Name: _____ Date: _____

2.2 The Factor Theorem

BLM 2–3

1. Determine if $x - 2$ is a factor of each binomial.
a) $3x^3 - x^2 + 2x$
b) $x^3 + 2x^2 - 16$
c) $2x^3 - 3x^2 + x - 6$

2. List the values that could be zeros of each polynomial. Then, factor the polynomial.
a) $x^3 - 2x^2 - x + 2$
b) $x^3 - 7x - 6$
c) $x^3 + 5x^2 - 2x - 24$

3. Factor each polynomial by grouping terms.
a) $x^3 + 2x^2 - 9x - 18$
b) $2x^3 + 5x^2 - 8x - 20$
c) $x^3 - 3x^2 - 25x + 75$
d) $3x^3 - 5x^2 - 27x + 45$

4. Determine the values that could be zeros of each polynomial. Then, factor the polynomial.
a) $x^3 + x^2 - 10x + 8$
b) $2x^3 + 5x^2 + x - 2$
c) $2x^3 + 3x^2 - 5x - 6$
d) $3x^3 - 16x^2 + 23x - 6$

5. Factor each polynomial.
a) $x^3 + 5x^2 - x - 5$
b) $x^3 - 7x + 6$
c) $x^3 - 3x^2 - 4x + 12$
d) $x^4 + 4x^3 - x^2 - 16x - 12$
e) $x^4 - 3x^3 - 14x^2 + 48x - 32$

6. Use Technology Factor each polynomial.
a) $2x^3 + 3x^2 - 11x - 6$
b) $4x^3 - 9x^2 - 10x + 3$
c) $5x^3 - 12x^2 - 36x + 16$

7. Determine the value of k so that $x - 3$ is a factor of $x^3 - 2x^2 + kx - 6$.

8. Determine the value of k so that $2x + 5$ is a factor of $4x^3 - kx^2 - 6x + 10$.

9. A carpenter is building a rectangular storage shed whose volume, V, in cubic metres, can be modelled by $V(x) = 4x^3 - 36x^2 + 107x - 105$.
a) Determine the possible dimensions of the shed, in terms of x, in metres, that result in the volume in part a).
b) What are the dimensions of the shed when $x = 5.2$?

10. Factor each polynomial.
a) $2x^3 + 11x^2 + 2x - 15$
b) $3x^3 + 8x^2 + 3x - 2$
c) $5x^3 - 17x^2 + 16x - 4$
d) $4x^3 + 5x^2 - 23x - 6$

11. Factor each polynomial.
a) $8x^3 - 125$
b) $64x^3 + \frac{8}{27}$
c) $216x^3 + y^3$
d) $27 - t^6$
e) $125x^6 - \frac{1}{64}y^3$
f) $8x^6 + 343y^{12}$

12. Factor each polynomial by letting $t = x^2$.
a) $16x^4 - 17x^2 + 1$
b) $9x^4 - 61x^2 + 100$

13. Determine a polynomial function $P(x)$ that satisfies the following set of conditions: $P(2) = P\left(\frac{2}{3}\right) = P(-4) = 0$ and $P(3) = -7$.

14. Factor.
$3x^5 - 2x^4 - 22x^3 - 4x^2 + 19x + 6$