

**Useful Information**

When an object is thrown straight upwards, its height  $S$  in meters is approximated by the quadratic equation

$$S = -5t^2 + vt + h,$$

where

$v$  = initial upward velocity of the object in m/s,

$h$  = height above ground from which the object is thrown in meters,

$t$  = time in seconds.

1. Factor:  $25x^2 + 30x + 9$ .

2. Factor:  $25a^2 - 81b^2$ .

3. Factor:  $12x^2 - 30x + 12$ .

4. Factor:  $\frac{1}{8}x^3 - 27$ .

5. Solve for  $x$ :  $(x - 5)(x + 2) = -4(x + 1)$ .

6. Solve for  $x$ :  $4x^2 - 3x + 1 = -7x$ .

7. Solve for  $x$ :  $\frac{10x^2 - 25x}{12} = 5$ .

8. Solve for  $x$ :  $2x^2 - 7x + 6 = 0$ .

9. Jules is standing on a platform 6 meters high and throws a ball straight up as high as he can at a velocity of 13 meters per second. At what time  $t$  will the ball hit the ground? Assume the ball is 6 meters from the ground when it leaves Jules hand.

10. The area of a rectangle is  $6 \text{ ft}^2$ . The length is 10 ft longer than 4 times the width. Determine the dimensions of the rectangle.

**Solutions**

1.  $(5x + 3)^2$

2.  $(5a + 9b)(5a - 9b)$

3.  $(6(2x - 1)(x - 2)$

4.  $\left(\frac{x}{2} - 3\right)\left(\frac{x^2}{4} + \frac{3x}{2} + 9\right)$  or  $\frac{1}{8}(x - 6)(x^2 + 6x + 36)$

5.  $x = 2, x = -3$

6.  $x = -\frac{1}{2}$

7.  $x = -\frac{3}{2}, x = 4$

8.  $x = \frac{3}{2}, x = 2$

9. 3 seconds.

10.  $1/2 \text{ ft}$  by  $12 \text{ ft}$ .