Name: _____ Date: _____

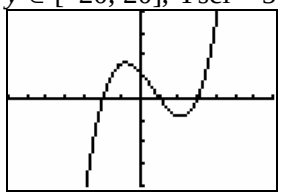
2.3 Polynomial Equations

BLM 2–5

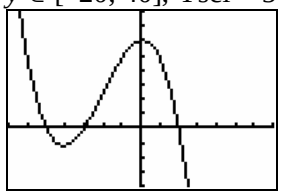
1. Solve.
a) $x^3 - 4x^2 + 3x = 0$
b) $2x^3 + x^2 - 18x - 9 = 0$
c) $3x^3 - 2x^2 - 12x + 8 = 0$

2. Solve.
a) $2x^3 - 3x^2 - 11x + 6 = 0$
b) $x^3 - x^2 - 17x - 15 = 0$
c) $8x^3 - 6x^2 - 3x + 1 = 0$

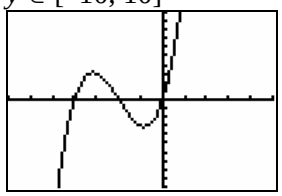
3. Use the graphs to determine the roots of the corresponding polynomial equations. The roots are all integral values.
a) Window variables: $x \in [-7, 7]$, $y \in [-20, 20]$, Yscl = 5



b) Window variables: $x \in [-7, 7]$, $y \in [-20, 40]$, Yscl = 5



c) Window variables: $x \in [-7, 5]$, $y \in [-10, 10]$



4. Determine the real roots of each polynomial equation.
a) $(x - 1)(x^2 + 2x + 4) = 0$
b) $(x^2 + 5x + 10)(x^2 - 25) = 0$
c) $(4x^2 - 64)(5x^2 + 25) = 0$
d) $(x^3 - 1)(3x^2 - 27) = 0$

5. Determine the x-intercepts of the graph of each polynomial function.
a) $f(x) = x^3 - 1$
b) $g(x) = x^3 + 3x^2 + 4x + 12$
c) $h(x) = x^5 - 9x^3 + 8x^2 - 72$
d) $y = x^4 - 25x^2 + 144$

6. Solve.
a) $x^3 - 2x^2 - 5x + 6 = 0$
b) $x^4 - x^3 - 10x^2 - 8x = 0$
c) $5x^5 - 80x = 0$
d) $2x^3 + 3x^2 - 23x - 12 = 0$
e) $3x^3 + 7x^2 = 4$
f) $x^4 - 26x^2 + 25 = 0$

7. **Use Technology** Solve. Round answers to two decimal places.
a) $x^3 + 3x^2 + 7x - 1 = 0$
b) $x^4 - 6x^3 + 2x^2 = 3$
c) $3x^3 - 4x = 2x^2 - 8$
d) $4x^4 - 6x^2 - 2x - 4 = 0$

8. **Use Technology** A rectangular water tank in an aquarium has width $2x - 5$, length $x + 4$, and height $2x - 3$, with all the dimensions in metres. If the volume of the tank is 110 m^3, use technology to solve a polynomial equation in order to determine the approximate dimensions of the tank, to two decimal places.

9. The length of a child's square-based jewellery box is 5 cm more than its height. The box has a capacity of 500 cm^3. Solve a polynomial equation to determine the dimensions of the box.

10. Find all real and complex solutions to $3x^3 + 12x^2 + 13x - 28 = 0$.

11. Determine a polynomial equation of degree 3 with roots $x = 5$ and $x = 7 \pm 2i$.