

## Practice C

### Solving Radical Equations and Inequalities

Solve each equation.

1.  $\sqrt[3]{4x+1} - 5 = 0$

$x = 31$

2.  $3\sqrt{x-11} = 18$

$x = 47$

3.  $\sqrt[4]{10x+11} = 3$

$x = 7$

4.  $\sqrt[3]{3x} = \sqrt[3]{2x+9}$

$x = 9$

5.  $x+2 = \sqrt{3x+6}$

$x = -2, x = 1$

6.  $(10x-25)^{\frac{1}{2}} = x$

$x = 5$

7.  $5(6x+1)^{\frac{1}{4}} = 10$

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

8.  $4(7x+18)^{\frac{1}{2}} = 4x \quad x = 9$

$x = -2$  is extraneous

Solve each inequality.

9.  $\sqrt{4x+5} \leq 3$

$[-\frac{5}{4}, 1]$

10.  $\sqrt[3]{x+3} \geq 2$

$[5, \infty)$

11.  $\sqrt{x-7} + 9 < 12$

$[7, 16)$

12.  $\sqrt[3]{x-6} + 7 > 4$

$(-2, \infty)$

13.  $\sqrt{3x-1} > \sqrt{x+7}$

$(4, \infty)$

14.  $\sqrt[3]{x+2} - 1 \leq 4$

$(-\infty, 123]$

Solve.

15. Einstein's theory of relativity states that the mass of an object increases as the object's velocity increases. The mass,  $m(v)$ , of an object traveling with velocity,  $v$ , is given by  $m(v) = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$ , where  $c$  is the speed of light

and  $m_0$  is the mass of the object at rest. In terms of  $c$ , solve for the velocity at which the effective mass,  $m(v)$ , of the particle has increased to twice its mass at rest,  $m_0$ .

$v = \frac{\sqrt{3}}{2} c$