

Solving Quadratics

Solve each equation by taking square roots.

1)  $8m^2 - 4 = 196$

$$\frac{8m^2}{8} = \frac{200}{8}$$

$$m^2 = 25$$

$$m = \pm 5$$

2)  $-4 - 3m^2 = -199$

$$-3m^2 = -195$$

$$\sqrt{m^2} = \sqrt{65}$$

$$m = \pm \sqrt{65}$$

3)  $100n^2 + 4 = -5$

$$\frac{100n^2}{100} = \frac{-9}{100}$$

$$n^2 = \sqrt{\frac{-9}{100}}$$

$$n = \pm \frac{3}{10}i$$

4)  $2n^2 - 8 = -15$

$$2n^2 = -7$$

$$\sqrt{n^2} = \sqrt{\frac{-7}{2}}$$

$$n = \pm i\sqrt{\frac{7}{2}}$$

$$= \frac{\pm i\sqrt{14}}{2}$$

Solve each equation by factoring.

5)  $25x^2 = 4$

$$25x^2 - 4 = 0$$

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

$$x = \pm \frac{2}{5}$$

6)  $v^2 = 15 - 2v$

$$v^2 + 2v - 15 = 0$$

$$(v-3)(v+5) = 0$$

$$v = 3, -5$$

7)  $3x^2 - 15x = 18$

$$3x^2 - 15x - 18 = 0$$

3

$$x^2 - 5x - 6 = 0$$

$$(x+1)(x-6) = 0$$

$$x = -1, 6$$

8)  $n^2 = -7n$

$$n^2 + 7n = 0$$

$$n(n+7) = 0$$

$$n = 0, -7$$

$$9) 7v^2 + 10v - 6 = -v$$

$$7v^2 + 11v - 6 = 0$$

$$(7v - 3)(v + 2) = 0$$

$$\boxed{v = \frac{3}{7}, -2}$$

$$10) 8a^2 + 7a - 4 = 3a^2 - 6$$

$$5a^2 + 7a + 2 = 0$$

$$(5a + 2)(a + 1) = 0$$

$$\boxed{a = -\frac{2}{5}, -1}$$

$$11) (16x^3 + 20x^2 + 4x + 5) = 0$$

$$4x^2(4x + 5) + 1(4x + 5) = 0$$

$$(4x + 5)(4x^2 + 1) = 0$$

$$\boxed{x = -\frac{5}{4}, \pm \frac{i}{2}}$$

$$x^2 = \sqrt{-\frac{1}{4}}$$

$$12) (7n^3 - 4n^2)(-42n + 24) = 0$$

$$n^2(7n - 4) - 6(7n - 4) = 0$$

$$(7n - 4)(n^2 - 6) = 0$$

$$\boxed{n = \frac{4}{7}, \pm \sqrt{6}}$$

Solve each equation with the quadratic formula.

$$13) n^2 = -4 + 4n \quad n^2 - 4n + 4 = 0$$

$$n = \frac{4 \pm \sqrt{16 - 4(1)(4)}}{2}$$

$$= \frac{4 \pm 0}{2} = \boxed{2, \text{d.r.}}$$

$$14) 2n^2 - 5 = -3n$$

$$2n^2 + 3n - 5 = 0$$

$$n = \frac{-3 \pm \sqrt{9 - 4(2)(-5)}}{4}$$

$$= \frac{-3 \pm \sqrt{49}}{4} = \frac{-3 \pm 7}{4}$$

$$= \boxed{1, -\frac{5}{2}}$$

$$15) 9n^2 = 13 + 9n$$

$$9n^2 - 9n - 13 = 0$$

$$n = \frac{9 \pm \sqrt{81 - 4(9)(-13)}}{18}$$

$$= \frac{9 \pm \sqrt{81 + 468}}{18}$$

$$= \frac{9 \pm \sqrt{549}}{18} = \frac{9 \pm 23.43}{18} = \boxed{1.8, -0.8}$$

$$16) 7k^2 + 7k = -7$$

$$k^2 + k + 1 = 0$$

$$k = \frac{-1 \pm \sqrt{1 - 4(1)(1)}}{2}$$

$$= \frac{-1 \pm \sqrt{-3}}{2}$$

$$= \boxed{\frac{-1 \pm i\sqrt{3}}{2}}$$

$$17) 3a^2 - 6a = -8$$

$$3a^2 - 6a + 8 = 0$$

$$a = \frac{6 \pm \sqrt{36 - 4(3)(8)}}{6}$$

$$= \frac{6 \pm \sqrt{-60}}{6}$$

$$= \frac{6 \pm 2i\sqrt{15}}{6} = \boxed{\frac{3 \pm i\sqrt{15}}{3}}$$

32  
3/46

Solve each equation by any method.

$$19) 7p^2 + 8 = p$$

$$7p^2 - p + 8 = 0$$

$$p = \frac{1 \pm \sqrt{1 - 4(7)(8)}}{14}$$

$$= \frac{1 \pm \sqrt{-223}}{14}$$

$$21) 11n^2 + 11n = -12$$

$$11n^2 + 11n + 12 = 0$$

$$n = \frac{-11 \pm \sqrt{121 - 4(11)(12)}}{22}$$

$$= \frac{-11 \pm \sqrt{-407}}{22}$$

$$18) 5x^2 + 2x = -7$$

$$5x^2 + 2x + 7 = 0$$

$$x = \frac{-2 \pm \sqrt{4 - 4(5)(7)}}{10}$$

$$= \frac{-2 \pm \sqrt{-136}}{10} < \frac{4}{34}$$

$$= \frac{-2 \pm 2i\sqrt{34}}{10}$$

$$= \frac{-1 \pm i\sqrt{34}}{5}$$

$$20) 4x^2 + 1 = -4x$$

$$4x^2 + 4x + 1 = 0$$

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

$$x = -\frac{1}{2}, \text{ d.r.}$$

$$22) 5x^2 = 5$$

$$x^2 = 1$$

$$x = \pm 1$$

10-04

6