Use the Horizontal Line Test.
(c) None of the above.

9. (1 pt) 
A function is given by a table of values, a graph, a formula, or a verbal description. Determine whether it is one-to-one. If it is one-to-one, enter "y" below. If not, enter "n" below.

\[ f(x) = \frac{1}{2}(x + 5) \]

10. (1 pt) 
A function is given by a table of values, a graph, a formula, or a verbal description. Determine whether it is one-to-one. If it is one-to-one, enter "y" below. If not, enter "n" below.

\[ f(x) = 1 + 4x - x^2 \]

11. (1 pt) 
If \( f \) is a one-to-one function such that \( f(2) = 4 \), what is \( f^{-1}(4) \)?

12. (1 pt) 
If \( g(x) = 3 + x + e^x \), find \( g^{-1}(4) \).

13. (1 pt) 
Find the exact value of each expression.

(a) \( \log_2 64 \)
(b) \( \log_6 \frac{1}{x} \)

(a) ________  (b) ________

14. (1 pt) 
Find the exact value of each expression.

(a) \( \log_8 2 \)
(b) \( \ln e^{\sqrt{2}} \)

(a) ________  (b) ________

15. (1 pt)
Find the exact value of each expression.

(a) $2 \log_2 3 + \log_2 5$
(b) $e^{3 \ln 2}$

(a) __________
(b) __________

16. (1 pt)
Express the given quantity as a single logarithm.

$2 \ln 4 - \ln 2$

________

17. (1 pt)
Express the given quantity as a single logarithm.

$\ln x + 6 \ln y - 5 \ln z$

________

18. (1 pt)
Solve each equation for $x$.

(a) $5 \ln x = 1$
(b) $e^{-x} = 9$

(a) __________
(b) __________

19. (1 pt)
Solve each equation for $x$.

(a) $e^{2x+3} = 2$
(b) $\ln(5 - 2x) = -9$

(a) __________
(b) __________

20. (1 pt)
Solve each equation for $x$.

(a) $\ln(\ln x) = 1$
(b) $e^{8t} = 7e^{-x}$

(a) __________
(b) __________

21. (1 pt)
If a ball is thrown into the air with a velocity of 40 ft/s, its height in feet after $t$ seconds is given by $y = 40t - 16t^2$.

(a) Find the average velocity for the time period beginning with $t = 2$:
   (1) .5 second
   (2) .1 second
   (3) .05 second
   (4) .01 second

(b) Find the instantaneous velocity when $t = 2$.

(1) __________ ft/s
(2) __________ ft/s
(3) __________ ft/s
(4) __________ ft/s

22. (1 pt)
The position of a car is given by the values in the table.

<table>
<thead>
<tr>
<th>$t$ (seconds)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>$s$ (feet)</td>
<td>0</td>
<td>10</td>
<td>32</td>
<td>70</td>
<td>119</td>
<td>178</td>
</tr>
</tbody>
</table>

Find the average velocity for the time period beginning when $t = 2$ and lasting
(1) 3 seconds, (2) 2 seconds, (3) 1 second

(Using the graph, one can estimate the instantaneous velocity when $t = 2$ to be about 28 ft/s.)

(1) __________ ft/s
(2) __________ ft/s
(3) __________ ft/s