📖 Take Assessment: Exam 4

Name   Exam 4

Instructions

Multiple Attempts   This Test allows 2 attempts. This is attempt number 1.

Force Completion   This Test can be saved and resumed later.

▼ **Question Completion Status:**

Question 1   **5 points**   Save

The loudness of a sound of intensity x, measured in watts per square meter, is defined as $L(x) = \log \left(\frac{x}{x_o} \right)$, where $x_o = 10^{-3}$.

A company with loud machinery needs to cut its sound intensity to 26% of its original level. By how many decibels should the loudness be reduced?

○ 5.850 decibels

○ 6.880 decibels

○ 6.237 decibels

○ 5.760 decibels

Question 2   **5 points**   Save

Solve the problem.

The function $D(h) = 5e^{-0.4h}$ can be used to determine the milligrams D of a certain drug in a patient's bloodstream h hours after the drug has been given. How many milligrams (to two decimals) will be present after $10 \, hours$?

○ 1.35 mg

○ 3.22 mg

○ 0.09 mg

○ 272.99 mg

Question 3   **5 points**   Save

Solve the problem.

A thermometer reading 9°C is brought into a room with a constant temperature of 30°C. If the thermometer reads 15°C after 3 minutes, what will it read after being in the room for 6 minutes? Assume the cooling follows Newton's Law of Cooling:
$U = T + (U_o - T)e^{kt}$.
(Round your answer to two decimal places.)

○ 19.29°C

○ 2.04°C

○ 27.21°C

○ 40.71°C

Question 4
5 points [Save]

Decide whether the composite functions, f $\circ$ g and g $\circ$ f, are equal to x.

$f(x) = x^3 + 7$, $g(x) = \sqrt[3]{x - 7}$

○ Yes, no

○ No, yes

○ No, no

○ Yes, yes

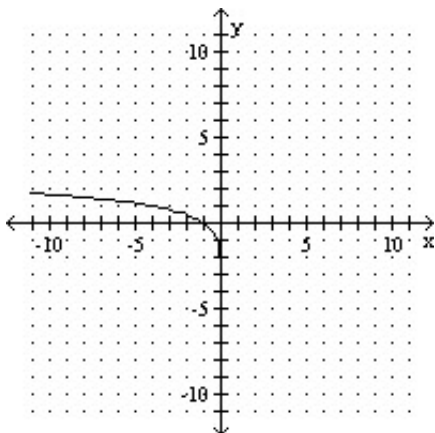## Question 5
5 points [Save]

Solve the problem.

The half-life of a radioactive element is 130 days, but your sample will not be useful to you after 80% of the radioactive nuclei originally present have disintegrated. About how many days can you use the sample?

○ 302

○ 287

○ 312

○ 297

Question 6
5 points [Save]

The graph of a logarithmic function is shown. Select the function which matches the graph.

○ $f(x) = log_4 x$

○ $f(x) = log_4(-x)$

○ $f(x) = -log_4 x$

○ $f(x) = 1 - log_4 x$

Question 7   5 points   Save

The function f is one-to-one. Find its inverse.

$f(x) = 3 \dfrac{}{\sqrt{x + 4}}$

○ $f^{-1}(x) = x^3 + 16$

○ $f^{-1}(x) = x - 4$

○ $f^{-1}(x) = \dfrac{1}{x^3 - 4}$

○ $f^{-1}(x) = x^3 - 4$

Question 8   5 points   Save

Find the indicated composite for the pair of functions.

$(f \circ g)(x): f(x) = \sqrt{x + 3}, g(x) = 8x - 7$

○ $8\sqrt{x - 4}$

○ $8\sqrt{x + 3} - 7$

○ $2\sqrt{2x + 1}$

○ $2\sqrt{2x - 1}$

Question 9   5 points   Save

Solve the exponential equation. Express the solution set in terms of natural logarithms.

$5^{3x} = 3.5$

○ $\left\{ \dfrac{\ln 3.5}{3 \ln 5} \right\}$

○ $\left\{ \dfrac{3 \ln 3.5}{\ln 5} \right\}$

○ $\left\{ \dfrac{\ln 3.5}{5 \ln 3} \right\}$

○ $\left\{ \dfrac{3.5 \ln 3}{\ln 5} \right\}$

Question 10   5 points   Save

Find the amount that results from the investment.

$14,000 invested at 12% compounded semiannually after a period of 7 years
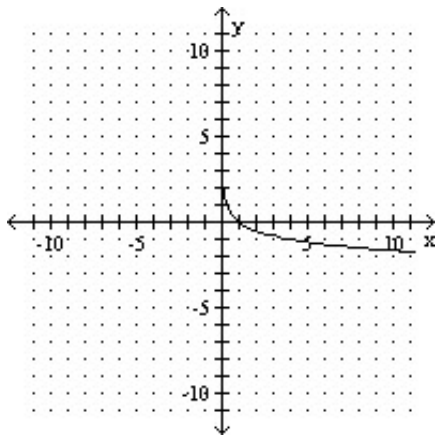
○ $17,652.66

○ $29,861.00

○ $31,652.66

○ $30,949.54

Question 11

5 points   Save

The graph of a logarithmic function is shown. Select the function which matches the graph.

○ $f(x) = -\log_4 x$

○ $f(x) = \log_4 x$

○ $f(x) = \log_4(-x)$

○ $f(x) = 1 - \log_4 x$

Question 12

5 points   Save

Solve the problem.

The Feldmans bought their first house for $18,000. Over the years they moved three times into bigger and bigger houses. Now, 45 years later, they are ready to retire and want a smaller house like the first one they bought. If inflation in property values has averaged 3.2% per year during that time, how much will such a house cost them now? (Round your answer to the nearest dollar.)

○ $75,973

○ $4362

○ $74,278

○ $4265

Question 13

5 points Save

Solve the problem.

A fossilized leaf contains 12% of its normal amount of carbon 14. How old is the fossil (to the nearest year)? Use 5600 years as the half-life of carbon 14.

- ○ 1031
- ○ 17,099
- ○ 20,040
- ○ 36,108

Question 14

5 points Save

Solve the problem.

A grocery store normally sells 5 jars of caviar per week. Use the Poisson Distribution $P(x) = \dfrac{5^x e^{-5}}{x!}$ to find the probability (to three decimals) of selling 3 jars in a week.

$(x! = x \cdot (x-1) \cdot (x-2) \cdot \ldots \cdot (3)(2)(1)).$

- ○ 0.281
- ○ 0.14
- ○ 0.421
- ○ 0.094

Question 15

5 points Save

Find the amount that results from the investment.

$12,000 invested at 11% compounded quarterly after a period of 4 years

- ○ $18,522.11
- ○ $18,026.39
- ○ $6522.11
- ○ $18,216.84

Question 16

5 points Save

Find the present value. Round to the nearest cent.

To get $10,000 after 2 years at 18% compounded monthly

- ○ $5000.00
- ○ $6995.44
- ○ $8363.87
- ○ $11,956.18

Question 17   5 points   Save

Find the domain of the composite function f ∘ g.

f(x) = $\sqrt{x}$; g(x) = 4x + 12

- ◯ {x | x ≤ -3 or x ≥ 0}
- ◯ {x | x ≥ -3}
- ◯ {x | x ≥ 0}
- ◯ {x | x is any real number}

Question 18   5 points   Save
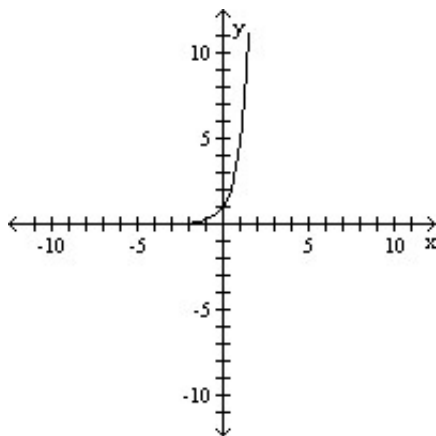
Find the amount that results from the investment.

$480 invested at 16% compounded quarterly after a period of 4 years

- ◯ $864.45
- ◯ $419.03
- ◯ $869.11
- ◯ $899.03

Question 19   5 points   Save

The graph of an exponential function is given. Match the graph to one of the following functions.

- ◯ f(x) = 5^x + 1
- ◯ f(x) = 5^x
- ◯ f(x) = $5^{x + 1}$
- ◯ f(x) = 5^x - 1

Question 20   5 points   Save

Change the exponential expression to an equivalent expression involving a logarithm.

$e^x = 25$

○ $\log_{25} x = e$

○ $\log_x e = 25$

○ $\ln x = 25$

○ $\ln 25 = x$

[Save] [Submit]