UNIT 2 REVIEW #1 Name: Key
CP Pre-Calculus

Solve the following radical equations. Be sure to check for extraneous solutions.

Reminders: Isolate one radical. If there are two radicals, put one on each side of the equation.

1) $\sqrt[3]{x+3}+5=8$

$\sqrt[3]{x+3} = 3$

$x+3 = 27$

$x = 24$ ✓

$\sqrt[3]{27}+5 \stackrel{?}{=} 8$

$3+5=8$ ✓

2) $\sqrt{5y-7}+7=3$

$\sqrt{5y-7} = -4$

$\emptyset$

$\sqrt{\ } \neq$ negative

no solution

3) $\sqrt{x^2-6x}-x=-10$

$\sqrt{x^2-6x} = x-10$

$x^2-6x = (x-10)^2$

$x^2-6x = x^2-20x+100$

$14x = 100$

$x = \frac{100}{14}$

$x = \frac{50}{7}$ ✓

4) $\sqrt{g^2+2g}-\sqrt{2g^2-8}=0$

$\sqrt{g^2+2g} = \sqrt{2g^2-8}$

$g^2+2g = 2g^2-8$

$0 = g^2-2g-8$

$0 = (g-4)(g+2)$

$g=4$ ✓ $g=-2$ ✓

FORMULAS

$A = P(1+\frac{r}{n})^{nt}$

$A = Pe^{rt}$

$A = A_0 e^{kt}$

$y = ab^x$

$y = a(1 \pm r)^x$

5. Jill deposits $2000 into an account that pays 4% interest compounded quarterly. What will her ending balance be after 12 years?

$A = P(1 + \frac{r}{n})^{nt}$

$n = 4$
$r = .04$
$t = 12$
$P = 2000$

$A = 2000(1 + \frac{.04}{4})^{48}$

$A = \$3224.45$

6. Your aunt wants you to have $22,000 on your 21st Birthday. If your account earns 6.25% interest compounded continuously, how much must she deposit on the day you are born?

$A = Pe^{rt}$

$22{,}000 = Pe^{[.0625(21)]}$

$22{,}000 = 3.7155P$

$\frac{22{,}000}{3.7155} = P$

$\$5921.14$

7. Write an exponential model that passes through the points (1, 2000) and (4, 2) BY HAND

$y = 2000\left(\frac{1}{10}\right)^x$

① Pick one point. Sub in for x and y into $y = ab^x$. Solve for a.

(1, 2000)

$2000 = ab^1$

$\frac{2000}{b} = a$

$\frac{1}{1000} = b^3$

$\frac{1}{10} = b$

③ Find

$a = \frac{2000}{b}$

$a = 2000 \div \frac{1}{10}$

$a = 20000$

② Sub in x and y from 2nd point, and "a" expression into $y = ab^x$

$2 = \frac{2000}{b} \cdot b^4$

$2 = 2000b^3$

8. Given the formula $A = 1000e^{.043t}$ models the change in population in the town of Nowhereville from 2000 on, with t = number of years since 2000.

A. What was the population of Nowhereville in 2000? → $t = 0$

Initial population = A_0 1000 people.

B. Is the population growing or declining?

Growing $r = .043 = \uparrow 4.3\%$

C. By what percent is the population changing?

4.3%

D. According to this model, what will the population be in 2017?

2017 → $t = 17$

$A = 1000e^{.043 \cdot 17} =$ 2077 people

E. According to this model, in what year will the population reach double of what it was in 2000?

$\therefore A = 2000$

$\frac{2000}{1000} = \frac{1000e^{.043t}}{1000}$

$2 = e^{.043t}$

$y_1 = 2$

$y_2 = e^{.043t}$

Xmin = 0
Xmax = 20
Ymin = 0
Ymax = 4
Yscale = .5
CALC
INTERSECT
16.11
∴ 2016

9. Determine if each function represents growth or decay.

a. $y = 8(2)^x$ **b.** $y = 0.9(1/4)^x$ **c.** $y = 5(0.4)^x$

Growth $b = 2$ decay $b = \frac{1}{4}$ decay $b = .4$

10. Write a problem that could be modeled by the equation

A. $y = 1000(.97)^t$

A town with a pop. of 1000 is ↓ by 3% per year.

B. $A = 100e^{.062t}$

The initial # of bacteria is 100. If the population grows by 6.2% per hour, how many will there be in t hours?

10. Evaluate - no calculator.

(a) $\log_3 (1/27) = x$

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

$x = -3$

(b) $\log \sqrt{10}$

$\log 10^{1/2} = x$

$10^x = 10^{1/2}$

$x = 1/2$

(c) $\log_5 0.2$

$\log 5^{\frac{1}{5}} = x$

$5^x = \frac{1}{5}$

$x = -1$

d). ln1

$\log_e 1 = x$

$e^x = 1$

$x = 0$

(e) $\ln e^6 =$

$\log_e e^6 = 6$

(f) $3^{\log_3 8}$

$= 8$

SOLVE: Be sure to check for extraneous solutions as needed. The base in a log equation can never be negative. The argument in a log equation can never be negative. ☺

9. Solve: $4^{x^3} = \frac{1}{16}$

same base

$4^{x^3} = 4^{-2}$

$x^3 = -2$

$x = \sqrt[3]{-2}$

10. $3^{3n} = (1/81)$

$3^{3n} = 3^{-4}$

$3n = -4$

$n = -4/3$

11. $\log_x 25 = -2/3$

$\left(x^{-\frac{2}{3}}\right)^{-3/2} = (25)^{-3/2}$

$x = \left(\frac{1}{25}\right)^{3/2} = \left(\sqrt{\frac{1}{25}}\right)^3$

$= \left(\frac{1}{5}\right)^3 = \frac{1}{125}$

12. $\log_4 x = -.5$

$4^{-1/2} = x$

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

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

$a > 0$ ∴ can't be neg.

13) $\log_8 (x-5) = \frac{2}{3}$

$8^{\frac{2}{3}} = x - 5$

$4 = x - 5$

$9 = x$ ✓

14) $\log_{\frac{5}{2}} \frac{4}{25} = x$

$\left(\frac{5}{2}\right)^x = \frac{4}{25}$

$\left(\frac{5}{2}\right)^x = \left(\frac{2}{5}\right)^2 = \left(\frac{5}{2}\right)^{-2}$

$x = -2$

15. $\log_9 (8-r) = \log_9 (-3r)$

$8 - r = -3r$

$8 = -2r$

$-4 = r$ ∅

oh no! it makes argument, 8-r, neg

16. $\log (3x+2) = \log (2x-1)$

$3x + 2 = 2x - 1$

$x = -3$

∴ ∅

makes arg. negative