

Factor, Square Root, Complete the Square Review

Solve each equation by factoring.

1) $(6b - 5)(b - 7) = 0$

$6b - 5 = 0$ $b - 7 = 0$
 $6b = 5$ $b = 7$
 $b = \frac{5}{6}$

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

$x - 1 = 0$ $x + 5 = 0$
 $x = 1$ $x = -5$

3) $m^2 - 11m + 24 = 0$

~~$\begin{matrix} 24 & & \\ -8 & & -3 \\ -11 & & \end{matrix}$~~
 $(m - 8)(m - 3) = 0$
 $m - 8 = 0$ $m - 3 = 0$
 $m = 8$ $m = 3$

4) $x^2 + x - 56 = 0$

~~$\begin{matrix} -56 & & \\ 8 & & -7 \\ 1 & & \end{matrix}$~~
 $(x + 8)(x - 7) = 0$
 $x + 8 = 0$ $x - 7 = 0$
 $x = -8$ $x = 7$

5) $p^2 - 3p - 2 = 2$

~~$\begin{matrix} -4 & & \\ -4 & & 1 \\ -3 & & \end{matrix}$~~
 $p^2 - 3p - 4 = 0$
 $(p - 4)(p + 1) = 0$
 $p - 4 = 0$ $p + 1 = 0$
 $p = 4$ $p = -1$

6) $p^2 + 5p - 11 = 3$

~~$\begin{matrix} -14 & & \\ 7 & & -2 \\ 5 & & \end{matrix}$~~
 $p^2 + 5p - 14 = 0$
 $(p + 7)(p - 2) = 0$
 $p + 7 = 0$ $p - 2 = 0$
 $p = -7$ $p = 2$

7) $5p^2 + 7p + 2 = 0$

~~$\begin{matrix} 10 & & \\ 5 & & 2 \\ 7 & & \end{matrix}$~~
 $(5p + 2)(p + 1) = 0$
 $5p + 2 = 0$ $p + 1 = 0$
 $5p = -2$ $p = -1$
 $p = -\frac{2}{5}$

8) $2m^2 - 3m - 20 = 0$

~~$\begin{matrix} -40 & & \\ -8 & & 5 \\ -3 & & \end{matrix}$~~
 $(2m + 5)(m - 4) = 0$
 $2m + 5 = 0$ $m - 4 = 0$
 $2m = -5$ $m = 4$
 $m = -\frac{5}{2}$

9) $2v^2 - 9v + 16 = 7$

~~$\begin{matrix} 18 & & \\ -6 & & 3 \\ -9 & & \end{matrix}$~~
 $2v^2 - 9v + 9 = 0$
 $(2v - 3)(v - 3) = 0$
 $2v - 3 = 0$ $v - 3 = 0$
 $2v = 3$ $v = 3$
 $v = \frac{3}{2}$ $v = 3$

10) $3n^2 - 19n - 46 = -6$

~~$\begin{matrix} -20 & & \\ -24 & & 5 \\ -19 & & \end{matrix}$~~
 $3n^2 - 19n - 40 = 0$
 $(3n + 5)(n - 8) = 0$
 $3n + 5 = 0$ $n - 8 = 0$
 $3n = -5$ $n = 8$
 $n = -\frac{5}{3}$

Solve each equation by taking square roots.

11) $\sqrt{m^2} = \pm 63$ $\sqrt{-1.9.7}$

$m = \pm 3i\sqrt{7}$

12) $\sqrt{a^2} = \pm 25$

$a = \pm 5$

$$13) \sqrt{n^2} = \sqrt{3}$$

$$n = \pm \sqrt{3}$$

$$14) \sqrt{r^2} = \sqrt{98}$$

$$r = \pm \sqrt{49 \cdot 2}$$

$$r = \pm 7\sqrt{2}$$

$$15) p^2 + 10 = 22$$

$$\frac{-10}{-10} \quad \sqrt{p^2} = \sqrt{12}$$

$$p = \pm \sqrt{4 \cdot 3}$$

$$p = \pm 2\sqrt{3}$$

$$16) -5x^2 = 90$$

$$\frac{-5}{-5} \quad \sqrt{x^2} = \sqrt{18}$$

$$x = \pm \sqrt{-1 \cdot 9 \cdot 2}$$

$$x = \pm 3i\sqrt{2}$$

$$17) \sqrt{(n+7)^2} = \sqrt{100}$$

$$n+7 = \pm \sqrt{100}$$

$$n+7 = \pm 10 \quad \begin{matrix} \nearrow n = -7+10 \\ \nearrow n = 3 \end{matrix}$$

$$\frac{-7}{-7} \quad n = -7 \pm 10 \rightarrow n = -7-10$$

$$n = -17$$

$$18) \sqrt{(x-9)^2} = \sqrt{24}$$

$$x-9 = \pm \sqrt{24} \rightarrow \sqrt{4 \cdot 6}$$

$$x-9 = \pm 2\sqrt{6}$$

$$x = 9 \pm 2\sqrt{6}$$

Solve each equation by completing the square.

$$19) b^2 + 4b - 5 = 0$$

$$\left(\frac{b}{2}\right)^2 \quad b^2 + 4b + 4 = 5 + 4$$

$$\left(\frac{4}{2}\right)^2 = (2)^2 = 4 \quad \sqrt{(b+2)^2} = \sqrt{9}$$

$$b+2 = \pm 3$$

$$b = -2+3$$

$$b = 1$$

$$b = -2-3$$

$$b = -5$$

$$20) r^2 - 6r + 5 = 0$$

$$r^2 - 6r + 9 = -5 + 9$$

$$\left(-\frac{6}{2}\right)^2 = (-3)^2 = 9 \quad \sqrt{(r-3)^2} = \sqrt{4}$$

$$r-3 = \pm 2$$

$$r = 3 \pm 2$$

$$r = 3+2$$

$$r = 5$$

$$r = 3-2$$

$$r = 1$$

$$21) x^2 + 12x + 20 = 0$$

$$x^2 + 12x + 36 = -20 + 36$$

$$\left(\frac{12}{2}\right)^2 = (6)^2 = 36$$

$$\sqrt{(x+6)^2} = \sqrt{16}$$

$$x+6 = \pm 4$$

$$x = -6 \pm 4$$

$$x = -6+4$$

$$x = -2$$

$$x = -6-4$$

$$x = -10$$

$$22) x^2 + 6x - 40 = 0$$

$$x^2 + 6x + 9 = 40 + 9$$

$$\left(\frac{6}{2}\right)^2 = (3)^2 = 9 \quad \sqrt{(x+3)^2} = \sqrt{49}$$

$$x+3 = \pm 7$$

$$x = -3 \pm 7$$

$$x = -3+7$$

$$x = 4$$

$$x = -3-7$$

$$x = -10$$

$$23) n^2 - 20n - 21 = 0$$

$$n^2 - 20n + 100 = 21 + 100$$

$$\left(-\frac{20}{2}\right)^2 = (-10)^2 = 100$$

$$(n-10)^2 = 121$$

$$n-10 = \pm 11$$

$$n = 10 \pm 11$$

$$n = 10+11$$

$$n = 21$$

$$n = 10-11$$

$$n = -1$$

$$24) x^2 + 8x + 12 = 0$$

$$x^2 + 8x + 16 = -12 + 16$$

$$\left(\frac{8}{2}\right)^2 = (4)^2 = 16$$

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

$$x+4 = \pm 2$$

$$x = -4 \pm 2$$

$$x = -4+2$$

$$x = -2$$

$$x = -4-2$$

$$x = -6$$

$$25) n^2 - 8n - 21 = 0$$

$$n^2 - 8n + 16 = 21 + 16$$

$$\left(-\frac{8}{2}\right)^2 = (-4)^2 = 16$$

$$(n-4)^2 = 37$$

$$n-4 = \pm \sqrt{37}$$

$$n = 4 \pm \sqrt{37}$$

$$26) m^2 + 20m - 72 = 0$$

$$m^2 + 20m + 100 = 72 + 100$$

$$\left(\frac{20}{2}\right)^2 = (10)^2 = 100$$

$$(m+10)^2 = 172$$

$$m+10 = \pm \sqrt{172} \rightarrow \pm \sqrt{4 \cdot 43}$$

$$m+10 = \pm 2\sqrt{43}$$

$$m = -10 \pm 2\sqrt{43}$$