NAME Key DATE PERIOD

7-7 Skills Practice

Solving Radical Equations and Inequalities

Solve each equation or inequality.

1. $\sqrt{x} = 5$

2. $\sqrt{x} + 3 = 7$

3. $5\sqrt{j} = 1$

4. $v^{\frac{1}{2}} + 1 = 0$

5. $18 - 3y^{\frac{1}{2}} = 25$

6. $\sqrt[3]{2w} = 4$

7. $\sqrt{b - 5} = 4$

8. $\sqrt{3n + 1} = 5$

9. $\sqrt[3]{3r - 6} = 3$

10. $2 + \sqrt{3p + 7} = 6$

11. $\sqrt{k - 4} - 1 = 5$

12. $(2d + 3)^{\frac{1}{3}} = 2$

13. $(t - 3)^{\frac{1}{3}} = 2$

14. $4 - (1 - 7u)^{\frac{1}{3}} = 0$

15. $\sqrt{3z - 2} = \sqrt{z - 4}$

16. $\sqrt{g + 1} = \sqrt{2g - 7}$

17. $\sqrt{x - 1} = 4\sqrt{x + 1}$

18. $5 + \sqrt{s - 3} \leq 6$

19. $-2 + \sqrt{3x + 3} < 7$

20. $-\sqrt{2a + 4} \geq -6$

21. $2\sqrt{4r - 3} > 10$

22. $4 - \sqrt{3x + 1} > 3$

23. $\sqrt{y + 4} - 3 \geq 3$

24. $-3\sqrt{11r + 3} \geq -15$

7.7 Skills Practice Ans Key

1. $\sqrt{x} = 5$

$(\sqrt{x})^2 = 5^2$

$\boxed{x = 25}$

Check: $\sqrt{25} = 5$

$5 = 5$ ✓

2. $\sqrt{x} + 3 = 7$

$\sqrt{x} = 4$

$(\sqrt{x})^2 = 4^2$

$\boxed{x = 16}$

Check $\sqrt{16} + 3 = 7$

$4 + 3 = 7$

$7 = 7$ ✓

3. $5\sqrt{y} = 1$

$\sqrt{y} = 1/5$

$\sqrt{y} = (1/5)^2$

$\boxed{y = 1/25}$

Check $5\sqrt{1/25} = 1$

$5 \cdot 1/5 = 1$

$1 = 1$ ✓

4. $v^{1/2} + 1 = 0$

$v^{1/2} = -1$

$(v^{1/2})^2 = (-1)^2$

$v = 1$

Check: $1^{1/2} + 1 = 0$

$1 + 1 = 0$

$2 \neq 0$

$\boxed{\text{no solution}}$

5. $18 - 3y^{1/2} = 25$

$-3y^{1/2} = 7$

$(y^{1/2})^2 = (-7/3)^2$

$y = 49/9$

Check: $18 - 3(\frac{49}{9})^{1/2} = 25$

$18 - 3(7/3) = 25$

$18 - 7 = 25$

$11 \neq 25$

$\boxed{\text{no solution}}$

6. $\sqrt[3]{2w} = 4$

$(\sqrt[3]{2w})^3 = 4^3$

$2w = 64$

$\boxed{w = 32}$

Check $\sqrt[3]{2(32)} = 4$

$\sqrt[3]{64} = 4$

$4 = 4$ ✓

7. $\sqrt{b-5} = 4$

$(\sqrt{b-5})^2 = 4^2$

$b - 5 = 16$

$\boxed{b = 21}$

Check: $\sqrt{21-5} = 4$

$\sqrt{16} = 4$

$4 = 4$ ✓

8. $\sqrt{3n+1} = 5$

$(\sqrt{3n+1})^2 = 5^2$

$3n + 1 = 25$

$3n = 24$

$\boxed{n = 8}$

Check: $\sqrt{3(8)+1} = 5$

$\sqrt{25} = 5$

$5 = 5$ ✓

9. $\sqrt[3]{3r-6} = 3$

$(\sqrt[3]{3r-6})^3 = 3^3$

$3r - 6 = 27$

$3r = 33$

$\boxed{r = 11}$

Check $\sqrt[3]{3(11)-6} = 3$

$\sqrt[3]{27} = 3$

$3 = 3$ ✓

10. $2 + \sqrt{3p+7} = 6$

$(\sqrt{3p+7})^2 = 4^2$

$3p + 7 = 16$

$3p = 9$

$p = 3$

Check: $2 + \sqrt{3 \cdot 3 + 7} = 6$

$2 + \sqrt{16} = 6$

$2 + 4 = 6$

$6 = 6$ ✓

11. $\sqrt{K-4} - 1 = 5$

$(\sqrt{K-4})^2 = 6^2$

$K - 4 = 36$

$\boxed{K = 40}$

Check: $\sqrt{40-4} - 1 = 5$

$\sqrt{36} - 1 = 5$

$5 = 5$

12. $(2d+3)^{1/3} = 2$

$((2d+3)^{1/3})^3 = 2^3$

$2d + 3 = 8$

$2d = 5$

$d = 5/2$

Check: $(2 \cdot 5/2 + 3)^{1/3} = 2$

$8^{1/3} = 2$

$2 = 2$

13. $((t-3)^{1/3})^3 = (2)^3$

$t - 3 = 8$

$t = 11$

Check $(11-3)^{1/3} = 2$

$8^{1/3} = 2$

$2 = 2$

14. $4 - (1-7u)^{1/3} = 0$

$-(1-7u)^{1/3} = -4$

$((1-7u)^{1/3})^3 = 4^3$

$1 - 7u = 64$

$-7u = 63$

$u = -9$

Check

$4 - (1-7(-9))^{1/3} = 0$

$4 - (64)^{1/3} = 0$

$0 = 0$

15. $\left(\sqrt{3z-2}\right)^2 = \left(\sqrt{z-4}\right)^2$

$3z-2 = z-4$

$3z = z-2$

$2z = -2$

$z = -1$

Check:

$\sqrt{3(-1)-2} = \sqrt{-1-4}$

$\sqrt{-3} \neq \sqrt{-5}$

no solution

16. $\left(\sqrt{g+1}\right)^2 = \left(\sqrt{2g-7}\right)^2$

$g+1 = 2g-7$

$g+8 = 2g$

$\boxed{8 = g}$

Check: $\sqrt{8+1} = \sqrt{2(8)-7}$

$\sqrt{9} = \sqrt{9}$ ✓

17. $\left(\sqrt{x-1}\right)^2 = \left(4\sqrt{x+1}\right)^2$

$x-1 = 16(x+1)$

$x-1 = 16x+16$

$-17 = 15x$

$-17/15 = x$

$\sqrt{-\frac{17}{15}-1} = 4\sqrt{-17/15+1}$

$\neq$

no solution

18. $5+\sqrt{5-3} \leq 6$

1. $5-3 \geq 0$

$\underline{5 \geq 3}$

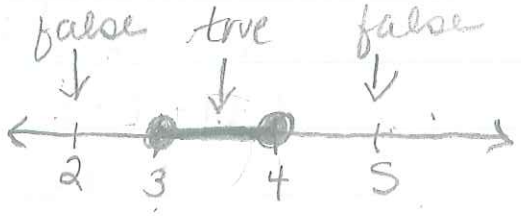
2. $5+\sqrt{5-3} \leq 6$

$\left(\sqrt{5-3}\right)^2 \leq (1)^2$

$5-3 \leq 1$

$5 \leq 4$

$3 \leq 5 \leq 4$



Check $5+\sqrt{2-3} \leq 6$ false

$5=2$ $\sqrt{-1}$

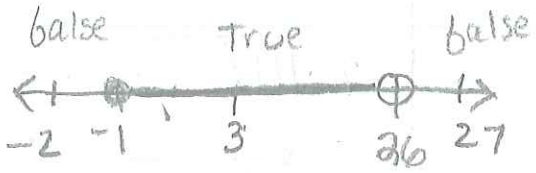
$5=3.5$ $5+\sqrt{3.5-3} \leq 6$

$5+\sqrt{.5} \leq 6$ true

$5=5$ $5+\sqrt{5-3} \leq 6$

$5+\sqrt{2} \leq 6$ false

19. $-2+\sqrt{3x+3} < 7$



1. $3x+3 \geq 0$

$3x \geq -3$

$x \geq -1$

2. $-2+\sqrt{3x+3} < 7$

$\sqrt{3x+3} < 9$

$(\sqrt{3x+3})^2 < 9^2$

$3x+3 < 81$

$3x < 78$

$x < 26$

3. Checks

$x = -2$

$-2+\sqrt{3(-2)+3} < 7$

$-2+\sqrt{-3}$ false

$x = 3$

$-2+\sqrt{9+3} < 7$

$-2+\sqrt{12} < 7$

$1.5 < 7$ true

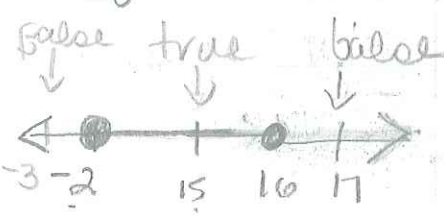
$x = 27$

$-2+\sqrt{81+3} < 7$

$7.2 \not< 7$

false

$-1 \leq x < 26$



20. $-\sqrt{2a+4} \geq -6$

$(\sqrt{2a+4})^2 \leq (6)^2$

$2a+4 \leq 36$

$2a \leq 32$

$a \leq 16$

$2a+4 \geq 0$

$2a \geq -4$

$a \geq -2$

$-2 \leq x \leq 16$

Check

$x = 15$ $-\sqrt{30+4} \geq -6$

$-5.8 \geq -6$

true

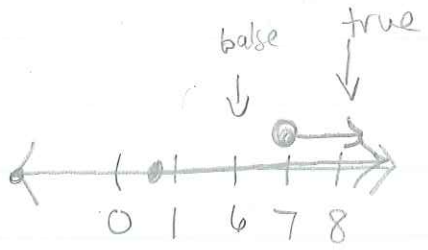
$x = -3$ $-\sqrt{-2} \geq -6$ false

$x = 17$ $-\sqrt{34+4} \geq -6$

$-6.1 \geq -6$ false

21 $2\sqrt{4r-3} > 10$

$\sqrt{4r-3} > 5$



$4r-3 \geq 0$

$4r \geq 3$

$r \geq 3/4$

$(\sqrt{4r-3})^2 > 5^2$

$4r-3 > 25$

$4r > 28$

$r > 7$

Check

$x = 6,\ x = 8$

$x=6$: $2\sqrt{4(6)-3} > 10$

$2\sqrt{21} > 10$

$9.2 > 10$ false

$x=8$: $2\sqrt{4(8)-3} > 10$

$2\sqrt{29} > 10$

$10.8 > 10$

true

$x > 7$

22. $4 - \sqrt{3x+1} > 3$

$-\sqrt{3x+1} > -1$

$\sqrt{3x+1} < 1$

$3x+1 \geq 0$

$3x \geq -1$

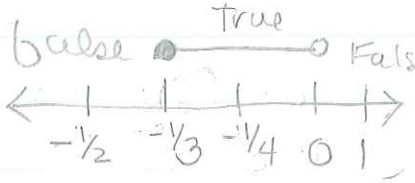
$x \geq -1/3$

$(\sqrt{3x+1})^2 < 1^2$

$3x+1 < 1$

$3x < 0$

$x < 0$



$-1/3 \leq x < 0$

Check:

$x = -1/2$

$4 - \sqrt{3(-1)+1} > 3$

$4 - \sqrt{-1} > 3$ false

$x = -1/4$ $4 - \sqrt{3(-1/4)+1} > 3$

true $3.5 > 3$

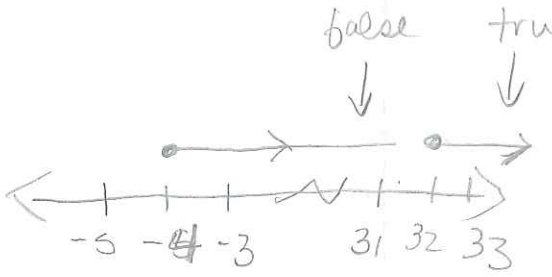
$x = 1$ $4 - \sqrt{3+1} > 3$

$4 - 2 > 3$

false

23. $\sqrt{y+4} - 3 \geq 3$

$\sqrt{y+4} \geq 6$



$y + 4 \geq 0$

$y \geq -4$

$(\sqrt{y+4})^2 \geq 6^2$

$y + 4 \geq 36$

$y \geq 32$

Check:

$y = 31$

$\sqrt{31+4} - 3 \geq 3$

$2.9 \geq 3$

false

$y = 33$

$\sqrt{33+4} - 3 \geq 3$

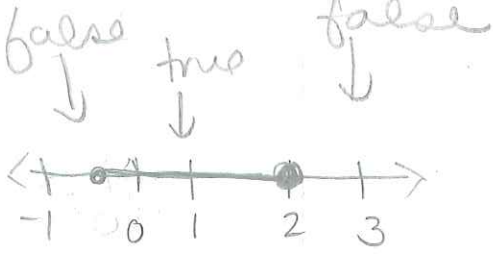
$3.1 \geq 3$

true

$y \geq 32$

24. $-3\sqrt{11r+3} \geq -15$

$\sqrt{11r+3} \leq 5$



$11r + 3 \geq 0$

$11r \geq -3$

$r \geq -3/11$

$r \geq -0.27$

$(\sqrt{11r+3})^2 \leq 5^2$

$11r + 3 \leq 25$

$11r \leq 22$

$r \leq 2$

Check:

$r = -1 \quad -3\sqrt{-11+3} \geq -15$

false

$r = 1 \quad -3\sqrt{11+3} \geq -15$

$-11.2 \geq -15$ true

$r = 3 \quad -3\sqrt{33+3} \geq -15$

$-18 \geq -15$

false

$-0.27 \leq x \leq 2$