Find the rational zeros of each polynomial function. Then write each function in factored form.

1. $f(x) = x^3 - x^2 - 10x - 8$

Factors of -8: $\pm1, \pm2, \pm4, \pm8$

4 is a zero.

$(x - 4)(x^2 + 3x + 2) = 0$
$(x - 4)(x + 2)(x + 1) = 0$
$x = 4, x = -2,$ or $x = -1$
$f(x) = (x - 4)(x + 2)(x + 1)$

2. $f(x) = x^3 + 2x^2 - 23x - 60$

**Factors of -60: $\pm1, \pm2, \pm3, \pm4, \pm5, \pm6,$
$\pm10, \pm12, \pm15, \pm20, \pm30, \pm60$**

5 is a zero.

$(x - 5)(x^2 + 7x + 12) = 0$
$(x - 5)(x + 3)(x + 4) = 0$
$x = 5, x = -3,$ or $x = -4$
$f(x) = (x - 5)(x + 3)(x + 4)$

3. $j(x) = 2x^3 - x^2 - 13x - 6$

Factors of -6: $\pm1, \pm2, \pm3, \pm6$

3 is a zero.

$(x - 3)(2x^2 + 5x + 2) = 0$
$(x - 3)(2x + 1)(x + 2) = 0$
$x = 3, x = -\frac{1}{2},$ or $x = -2$
$j(x) = (x - 3)(2x + 1)(x + 2)$

4. $g(x) = x^3 - 9x^2 + 23x - 15$

Factors of -15: $\pm1, \pm3, \pm5, \pm15$

1 is a zero.

$(x - 1)(x^2 - 8x + 15) = 0$
$(x - 1)(x - 5)(x - 3) = 0$
$x = 1, x = 5,$ or $x = 3$
$g(x) = (x - 1)(x - 5)(x - 3)$

5. $h(x) = x^3 - 5x^2 + 2x + 8$

Factors of 8: $\pm1, \pm2, \pm4, \pm8$

2 is a zero.

$(x - 2)(x^2 - 3x - 4) = 0$
$(x - 2)(x - 4)(x + 1) = 0$
$x = 2, x = 4,$ or $x = -1$
$m(x) = (x - 2)(x - 4)(x + 1)$

6. $h(x) = 6x^3 - 7x^2 - 9x - 2$

Factors of -2: $\pm1, \pm2$

2 is a zero.

$(x - 2)(6x^2 + 5x + 1) = 0$
$(x - 2)(2x + 1)(3x + 1) = 0$
$x = 2, x = -\frac{1}{2},$ or $x = -\frac{1}{3}$
$h(x) = (x - 2)(2x + 1)(3x + 1)$

7. $s(x) = x^3 - x^2 - x + 1$

Factors of 1: ±1

1 is a zero.

$(x - 1)(x^2 - 1) = 0$
$(x - 1)(x + 1)(x - 1) = 0$
$x = 1$ or $x = -1$
$s(x) = (x - 1)(x + 1)(x - 1)$

8. $t(x) = x^3 + x^2 - 8x - 12$

Factors of -12: $\pm1, \pm2, \pm3, \pm4, \pm6, \pm12$

3 is a zero.

$(x - 3)(x^2 + 4x + 4) = 0$
$(x - 3)(x + 2)(x + 2) = 0$
$x = 3$ or $x = -2$
$t(x) = (x - 3)(x + 2)(x + 2)$