

Adv. Algebra 2 – Concept Quiz

Name: *key

Date: _____ Period: _____

Form A

27. The Definition of a Log

a) Evaluate.

a) $\log_3(81)$

$$3^x = 81$$

$$x = 4$$

b) $\log_{27}\left(\frac{1}{3}\right)$

$$27^x = \frac{1}{3}$$

$$x = -\frac{1}{3}$$

c) $\log\left(\frac{1}{10,000}\right)$

$$10^x = \frac{1}{10,000}$$

$$x = -4$$

d) $\log_9(3)$

$$9^x = 3$$

$$x = \frac{1}{2}$$

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Form B

27. The Definition of a Log

a) Evaluate.

a) $\log_6(216)$

$$6^x = 216$$

$$x = 3$$

b) $\log_{49}\left(\frac{1}{7}\right)$

$$49^x = \frac{1}{7}$$

$$x = -\frac{1}{2}$$

c) $\log\left(\frac{1}{100}\right)$

$$10^x = \frac{1}{100}$$

$$x = -2$$

d) $\log_{81}(3)$

$$81^x = 3$$

$$x = \frac{1}{4}$$

Adv. Algebra 2 – Concept Quiz

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Form A

25. Compound Interest

Ashley invested \$19,000 in an account paying an interest rate of 4.7% compounded continuously. Assuming no deposits or withdrawals are made, how much money, to the nearest hundred dollars, would be in the account after 9 years?

$$A = Pe^{rt} \quad A = 19000 e^{0.047(9)} \approx \boxed{\$29,000}$$

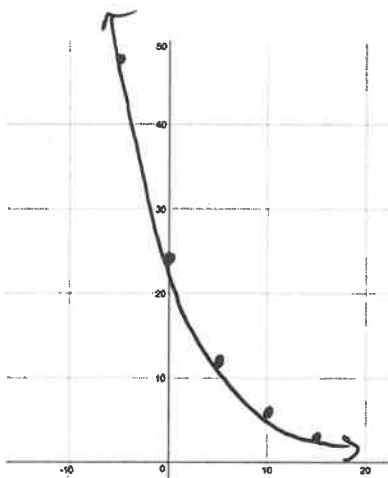
Brandon invested \$31,000 in an account paying an interest rate of 3.5% compounded daily. Assuming no deposits or withdrawals are made, how much money, to the nearest cent, would be in the account after 9 years?

$$A = P\left(1 + \frac{r}{n}\right)^{nt} \quad A = 31000 \left(1 + \frac{0.035}{365}\right)^{365 \cdot 9} \approx \boxed{\$42,477.40}$$

26. Graphs of Exponential Functions

$$y = 24 \left(\frac{1}{2}\right)^{\frac{x}{5}}$$

| x | y |
|-----|----|
| -10 | 96 |
| -5 | 48 |
| 0 | 24 |
| 5 | 12 |
| 10 | 6 |
| 15 | 3 |



As x increases by 5,
 the y-values increase/decrease
 by a factor of 2.

The y-values are increasing/
decreasing at an increasing/
decreasing rate.

Exponential Growth or Decay

| | | |
|-----------------------------|--|--------------------------|
| Domain: $(-\infty, \infty)$ | Horizontal Asymptote: $y = 0$ | x-intercept: <u>None</u> |
| Range: $(0, \infty)$ | End Behavior: $\text{as } x \rightarrow \infty, y \rightarrow 0$ $\text{as } x \rightarrow -\infty, y \rightarrow \infty$ | y-intercept: $(0, 24)$ |

28. Solving Exponential Equations

1. Solve for x, rounding to the nearest hundredth.

$$1100 \cdot 3^x = 100$$

$$3^x = \frac{100}{1100}$$

$$\log_3\left(\frac{1}{11}\right) = x$$

$$\boxed{x \approx 2.18}$$

2. Element X decays radioactively with a half life of 11 minutes. If there are 650 grams of Element X, how long, to the nearest tenth of a minute, would it take the element to decay to 33 grams?

$$33 = 650 \left(\frac{1}{2}\right)^{\frac{x}{11}}$$

$$\frac{33}{650} = \left(\frac{1}{2}\right)^{\frac{x}{11}}$$

$$11 \cdot \log_{1/2}\left(\frac{33}{650}\right) = \frac{x}{11} \cdot 11$$

$$x = 11 \cdot \log_{1/2}\left(\frac{33}{650}\right) \approx \boxed{47.3 \text{ mins}}$$

Adv. Algebra 2 – Concept Quiz

Form B

Name: Xkey

Date: _____ Period: _____

25. Compound Interest

Stella invested \$57,000 in an account paying an interest rate of 1.6% compounded quarterly. Assuming no deposits or withdrawals are made, how much money, to the nearest hundred dollars, would be in the account after 13 years?

$$A = P \left(1 + \frac{r}{n}\right)^{nt} \quad A = 57000 \left(1 + \frac{0.016}{4}\right)^{4 \cdot 13} \approx \boxed{\$70,200}$$

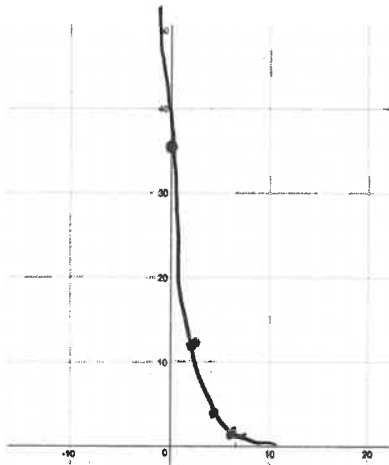
Zachary invested \$2,100 in an account paying an interest rate of 4% compounded continuously. Assuming no deposits or withdrawals are made, how much money, to the nearest dollar, would be in the account after 15 years?

$$A = Pe^{rt} \quad A = 2100 e^{0.04 \cdot 15} \approx \boxed{\$3,826}$$

26. Graphs of Exponential Functions

$$y = 36 \left(\frac{1}{3}\right)^{\frac{x}{2}}$$

| x | y |
|----|---------------|
| -4 | 324 |
| -2 | 108 |
| 0 | 36 |
| 2 | 12 |
| 4 | 4 |
| 6 | $\frac{4}{3}$ |



As x increases by 2,
the y-values increase/decrease
by a factor of 3.

The y-values are increasing/
decreasing at an increasing/
decreasing rate.

Exponential Growth or Decay

Domain: $(-\infty, \infty)$

Range: $(0, \infty)$

Horizontal Asymptote:

$$y = 0$$

End Behavior: as $x \rightarrow \infty, y \rightarrow 0$
as $x \rightarrow -\infty, y \rightarrow \infty$

x-intercept:

None

y-intercept:

$(0, 36)$

28. Solving Exponential Equations

1. Solve for x, rounding to the nearest hundredth.

$$\frac{18 \cdot 2^{5x}}{18} = \frac{216}{18}$$

$$2^{5x} = 12$$

$$\frac{\log_2(12)}{\frac{5}{5}} = \frac{5x}{5}$$

$$\boxed{x \approx 0.72}$$

2. A person invests 4000 dollars in a bank. The bank pays 5.25% interest compounded semi-annually. To the nearest tenth of a year, how long must the person leave the money in the bank until it reaches 10800 dollars?

$$10800 = \frac{4000}{4000} \left(1 + \frac{0.0525}{2}\right)^{2t}$$

$$2.7 = (1.02625)^{2t}$$

$$\frac{\log_{1.02625}(2.7)}{\frac{2}{2}} = \frac{2t}{2}$$

$$\boxed{t \approx 19.2 \text{ years}}$$