SM2—Solving Quadratic Equations Test Review

Solve the following equations by factoring: set = 0, factor, set each factor = 0

1. $(3x+2)(2x+4)=0$

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

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

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

$2x+4=0$ $\quad -4 \quad -4$

$\frac{2x}{2} = \frac{-4}{2}$

$x = -2$

2. $6y^2+30y=0$

GCF $6y$

$6y(y+5)=0$

$\frac{6y}{6} = \frac{0}{6}$

$y = 0$

$y+5=0$ $\quad -5 \quad -5$

$y = -5$

3. $n^2+28=11n$

$-11n$

$n^2-11n+28=0$

a b c

add b

ac	add b
28 | -11	
-1 · 28	-1+-28
-2 · 14	-2+-14
-4 · -7	-4+-7

	n	-4
n	n^2	$-4n$
-7	$-7n$	28

Steps

Set one side = 0

Subtract 11n when it crosses the line it changes the sign.

factor $n^2-11n+28$

Set each factor = 0

$(n-4)(n-7)=0$

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

$n = 4$

$n-7=0$ $\quad +7 \quad +7$

$n = 7$

4. $-3h^2 + h = -14$

$+14 \quad +14$

$-3h^2 + h + 14 = 0$

$-1(3h^2 - 1h - 14) = 0$

Set = 0

factor out -1

factor $3h^2 - 1h - 14$

$ac = -42 \quad b = -1$

mult	
-42	-1
1 · -42	1 + -42
2 · -21	2 + -21
3 · -14	3 + -14
6 · -7	6 + -7

Make the box

	h	2
3h	$3h^2$	6h
-7	-7h	-14

$-1(h+2)(3h-7) = 0$

$h + 2 = 0$

$-2 \quad -2$

$h = -2$

$3h - 7 = 0$

$+7 \quad +7$

$\frac{3h}{3} = \frac{7}{3}$

$h = \frac{7}{3}$

5. $0 = 9w^2 - 16$ Difference of 2 perfect squares

5. $9w^2 - 16 = 0$

$\sqrt{9} \quad \sqrt{16}$

$(3w + 4)(3w - 4) = 0$

$3w + 4 = 0$

$-4 \quad -4$

$\frac{3w}{3} = \frac{-4}{3}$

$w = -\frac{4}{3}$

$3w - 4 = 0$

$+4 \quad +4$

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

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

Find all solutions (real and imaginary) of each equation by using the square root principle. Write all answers in simplest radical form, and write imaginary answers in the form $a+bi$.

get square by itself
Take square root : Don't forget $\pm$
Simplify : if a negative is in $\sqrt{}$ take out i
Solve for variable

6. $m^2 = 64$

$\sqrt{m^2} = \pm\sqrt{64}$

$\sqrt{m \cdot m} = \pm 8$

$\boxed{m = \pm 8}$

7. $k^2 + 13 = -7$

subtract 13

$-13 \quad -13$

$k^2 = -20$

$\sqrt{k \cdot k} = \pm\sqrt{-20}$

$k = \pm i\sqrt{20}$

$\boxed{k = \pm 2i\sqrt{5}}$

8. $(r+3)^2 = 81$

$\sqrt{(r+3)(r+3)} = \pm\sqrt{81}$

$r+3 = \pm 9$

$-3 \quad -3$

$r = \pm 9 - 3$ → $9-3 = \boxed{6}$, $-9-3 = \boxed{-12}$

9. $(z-3)^2 = 24$

$\sqrt{(z-3)(z-3)} = \pm\sqrt{24}$

$z-3 = \pm 2\sqrt{6}$

$+3 \quad +3$

$z = 3 \pm 2\sqrt{6}$

10. $-2(v-7)^2 - 50 = 0$

$+50 \quad +50$

$\frac{-2(v-7)^2}{-2} = \frac{50}{-2}$

$(v-7)^2 = -25$

$\sqrt{(v-7)(v-7)} = \pm\sqrt{-25}$

$v-7 = \pm i\sqrt{25}$

$v-7 = \pm 5i$

$+7 \quad +7$

$v = 7 \pm 5i$

Find all solutions (real and imaginary) of each equation by using the quadratic formula. Write all answers in simplest radical form, and write imaginary answers in the form $a+bi$.

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

11. $x^2+10x-11=0$

a = 1, b = 10, c = -11

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$\frac{-10 \pm \sqrt{(10)^2-4(1)(-11)}}{2(1)}$$

$$\frac{-10 \pm \sqrt{144}}{2}$$

$$\frac{-10 \pm 12}{2}$$

$$\frac{(-10+12)}{2} = \frac{2}{2} = 1$$

$$\frac{(-10-12)}{2} = \frac{-22}{2} = -11$$

12. $2n^2 - 2n + 7 = 0$

a b c

a = 2, b = -2, c = 7

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

$$X = \frac{2 \pm \sqrt{-52}}{4}$$

$$\frac{2 \pm i\sqrt{52}}{4} = \boxed{\frac{2 \pm 2i\sqrt{13}}{4}} \text{ or } \boxed{\frac{1 \pm i\sqrt{13}}{2}}$$

13. $-2t^2 + 3 = 8t$ subtracting 8t

$$-2t^2 - 8t + 3 = 0$$

a = -2, b = -8, c = 3

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$X = \frac{--8 \pm \sqrt{(-8)^2 - 4(-2)(3)}}{2(-2)}$$

$$\frac{8 \pm \sqrt{88}}{-4} = \boxed{\frac{8 \pm 2\sqrt{22}}{-4}}$$