

Review 3.1-3.4

Solve each equation. These can be linear, absolute value, quadratic, radical, or rational equations. If the equation is radical or rational, state the restrictions and extraneous solutions.

1) $3 + 3|3 + 10x| = -18$
 $-3 \qquad -3$

$3|3 + 10x| = -21$
 $|3 + 10x| = -7$
no solution

can't have negative when absolute value is isolated

2) $4x^2 = 7$

$4x^2 - 7 = 0$

Quadratic Form
 $a=4 \quad b=0 \quad c=-7$

$x = \frac{0 \pm \sqrt{0^2 - 4(4)(-7)}}{2(4)}$

$x = \frac{\sqrt{2 \cdot 2 \cdot 2 \cdot 7}}{8} = \frac{\pm 4\sqrt{7}}{8}$

$x = \frac{\sqrt{7}}{2}, \frac{-\sqrt{7}}{2}$

3) $(\sqrt{-4k})^2 = (k-1)^2$
 $-4k = (k-1)(k-1)$
 $-4k = k^2 - 2k + 1$
 $0 = k^2 + 2k + 1$
 $0 = (k+1)(k+1)$
 $k = -1$

check it
 $\sqrt{-4(-1)} = -1-1$
 $\sqrt{4} = -2$
 $2 \neq -2$

4) $\frac{3(7b+7)}{3} = \frac{-126}{3}$

$7b+7 = -42$

$7b = -49$

$b = -7$

5) $5|3x-3| + 7 = 67$
 $-7 \quad -7$

$5|3x-3| = 60$

$|3x-3| = 12$

$3x-3 = 12 \quad 3x-3 = -12$

$3x = 15 \quad 3x = -9$
 $x = 5$ **$x = -3$**

6) $|8-4a| - 9 = 11$
 $+9 \quad +9$

$|8-4a| = 20$

$8-4a = 20$

$8-4a = -20$

$-4a = 12$

$-4a = -28$

$a = -3$

$a = 7$

8) $-92 = -k + 2(6-6k)$

$-92 = -k + 12 - 12k$

$-92 = -13k + 12$

$-104 = -13k$

$8 = k$

10) $120 = -3(3+7k) + 3$

$120 = -9 - 21k + 3$

$120 = -6 - 21k$

$126 = -21k$

$-6 = k$

7) $4r^2 - 1 = 0$

$(2r-1)(2r+1) = 0$

$2r-1 = 0 \quad 2r+1 = 0$

$2r = 1 \quad 2r = -1$

$r = 1/2$

$r = -1/2$

9) $2|6x-6| - 1 = 71$
 $+1 \quad +1$

$2|6x-6| = 72$

$|6x-6| = 36$

$6x-6 = 36 \quad 6x-6 = -36$

$6x = 42 \quad 6x = -30$
 $x = 7$ **$x = -5$**

11) $5|8p+2| - 5 = 85$
 $+5 \quad +5$

$5|8p+2| = 90$

$|8p+2| = 18$

$8p+2 = 18$

$8p+2 = -18$

$8p = 16$

$8p = -20$

$p = 2$

$p = -20/8$ **$p = -5/2$**

12) $x = 7 + \sqrt{x-1}$

$(x-7)^2 = (\sqrt{x-1})^2$
 $(x-7)(x-7) = x-1$
 $x^2 - 14x + 49 = x-1$
 $-x+1$

$x^2 - 15x + 50 = 0$

$(x-10)(x-5) = 0$
 $x = 10$ **$x = 5$**

check it

$10 = 7 + \sqrt{10-1}$

$10 = 7 + 3$

$10 = 10 \checkmark$

$5 = 7 + \sqrt{5-1}$

$5 = 7 + 2$

$5 \neq 9$

EXTRANEUS

$$13) 6b^2 + 24b = 0$$

$$6b(b-4) = 0$$

$$6b = 0 \quad b-4 = 0$$

$$\boxed{b=0} \quad \boxed{b=4}$$

$$15) (4)^2 = (\sqrt{4b+4})^2$$

$$16 = 4b+4$$

$$12 = 4b$$

$$\boxed{3=b}$$

check it

$$4 = \sqrt{4 \cdot 3 + 4}$$

$$4 = \sqrt{16}$$

$$4 = 4 \checkmark$$

$$17) k^2 + 15 = -8k$$

$$k^2 + 8k + 15 = 0$$

$$(k+5)(k+3) = 0$$

$$\boxed{k=-5} \quad \boxed{k=-3}$$

$$19) -2 + 3(-3a - 8) = -98$$

$$-2 - 9a - 24 = -98$$

$$-9a - 26 = -98$$

$$-9a = -72$$

$$\boxed{a=8}$$

$$21) 3(6p+7) - 3 = -108$$

$$18p+21-3 = -108$$

$$18p+18 = -108$$

$$18p = -126$$

$$\boxed{p=-7}$$

$$23) (\sqrt{-16+10p})^2 = (p)^2$$

$$-16+10p = p^2$$

$$p^2 - 10p + 16 = 0$$

$$(p-8)(p-2) = 0$$

$$\boxed{p=8} \quad \boxed{p=2}$$

check it

$$\sqrt{-16+10 \cdot 8} = 8$$

$$\sqrt{64} = 8$$

$$8 = 8 \checkmark$$

$$\sqrt{-16+10 \cdot 2} = 2$$

$$\sqrt{4} = 2$$

$$2 = 2 \checkmark$$

DIF OF SQ.

$$14) p^2 - 16 = 0 \quad a=p \quad b=4$$

$$(p+4)(p-4) = 0$$

$$p+4=0 \quad p-4=0$$

$$\boxed{p=-4} \quad \boxed{p=4}$$

$$16) (\sqrt{-35+12x})^2 = x^2$$

check it

$$\sqrt{-35+12 \cdot 7} = 7 \quad \sqrt{-35+84} = 7 \quad \sqrt{49} = 7$$

$$\sqrt{25} = 5 \quad \sqrt{5^2} = 5$$

$$-35+12x = x^2$$

$$0 = x^2 - 12x + 35$$

$$0 = (x-7)(x-5)$$

$$\boxed{x=7} \quad \boxed{x=5}$$

$$18) 4x^2 = 81 \quad \text{DIF OF SQ} \quad a=2x \quad b=9$$

$$4x^2 - 81 = 0$$

$$(2x+9)(2x-9) = 0$$

$$2x+9=0 \quad 2x-9=0$$

$$\boxed{x=-9/2} \quad \boxed{x=9/2}$$

$$20) 2a^2 + 7a = 85$$

$$2a^2 + 7a - 85 = 0$$

$$2a^2 + 10a + 17a - 85 = 0$$

$$2a(a+5) + 17(a-5) = 0$$

$$(a-5)(2a+17) = 0$$

$$\boxed{a=5} \quad \boxed{a=-17/2}$$

$$22) 2n^2 - 6n = -2$$

Quad. Form

$$2n^2 - 6n + 2 = 0$$

$$2(n^2 - 3n + 1) = 0$$

$$2(n \quad)(n \quad) = 0$$

curt factor

$$a=2 \quad b=-6 \quad c=2$$

$$n = \frac{6 \pm \sqrt{36 - 4(2)(2)}}{2(2)}$$

$$n = \frac{6 \pm 2\sqrt{5}}{4}$$

$$\boxed{n = \frac{3 \pm \sqrt{5}}{2}}$$

$$24) 9 = (\sqrt{9-8m})^2$$

$$81 = 9-8m$$

$$72 = -8m$$

$$m = -9$$

check it

$$9 = \sqrt{9-8(-9)}$$

$$9 = \sqrt{81}$$

$$9 = 9 \checkmark$$

$$25) (\sqrt{-3-r})^2 = 0^2$$

$$\begin{aligned} -3-r &= 0 \\ -3 &= r \end{aligned}$$

check it

$$\begin{aligned} \sqrt{-3+(-3)} &= 0 \\ \sqrt{0} &= 0 \\ \checkmark 0 &= 0 \end{aligned}$$

$$26) p^2 - 6p = 0$$

$$p(p-6) = 0$$

$$\boxed{p=0} \quad \boxed{p=6}$$

$$27) k^2 - 2k = 3$$

$$k^2 - 2k - 3 = 0$$

$$(k-3)(k+1) = 0$$

$$\boxed{k=3} \quad \boxed{k=-1}$$

$$29) -87 = -3(4x+5)$$

$$-87 = -12x - 15$$

$$\frac{-72}{-12} = \frac{-12x}{-12}$$

$$\boxed{6 = x}$$

$$31) 7 = (\sqrt{1-16b})^2$$

$$49 = 1 - 16b$$

$$48 = -16b$$

$$\boxed{-3 = b}$$

check it

$$7 = \sqrt{1-16(-3)}$$

$$7 = \sqrt{49}$$

$$7 = 7 \checkmark$$

$$28) n^2 = 8 + 7n$$

$$n^2 - 7n - 8 = 0$$

$$(n-8)(n+1) = 0$$

$$\boxed{n=8} \quad \boxed{n=-1}$$

$$30) 3b^2 = 5b - 1$$

$$3b^2 - 5b + 1 = 0$$

$$b = \frac{5 \pm \sqrt{25 - 4(3)(1)}}{2(3)}$$

Quad. Form Factoring doesn't work

$$a=3 \quad b=-5 \quad c=1$$

$$\boxed{b = \frac{5 \pm \sqrt{13}}{6}}$$

$$32) \frac{10-8}{-10} |6m+5| = \frac{-46}{-10}$$

$$-8 |6m+5| = -56$$

$$|6m+5| = 7$$

$$6m+5 = 7$$

$$6m = 2$$

$$\boxed{m = \frac{1}{3}}$$

$$6m+5 = -7$$

$$-5 = -5$$

$$6m = -12$$

$$\boxed{m = -2}$$