

Final Exam Review 3 of 4

$$\log_b Y = X$$

$$b^X = Y$$

1. $x^{\frac{1}{2}} = 6$
 $(\sqrt{x})^2 = (6)^2$
 $x = 36$

2. $4^{x+1} = 8$
 $(2^2)^{x+1} = (2^3)$
 $2x+2 = 3$
 $2x = 1$
 $x = \frac{1}{2}$

3. $\log\left(\frac{x+2}{x+1}\right) = \log 4$
 $\frac{x+2}{x+1} = \frac{4}{1}$
 $x+2 = 4x+4$
 $-2 = 3x$
 $-\frac{2}{3} = x$

4. $10^9 = x$
 $1000000000 = x$

6. $5^x = 12$
 $x \frac{\log 5}{\log 5} = \frac{\log 12}{\log 5}$
 $x = 1.54$

7. $x-3 = -6x-4$
 $+6x \quad +6x$
 $7x-3 = -4$
 $+3 \quad +3$
 $7x = -1$
 $\frac{7x}{7} = \frac{-1}{7}$
 $x = -\frac{1}{7}$

8. $25^{3v} = 625^{3v-1}$
 $(5^2)^{3v} = (5^4)^{3v-1}$
 $2(3v) = 4(3v-1)$
 $6v = 12v-4$
 $-12v \quad -12v$
 $-6v = -4$
 $-\frac{6v}{-6} = \frac{-4}{-6}$
 $v = \frac{2}{3}$

9. $x^{\frac{3}{2} \cdot \frac{2}{3}} = 27^{\frac{2}{3}}$
 $x = 27^{\frac{2}{3}}$
 $x = (\sqrt[3]{27})^2$
 $x = (3)^2$
 $x = 9$

$$10. \log \frac{2X}{4} = 6$$

$$10^6 = \frac{2X}{4}$$

$$1000000 = \frac{2X}{4}$$

$$\frac{4000000}{2} = \frac{2X}{2}$$

$$\boxed{2000000 = X}$$

$$11. 3^{X+1} = 10$$

$$\frac{X+1 \log 3}{\log 3} = \frac{\log 10}{\log 3}$$

$$X+1 = 2.696$$

$$\boxed{X = 1.696}$$

$$12. \log_8 3 = X$$

$$8^X = 3$$

$$\frac{X \log 8}{\log 8} = \frac{\log 3}{\log 8}$$

$$\boxed{X = .5283}$$

$$13. \log_3 x^2 - \log_3 y^3 + \log_3 z^8$$

$$\boxed{\log_3 \frac{x^2 z^8}{y^3}}$$

$$15. \log \frac{16x^{12}}{y^4}$$

$$\boxed{\log 16 + 12 \log x - 4 \log y}$$

$$16. A. \frac{\overset{3}{\cancel{6}x}(\cancel{x-4})}{x(\cancel{x-5})(x+3)} \cdot \frac{(\cancel{x-3})(\cancel{x-5})}{2(\cancel{x-4})(\cancel{x-3})}$$

$$\boxed{\frac{-3}{x+3}}$$

$$B. \frac{(x+8)(\cancel{x+2})}{(\cancel{x-8})(\cancel{x+2})} \cdot \frac{(\cancel{x-8})(\cancel{x+8})}{x+8}$$

$$\boxed{x+8}$$

$$C. \frac{108x^3y}{24x^2y^3} = \boxed{\frac{9x}{2y^2}}$$

$$D. \frac{(x-4)(\cancel{x-4})}{2(\cancel{x+1})} \cdot \frac{(x-6)(\cancel{x+1})}{(\cancel{x-4})(x-2)}$$

$$\boxed{\frac{(x-4)(x-6)}{2(x-2)}}$$

$$17. a. \frac{(x^2-4)}{x+2} = \frac{1}{3}$$

$$3(x^2-4) = x+2$$

$$\begin{array}{r} 3x^2 - 12 = x + 2 \\ -x - 2 \quad -x - 2 \\ \hline \end{array}$$

$$3x^2 - x - 14 = 0$$

$$(3x - 7)(x + 2) = 0$$

$$3x - 7 = 0 \quad x + 2 = 0$$

$x = 7/3$	$x = -2$
-----------	----------

$$b. \frac{1}{x-1} + \frac{1}{x+2} = \frac{1}{2}$$

$$\text{LCD: } 2(x-1)(x+2)$$

$$\frac{2(x+2)}{2(x-1)(x+2)} + \frac{2(x-1)}{2(x-1)(x+2)} = \frac{(x-1)(x+2)}{2(x-1)(x+2)}$$

$$2x+4 + 2x-2 = x^2 + x - 2$$

$$4x+2 = x^2 + x - 2$$

$$\begin{array}{r} -4x - 2 \quad -4x - 2 \\ \hline \end{array}$$

$$0 = x^2 - 3x - 4$$

$$0 = (x-4)(x+1)$$

$$x-4=0 \quad x+1=0$$

$x = 4$	$x = -1$
---------	----------

$$c. \frac{3}{x+4} - 2 = \frac{5}{x+4}$$

$$\text{LCD: } x+4$$

$$\frac{3}{x+4} - \frac{2(x+4)}{x+4} = \frac{5}{x+4}$$

$$3 - 2x - 8 = 5$$

$$-2x - 5 = 5$$

$$\begin{array}{r} +5 \quad +5 \\ \hline \end{array}$$

$$-2x = 10$$

$$\begin{array}{r} -2 \quad -2 \\ \hline \end{array}$$

$x = -5$

$$d. \frac{3}{x+1} + \frac{5}{x-1} = \frac{8}{(x+1)(x-1)}$$

$$\text{LCD: } (x+1)(x-1)$$

$$\frac{3(x-1)}{(x+1)(x-1)} + \frac{5(x+1)}{(x+1)(x-1)} = \frac{8}{(x+1)(x-1)}$$

$$3x - 3 + 5x + 5 = 8$$

$$8x + 2 = 8$$

$$\begin{array}{r} -2 \quad -2 \\ \hline \end{array}$$

$$\frac{8x}{8} = \frac{6}{8}$$

$x = \frac{3}{4}$

18. A. hole: none
VA: $x=3$

B. $\frac{(x+2)}{(x-2)(x+2)}$
hole: $x=-2$
V.A: $x=2$

19. $f(x) = (x-2)^2 + 1$
 $(x-2)(x-2) + 1$
 $x^2 - 4x + 4 + 1$
 $x^2 - 4x + 5$

f	f^{-1}
$(0, 5)$	$(5, 0)$
$(1, 2)$	$(2, 1)$
$(2, 1)$	$(1, 2)$
$(3, 2)$	$(2, 3)$
$(4, 5)$	$(5, 4)$

Domain: \mathbb{R}
Range: $y \geq 1$

Domain: $x \geq 1$
Range: \mathbb{R}

