**2-3 Practice**

***The Remainder and Factor Theorems***

**Divide using long division.**

 **1.** (2$x^{4}$ + 14$x^{3}$ – 2$x^{2}$ – 14*x*) ÷ (*x* + 7) **2.** (3$t^{3}$ – 10$t^{2}$ + *t* – 5) ÷ (*t* – 4)

**Divide using synthetic division.**

 **3.** ($y^{3}$ + $y^{2}$ – 10) ÷ (*y* + 3) **4.** ($n^{4}$ – $n^{3}$ – 10$n^{2}$ + 4*n* + 24) ÷ (*n* + 2)

 **5.** ($x^{4}$ – 3$x^{3}$ – 15$x^{2}$ + 19*x* + 30) ÷ (*x* – 5) **6.** ($x^{3}$ – 8$x^{2}$ – 29*x* + 180) ÷ (*x* – 10)

**Find each *f*(*c*) using synthetic substitution.**

 **7.** *f*(*x*) = $x^{3}$ + 6$x^{2}$ – 9*x* – 54 ; *c* = 3 **8.** *f*(*x*) = 3$x^{4}$ – 6$x^{2}$ – 30 ; *c* = 2

 **9.** *f***(***x***)** = –$x^{4}$ + 2$x^{3}$– $x^{2}$ + 7*x* + 5 ; *c* = –1 **10.** *f*(*x*) = $x^{5}$+ 6$x^{3}$ + 9*x* – 3 ; *c* = 4

**Use the Factor Theorem to determine if the binomials given are factors of *f*(*x*).
Use the binomials that are factors to write a factored form of *f*(*x*)*.***

**11.** *f*(*x*) = $x^{3}$ – 7*x* − 6; (*x* + 2), (*x* – 1)

**12.** *f*(*x*) = 2$x^{3}$ + $x^{2}$ − 50*x* − 25; (*x* + 5), (*x* – 5)

**13.** *f*(*x*) = $x^{4}$ – $x^{3}$ – 7$x^{2}$ + *x* + 6; (*x* + 2), (*x* + 4)

**14.** *f*(*x*) = 3$x^{4}$ – 4$x^{3}$ – 61$x^{2}$ + 22*x* + 40; (3*x* + 2), (*x* – 1)

**List all possible rational zeros of each function. Then determine which, if any, are zeros.**

 **15.** *f*(*x*) = $x^{3}$ – $x^{2}$ – 8*x* + 12

 **16.** *h*(*x*) = 2$x^{3}$ – 3$x^{2}$ – 2*x* + 3

 **17.** *g*(*x*) = $x^{3}$ + 3$x^{2}$ – 6*x* – 8

**2-3 Practice**

***The Remainder and Factor Theorems***

**Divide using long division.**

 **1.** (2$x^{4}$ + 14$x^{3}$ – 2$x^{2}$ – 14*x*) ÷ (*x* + 7) **2.** (3$t^{3}$ – 10$t^{2}$ + *t* – 5) ÷ (*t* – 4)

**Divide using synthetic division.**

 **3.** ($y^{3}$ + $y^{2}$ – 10) ÷ (*y* + 3) **4.** ($n^{4}$ – $n^{3}$ – 10$n^{2}$ + 4*n* + 24) ÷ (*n* + 2)

 **5.** ($x^{4}$ – 3$x^{3}$ – 15$x^{2}$ + 19*x* + 30) ÷ (*x* – 5) **6.** ($x^{3}$ – 8$x^{2}$ – 29*x* + 180) ÷ (*x* – 10)

**Find each *f*(*c*) using synthetic substitution.**

 **7.** *f*(*x*) = $x^{3}$ + 6$x^{2}$ – 9*x* – 54 ; *c* = 3 **8.** *f*(*x*) = 3$x^{4}$ – 6$x^{2}$ – 30 ; *c* = 2

 **9.** *f***(***x***)** = –$x^{4}$ + 2$x^{3}$– $x^{2}$ + 7*x* + 5 ; *c* = –1 **10.** *f*(*x*) = $x^{5}$+ 6$x^{3}$ + 9*x* – 3 ; *c* = 4

**Use the Factor Theorem to determine if the binomials given are factors of *f*(*x*).
Use the binomials that are factors to write a factored form of *f*(*x*)*.***

**11.** *f*(*x*) = $x^{3}$ – 7*x* − 6; (*x* + 2), (*x* – 1)

**12.** *f*(*x*) = 2$x^{3}$ + $x^{2}$ − 50*x* − 25; (*x* + 5), (*x* – 5)

**13.** *f*(*x*) = $x^{4}$ – $x^{3}$ – 7$x^{2}$ + *x* + 6; (*x* + 2), (*x* + 4)

**14.** *f*(*x*) = 3$x^{4}$ – 4$x^{3}$ – 61$x^{2}$ + 22*x* + 40; (3*x* + 2), (*x* – 1)

**List all possible rational zeros of each function. Then determine which, if any, are zeros and completely factor.**

 **15.** *f*(*x*) = $x^{3}$ – $x^{2}$ – 8*x* + 12

 **16.** *h*(*x*) = 2$x^{3}$ – 3$x^{2}$ – 2*x* + 3

 **17.** *g*(*x*) = $x^{3}$ + 3$x^{2}$ – 6*x* – 8