

Solve the equation.

1) $3 \cdot 5^{2t} - 1 = 75$

A) $\left\{\frac{13}{10}\right\}$

B) $\left\{\frac{1}{2}\right\}$

C) {3}

D) $\left\{\frac{3}{2}\right\}$

1) _____

Solve the problem.

2) $f(x) = 3^x + 2$ and $g(x) = 3^{-x} + 4$.

Find the point of intersection of the graphs of f and g by solving $f(x) = g(x)$.

A) (27, 1)

B) (9, 1)

C) (1, 27)

D) (1, 9)

2) _____

3) $f(x) = 3^x$ and $g(x) = 12$.

Find the point of intersection of the graphs of f and g by solving $f(x) = g(x)$.

A) $(\log_3 12, 3)$

B) $(\log_3 12, 0)$

C) (12, 12)

D) $(\log_3 12, 12)$

3) _____

Solve the exponential equation and approximate the result, correct to three decimal places.

4) $4^x = 18$

A) 0.480

B) 4.500

C) 2.085

D) 1.504

4) _____

5) $6^{x+3} = 3^x$

A) -9.615

B) -7.755

C) 7.755

D) -5.895

5) _____

6) $(3.1)^x = 42$

A) 3.3159

B) 3.427

C) 3.2913

D) 3.3036

6) _____

7) $e^x + e^{-x} = 3$

A) 0.557, -1.3679

B) 0.9163, -0.6931

C) 0.9624, -0.9624

D) 1.1948, -1.1948

7) _____

8) $\frac{e^x + e^{-x}}{e^x - e^{-x}} = 6$

A) 0.1805

B) 0.1682

C) 0.235

D) 0.2916

8) _____

9) $3^{(x-2)} = 12$

A) 6.000

B) 3.386

C) 0.262

D) 4.262

9) _____

10) $3^{(4x-1)} = 11$

A) 0.575

B) 1.167

C) 0.296

D) 0.796

10) _____

11) $6e^{4x-5} = 24$

A) 1.597

B) 1.382

C) -0.903

D) 7.250

11) _____

12) $5 \cdot 2^x - 2 = 13$

A) 1.176

B) 1.138

C) 1.585

D) 2.202

12) _____

13) $3^{2x} - 5 \cdot 3^x = 14$

A) 1.771

B) 0.176

C) 0.631

D) \emptyset

13) _____

Find the amount that results from the investment.

- 14) \$1,000 invested at 10% compounded annually after a period of 11 years 14) _____
A) \$1853.12 B) \$2853.12 C) \$2593.74 D) \$3138.43
- 15) \$14,000 invested at 12% compounded semiannually after a period of 9 years 15) _____
A) \$25,960.75 B) \$38,823.10 C) \$37,698.82 D) \$39,960.75
- 16) \$480 invested at 12% compounded quarterly after a period of 7 years 16) _____
A) \$1061.13 B) \$1066.22 C) \$618.21 D) \$1098.21
- 17) \$12,000 invested at 7% compounded quarterly after a period of 3 years 17) _____
A) \$14,777.27 B) \$14,523.12 C) \$2777.27 D) \$14,700.52

Solve the problem.

- 18) How long will it take for \$1700 to grow to \$40,700 at an interest rate of 2.6% if the interest is 18) _____
compounded continuously? Round the number of years to the nearest hundredth.
A) 122.14 yr B) 1.22 yr C) 12,213.85 yr D) 12.21 yr
- 19) Suppose that \$5000 is invested at an interest rate of 5.6% per year, compounded continuously. 19) _____
What is the balance after 3 years?
A) \$6014.68 B) \$5280.00 C) \$5840.00 D) \$5914.68
- 20) Kimberly invested \$4000 in her savings account for 8 years. When she withdrew it, she had 20) _____
\$5085.00. Interest was compounded continuously. What was the interest rate on the account?
Round to the nearest tenth of a percent.
A) 2.9% B) 3.15% C) 3.1% D) 3%

Find the present value. Round to the nearest cent.

- 21) To get \$10,500 after 4 years at 9% compounded annually 21) _____
A) \$7438.46 B) \$7084.25 C) \$8107.93 D) \$3061.54
- 22) To get \$2000 after 11 years at 8% compounded semiannually 22) _____
A) \$857.77 B) \$843.91 C) \$1156.09 D) \$877.67
- 23) To get \$25,000 after 4 years at 10% compounded semiannually 23) _____
A) \$17,075.34 B) \$17,767.03 C) \$16,920.98 D) \$8079.02
- 24) To get \$6500 after 4 years at 10% compounded quarterly 24) _____
A) \$2121.44 B) \$4439.59 C) \$4378.56 D) \$4488.03
- 25) To get \$10,000 after 3 years at 6% compounded monthly 25) _____
A) \$3333.33 B) \$10,616.78 C) \$8356.45 D) \$9419.05

Solve the problem.

- 26) What principal invested at 8% compounded continuously for 4 years will yield \$1190? Round the 26) _____
answer to two decimal places.
A) \$627.48 B) \$1188.62 C) \$864.12 D) \$1638.78

- 27) What principal invested at 6%, compounded continuously for 3 years, will yield \$1500? Round the answer to two decimal places. 27) _____
 A) \$651.45 B) \$837.25 C) \$1252.91 D) \$1522.91
- 28) How much money needs to be invested now to get \$2000 after 4 years at 8% compounded quarterly? Express your answer to the nearest dollar. 28) _____
 A) \$1848 B) \$1457 C) \$2746 D) \$584
- 29) Randy invested his inheritance in an account that paid 6.8% interest, compounded continuously. After 6 years, he found that he now had \$48,249.65. What was the original amount of his inheritance? 29) _____
 A) \$21,817.80 B) \$33,085.00 C) \$32,085 D) \$31,085.00
- 30) Cindy will require \$20,000 in 4 years to return to college to get an MBA degree. How much money should she ask her parents for now so that, if she invests it at 11% compounded continuously, she will have enough for school? (Round your answer to the nearest dollar.) 30) _____
 A) \$31,054 B) \$8296 C) \$13,175 D) \$12,881

Solve the problem. Round your answer to three decimals.

- 31) What annual rate of interest is required to double an investment in 5 years? 31) _____
 A) 13.863% B) 24.573% C) 14.87% D) 7.435%
- 32) What annual rate of interest is required to triple an investment in 12 years? 32) _____
 A) 4.794% B) 9.155% C) 5.946% D) 9.587%
- 33) How long will it take for an investment to double in value if it earns 4.25% compounded continuously? 33) _____
 A) 16.309 yr B) 25.85 yr C) 8.155 yr D) 17.715 yr
- 34) How long will it take for an investment to triple in value if it earns 7.25% compounded continuously? 34) _____
 A) 16.362 yr B) 7.577 yr C) 15.153 yr D) 9.561 yr

Solve the problem.

- 35) How long does it take \$1125 to triple if it is invested at 7% interest, compounded quarterly? Round your answer to the nearest tenth. 35) _____
 A) 18.1 yr B) 18.1 mo C) 15.8 mo D) 15.8 yr
- 36) How long does it take \$1700 to double if it is invested at 5% interest, compounded monthly? Round your answer to the nearest tenth. 36) _____
 A) 3.9 yr B) 7.9 yr C) 4.8 yr D) 13.9 yr
- 37) Gillian has \$10,000 to invest in a mutual fund. The average annual rate of return for the past five years was 12.25%. Assuming this rate, determine how long it will take for her investment to double. 37) _____
 A) 6 yr B) 4 yr C) 3 yr D) 12 yr
- 38) Suppose that \$4000 is invested at an interest rate of 5.6% per year, compounded continuously. What is the doubling time? 38) _____
 A) 12.4 yr B) 2 yr C) 11.4 yr D) 13.4 yr

- 39) The half-life of silicon-32 is 710 years. If 70 grams is present now, how much will be present in 400 years? (Round your answer to three decimal places.) 39) _____
 A) 0 B) 67.319 C) 1.41 D) 47.37
- 40) The half-life of plutonium-234 is 9 hours. If 40 milligrams is present now, how much will be present in 5 days? (Round your answer to three decimal places.) 40) _____
 A) 0.85 B) 27.215 C) 0.004 D) 15.874
- 41) A fossilized leaf contains 7% 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. 41) _____
 A) 36,553 B) 585 C) 21,446 D) 15,693
- 42) A sample of 200 grams of radioactive substance decays according to the function $A(t) = 200e^{-0.025t}$, where t is the time in years. How much of the substance will be left in the sample after 50 years? Round to the nearest whole gram. 42) _____
 A) 1 g B) 57 g C) 2625 g D) 0 g
- 43) There are currently 61 million cars in a certain country, decreasing exponentially by 0.7% annually. How many years will it take for this country to have 43 million cars? Round to the nearest year. 43) _____
 A) 26 yr B) 18 yr C) 50 yr D) 413 yr
- 44) The number of acres in a landfill is given by the function $B = 6400e^{-0.04t}$, where t is measured in years. How many acres will the landfill have after 2 years? (Round to the nearest acre.) 44) _____
 A) 5908 B) 5323 C) 16,165 D) 7020
- 45) A bacterial culture has an initial population of 10,000. If its population declines to 6000 in 8 hours, what will it be at the end of 10 hours? Assume that the population decreases according to the exponential model. 45) _____
 A) 5281 B) 2000 C) 2641 D) 5061
- 46) A bacterial culture has an initial population of 10,000. If its population declines to 6000 in 2 hours, when will its population be 3600? Assume that the population decreases according to the exponential model. 46) _____
 A) after 5 hr B) after 9 hr C) after 4 hr D) after 7 hr
- 47) The logistic growth model $P(t) = \frac{1210}{1 + 39.33e^{-0.321t}}$ represents the population of a bacterium in a culture tube after t hours. What was the initial amount of bacteria in the population? 47) _____
 A) 29 B) 31 C) 35 D) 30
- 48) The logistic growth model $P(t) = \frac{1000}{1 + 19e^{-0.358t}}$ represents the population of a bacterium in a culture tube after t hours. When will the amount of bacteria be 620? 48) _____
 A) 4.01 hr B) 6.89 hr C) 9.59 hr D) 1.3 hr

49) The logistic growth model $P(t) = \frac{320}{1 + 52.33e^{-0.194t}}$ represents the population of a species introduced into a new territory after t years. When will the population be 70? 49) _____
A) 2.26 yr B) 13.84 yr C) 3.53 yr D) 12.57 yr

50) The logistic growth model $P(t) = \frac{260}{1 + 64e^{-0.175t}}$ represents the population of a species introduced into a new territory after t years. What will the population be in 20 years? 50) _____
A) 89 B) 135 C) 260 D) 99