

# Mr. Ward Answer Key

## Practice B Worksheet

1.  $5^{2x} = 20$

$$\log 5^{2x} = \log 20$$

$$2x \log 5 = \log 20$$

$$2x = \log 20 / \log 5$$

$$x = 0.93$$

2.  $12^{2x-8} = 15$

$$\log 12^{2x-8} = \log 15$$

$$(2x-8) \log 12 = \log 15$$

$$2x-8 = \log 15 / \log 12$$

$$x = 4.54$$

3.  $2^{x+6} = 4$

$$\log 2^{x+6} = \log 4$$

$$(x+6) \log 2 = \log 4$$

$$x+6 = \log 4 / \log 2$$

$$x = -4$$

4.  $16^{5x} = 64^{x+7}$

$$\log 16^{5x} = \log 64^{x+7}$$

$$5x \log 16 = (x+7) \log 64$$

$$5x/x+7 = \log 64 / \log 16$$

$$\frac{5x}{x+7} = 1.5$$

$$5x = 1.5(x+7)$$

$$5x = 1.5x + 10.5$$

$$3.5x = 10.5$$

$$x = 3$$

5.  $243^{0.2x} = 81^{x+5}$

$$\log 243^{0.2x} = \log 81^{x+5}$$

$$0.2x \log 243 = (x+5) \log 81$$

$$0.2x = (x+5) \log 81 / \log 243$$

$$0.2x = (x+5) 0.8$$

$$0.2x = 0.8x + 4$$

$$-0.6x = 4$$

$$x = -6\frac{2}{3}$$

6.  $25^x = 125^{x-2}$

$$\log 25^x = \log 125^{x-2}$$

$$x \log 25 = (x-2) \log 125$$

$$x = (x-2) \log 125 / \log 25$$

$$x = (x-2) 1.5$$

$$x = 1.5x - 3$$

$$-0.5x = -3$$

$$x = 6$$

$$7. \left(\frac{1}{2}\right)^x = 16^2$$

$$\left(\frac{1}{2}\right)^x = 256$$

$$\log \frac{1}{2}^x = \log 256$$

$$x \log \frac{1}{2} = \log 256$$

$$x = \log 256 / \log \frac{1}{2}$$

$$x = -8$$

$$8. \left(\frac{1}{32}\right)^{2x} = 64$$

$$\log \frac{1}{32}^{2x} = \log 64$$

$$2x \log \frac{1}{32} = \log 64$$

$$2x = \log 64 / \log \frac{1}{32}$$

$$x = -0.6$$

$$9. \left(\frac{1}{27}\right)^{x-6} = 27$$

$$\log \frac{1}{27}^{x-6} = \log 27$$

$$(x-6) \log \frac{1}{27} = \log 27$$

$$x-6 = \log 27 / \log \frac{1}{27}$$

$$x = 5$$

$$10. \log_4 X^5 = 20$$

$$5 \log_4 X = 20$$

$$\log_4 X = 20/5$$

$$\log_4 X = 4$$

$$4^4 = X$$

$$X = 256$$

$$11. \log_3 X^6 = 12$$

$$6 \log_3 X = 12$$

$$\log_3 X = 2$$

$$3^2 = X$$

$$X = 9$$

$$12. \log_4 (x-6)^3 = 6$$

$$3 \log_4 (x-6) = 6$$

$$\log_4 (x-6) = 2$$

$$4^2 = x-6$$

$$16 = x-6$$

$$x = 22$$

$$13. \log x - \log 10 = 14$$

$$\log \frac{x}{10} = 14$$

$$10^{14} = \frac{x}{10}$$

$$x = 10^{15}$$

$$14. \log x + \log 5 = 2$$

$$\log 5x = 2$$

$$10^2 = 5x$$

$$100 = 5x$$

$$x = 20$$

## Practice B Worksheet

15.  $\log(x+9) = \log(2x-7)$

$$x+9 = 2x-7$$

$$x+16 = 2x$$

$$x = 16$$

16.  $\log(x+4) - \log 6 = 1$

$$\log \frac{x+4}{6} = 1$$

$$10^1 = \frac{x+4}{6}$$

$$60 = x+4$$

$$x = 56$$

17.  $\log x^2 + \log 25 = 2$

$$\log 25x^2 = 2$$

$$10^2 = 25x^2$$

$$100 = 25x^2$$

$$4 = x^2$$

$$x = \pm 2$$

18.  $\log(x-1)^2 = \log(-5x-1)$

$$(x-1)^2 = (-5x-1)$$

$$x^2 - 2x + 1 = -5x - 1$$

$$+5x + 1 \quad +5x + 1$$

$$x^2 + 3x + 2 = 0$$

$$(x+2)(x+1) = 0$$

$$x = -2, -1$$

22.  $P = C(1-0.07)^t$

$$P = 8500(.93)^t$$

What  $t$  value gets us below 6,000?

$$P(5) = 8500(.93)^5$$

$$P(5) = 5913$$

Prüfung B Wirtschaft

$$14. \log(x+1) = \log(2x-3) \quad | \log(x+1) - \log(2x-3) = 0$$

$$\log \frac{x+1}{2x-3} = 0$$

$$\frac{x+1}{2x-3} = 1$$

$$x+1 = 2x-3$$

$$x = 4$$

$$15. \log x^2 + \log 2 = 5$$

$$\log 2x^2 = 5$$

$$10^{\log 2x^2} = 10^5$$

$$2x^2 = 100000$$

$$x^2 = 50000$$

$$x = \pm \sqrt{50000}$$

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

$$\log \frac{1-x}{1-2x} = 0$$

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

$$1-x = 1-2x$$

$$x = 0$$

$$17. \log(1-0.05) = 0$$

$$1-0.05 = 1$$

100% + 5% = 105%

$$1.05 = 1.05$$

$$x = 0.05$$

# Mr. Ward Answer Key

## Practice C Worksheet

1.  $16^{3x} = 8^{x+6}$

$$\log 16^{3x} = \log 8^{x+6}$$

$$3x \log 16 = (x+6) \log 8$$

$$3x = (x+6) \log 8 / \log 16$$

$$3x = (x+6) 0.75$$

$$3x = 0.75x + 4.5$$

$$2.25x = 4.5$$

$$x = 2$$

2.  $\log_2 x^6 = 3$

$$6 \log_2 x = 3$$

$$\log_2 x = 1/2$$

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

$$x = 1.41$$

3.  $12^{x-1} = 20^2$

$$\log 12^{x-1} = \log 400$$

$$(x-1) \log 12 = \log 400$$

$$x-1 = \log 400 / \log 12$$

$$x = 3.41$$

4.  $9^{2x} = 27^{x+4}$

$$\log 9^{2x} = \log 27^{x+4}$$

$$2x \log 9 = (x+4) \log 27$$

$$2x = (x+4) \log 27 / \log 9$$

$$2x = (x+4) 1.5$$

$$2x = 1.5x + 6$$

$$0.5x = 6$$

$$x = 12$$

6.

$$216^{x/3} = 36^{2x+3}$$

$$\log 216^{x/3} = \log 36^{2x+3}$$

$$\left(\frac{x}{3}\right) \log 216 = (2x+3) \log 36$$

$$\left(\frac{x}{3}\right) = (2x+3) \log 36 / \log 216$$

$$\left(\frac{x}{3}\right) = (2x+3) 2/3$$

$$x/3 = 4/3x + 2$$

$$-x = 2$$

$$x = -2$$

5.  $256^{0.5x} = 64^{2x+5}$

$$\log 256^{0.5x} = \log 64^{2x+5}$$

$$0.5x \log 256 = (2x+5) \log 64$$

$$0.5x = (2x+5) \log 64 / \log 256$$

$$0.5x = (2x+5) 0.75$$

$$0.5x = 1.5x + 3.75$$

$$-x = 3.75$$

$$x = -3.75$$

$$7. \left(\frac{1}{9}\right)^{3x} = 27$$

$$\log \frac{1}{9}^{3x} = \log 27$$

$$3x \log \frac{1}{9} = \log 27$$

$$3x = \frac{\log 27}{\log \frac{1}{9}}$$

$$3x = -1.5$$

$$x = -0.5$$

$$8. \left(\frac{1}{16}\right)^{x+5} = 8^2$$

$$\log \frac{1}{16}^{x+5} = \log 64$$

$$(x+5) \log \frac{1}{16} = \log 64$$

$$x+5 = \frac{\log 64}{\log \frac{1}{16}}$$

$$x+5 = -1.5$$

$$x = -6.5$$

$$9. \left(\frac{2}{5}\right)^{8x} = \left(\frac{25}{4}\right)^2$$

$$\log \frac{2}{5}^{8x} = \log \frac{625}{16}$$

$$8x \log \frac{2}{5} = \log \frac{625}{16}$$

$$8x = \frac{\log \frac{625}{16}}{\log \frac{2}{5}}$$

$$8x = -4$$

$$x = -0.5$$

$$10. \log_5 (4x-5)^2 = 6$$

$$2 \log_5 (4x-5) = 6$$

$$\log_5 (4x-5) = 3$$

$$5^3 = 4x-5$$

$$125 = 4x-5$$

$$x = 32.5$$

$$11. \log_4 (3x+4)^5 = 15$$

$$5 \log_4 (3x+4) = 15$$

$$\log_4 (3x+4) = 3$$

$$4^3 = 3x+4$$

$$64 = 3x+4$$

$$x = 20$$

$$12. \log_3 (10x-1)^5 = 10$$

$$5 \log_3 (10x-1) = 10$$

$$\log_3 (10x-1) = 2$$

$$3^2 = 10x-1$$

$$9 = 10x-1$$

$$10 = 10x$$

$$x = 1$$

$$13. \log x - \log 8 = 3$$

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

$$10^3 = \frac{x}{8}$$

$$1000 = \frac{x}{8}$$

$$x = 8000$$

$$14. \log 5x + \log 2 = 10$$

$$\log 10x = 10$$

$$10^{10} = 10x$$

$$x = 10^9$$

## Practice C Worksheet

15.  $\log(x^2 - 9) = \log(5x + 5)$

$$\begin{aligned} x^2 - 9 &= 5x + 5 \\ -5x - 5 & \quad -5x - 5 \end{aligned}$$

$$x^2 - 5x - 14 = 0$$

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

$$x = 7, -2$$

16.  $\log(x^2 - 1) - \log 12 = 1$

$$\begin{aligned} \log \frac{x^2 - 1}{12} &= 1 \\ 10^1 &= \frac{x^2 - 1}{12} \end{aligned}$$

$$120 = x^2 - 1$$

$$121 = x^2$$

$$x = \pm 11$$

17.  $\log x^3 + \log 8 = 3$

$$\log 8x^3 = 3$$

$$10^3 = 8x^3$$

$$1000 = 8x^3$$

$$125 = x^3$$

$$x = 5$$

18.  $\log(9x + 1) - \log x^2 = 1$

$$\log \frac{9x + 1}{x^2} = 1$$

$$10^1 = \frac{9x + 1}{x^2}$$

$$10x^2 = 9x + 1$$

$$10x^2 - 9x - 1 = 0$$

$$x = 1, -0.1$$

$$\frac{9 \pm \sqrt{81 - 4(10)(-1)}}{2(10)}$$

$$\frac{9 \pm \sqrt{81 + 40}}{20}$$

$$\frac{9 \pm 11}{20}$$

22. a)  $A(t) = 9000(1 + 0.0425)^t$

b) 20 years

c)  $A(50) = 9000(1.0425)^{50}$

$$A(50) = \$72,118.34$$

Practise C Workbook

$$1 = 8x \text{ pol} - (1-x^2) \text{ pol} \quad \text{at } x=1$$

$$1 = \frac{1-8}{2} \text{ pol}$$

$$\frac{1-8}{2} = 101$$

$$1-8x = 051$$

$$8x = 151$$

$$112 = x$$

$$(2+2x) \text{ pol} = (4-x^2) \text{ pol} \quad \text{at } x=1$$

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

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

$$0 = 41 - 2 - 2x$$

$$0 = (5-x)(1-x)$$

$$5 = 1, 5 = x$$

$$1 = 2x \text{ pol} \quad (1-x^2) \text{ pol} \quad \text{at } x=1$$

$$1 = \frac{1-2}{2} \text{ pol}$$

$$\frac{1-2}{2} = 101$$

$$1+2x = 101$$

$$0 = 1 - 2x - 101$$

$$102 = x$$

$$E = 2 \text{ pol} - 2x \text{ pol} \quad \text{at } x=1$$

$$E = 2x^2 - 2x$$

$$2x^2 = 2x$$

$$2x^2 - 2x = 1001$$

$$152 = x$$

$$2 = x$$

$$(1-x)(1-x)$$

$$1-x^2$$

$$1-x^2 = 101$$

$$\frac{1-101}{-2} = 50$$

$$(1-x)(1-x) = 1-x^2$$

$$1-x^2 = 101$$

$$(1-x)(1-x) = 1-x^2$$

$$1-x^2 = 101$$