**Trig/PreCalculus**
**Chapter 11 Practice Test**

**Name:** Key

1. Evaluate $(9^{\frac{1}{2}} + 216^{\frac{1}{3}})^{-\frac{1}{2}}$.

$(3+6)^{-1/2} = 9^{-1/2}$

$= \frac{1}{\sqrt{9}} = \boxed{\frac{1}{3}}$

2. Simplify $\left(\frac{32x^4y^4}{4x^{-2}y}\right)^{\frac{2}{3}}$.

$= (8x^6y^3)^{2/3} = 8^{2/3}x^4y^2$

$= \boxed{4x^4y^2}$

3. Express $\sqrt[3]{27x^4y^6}$ using rational exponents.

$27^{1/3} x^{4/3} y^{6/3}$

$= \boxed{3x^{4/3}y^2}$

4. Express $(2x^2)^{\frac{1}{3}}(2x)^{\frac{1}{2}}$ using radicals.

$= (2x^2)^{2/6}(2x)^{3/6}$

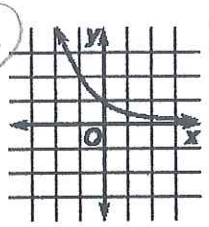
$= \sqrt[6]{(2x^2)^2(2x)^3}$

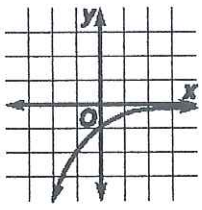
$= \sqrt[6]{4x^4 8x^3}$

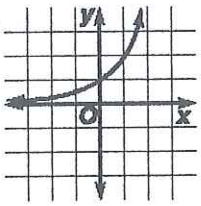
$= \sqrt[6]{32x^7}$ or $|x|\sqrt[6]{32x}$

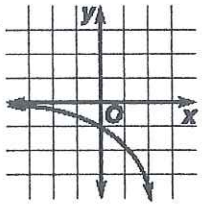
5. Choose the graph of $y = 2^{-x}$.

5. A

A. 

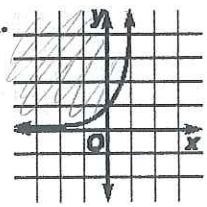

B. 

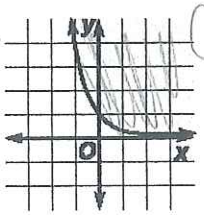

C. 


D. 

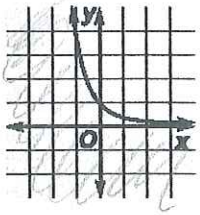

6. Choose the graph of $y \leq 4^x$.

6. C

A. 

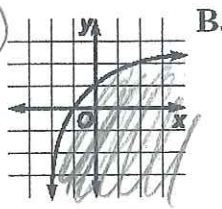

B. 

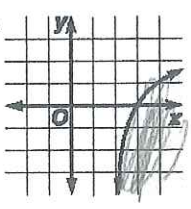

C. 

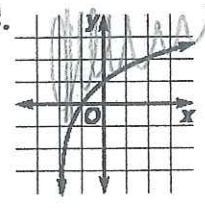

D. 

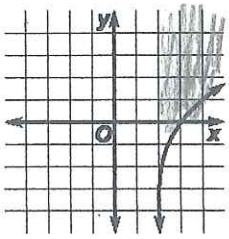

7. Choose the graph of $y \leq \log_2(x+2)$.

7. A

A. 


B. 


C. 


D. 

8. A 1991 report estimated that there were 640 salmon in a certain river. If the population is decreasing exponentially at a rate of 4.3% per year, what is the expected population in 2002?

$N = N_0(1-r)^t$

$N = 640(1-0.043)^{11}$

2002 − 1991

$11 = t$

N = 395 salmon

9. Compare the balance after 12 years of a $4000 investment earning 9% interest that is compounded continuously to the same investment compounded monthly.

$A = Pe^{rt}$

$= 4000e^{(0.09)(12)}$

$= \$11778.72$

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

$= 4000(1+\frac{0.09}{12})^{12(12)}$

1.0075

$= \$11731.35$

Continuously is $47.37 more than Monthly

10. Write $16^{\frac{3}{4}} = 8$ logarithmic form.

$\log_{16} 8 = \frac{3}{4}$

11. Evaluate $\log_4 \frac{1}{64} = x$

$4^x = \frac{1}{64}$

$4^x = 64^{-1}$

$4^x = (4^4)^{-1}$

$4^x = 4^{-4}$ $\quad x = -4$

12. Solve $\log_2(x+6) + \log_2 3 = 2\log_2 6$.

$\log_2(x+6)(3) = \log_2 6^2$

$(x+6)(3) = 6^2$

$3x + 18 = 36$

$3x = 18$

$x = 6$

13. Evaluate $\log_4 48 - \log_4 x = \log_4 8$.

$\log_4 \frac{48}{x} = \log_4 8$

$\frac{48}{x} = 8$

$x = 48(8) = 384$

14. Evaluate $\log_2(2x) = \log_2(4x-10)$.

$2x = 4x - 10$

$10 = 2x$

$5 = x$

15. Find the value of $\log_3 92.4$ using the change of base formula.

$$\frac{\log 92.4}{\log 3} = 4.1199$$

16. Solve $6^{x-1} = 8^{2-x}$ using common logarithms.

$$(x-1)\log 6 = (2-x)\log 8$$
$$x\log 6 - \log 6 = 2\log 8 - x\log 8$$
$$+x\log 8 \quad +\log 6 \quad +\log 6 + x\log 8$$
$$x\log 6 + x\log 8 = 2\log 8 + \log 6$$
$$x(\log 6 + \log 8) = 2\log 8 + \log 6$$
$$x = \frac{2\log 8 + \log 6}{\log 6 + \log 8}$$
$$x = 1.5371$$

17. Convert $\log_5 156$ to a natural logarithm and evaluate.

$$\frac{\ln 156}{\ln 5} = 3.1377$$

18. Solve $\frac{10(6 - e^{4x})}{10} < \frac{40}{10}$ by using natural logarithms.

$$6 - e^{4x} < 4$$
$$-e^{4x} < -2$$
$$e^{4x} > 2$$
$$4x \ln e > \ln 2$$
$$4x > \ln 2$$
$$x > \frac{\ln 2}{4}$$
$$x > 0.1733$$

19. Find the amount of time in years required for an investment to double at a rate of 6.2% if the interest is compounded continuously.

$$t = \frac{\ln 2}{r} = \frac{\ln 2}{0.062} = 11.2 \text{ years}$$

20. If your Grandparents left you an inheritance of $25,000, what average annual investment rate would be necessary for you to accumulate $1 million in a mutual fund at retirement in 45 years?

$$1{,}000{,}000 = 25{,}000\, e^{r \cdot 45}$$
$$40 = e^{45r}$$
$$\ln 40 = 45r \ln e$$
$$r = \frac{\ln 40}{45} = 0.082$$

8.2%