

PRE-AP ALGEBRA 2

- 1) For $y = f(x) = 16x^3 - 82x^2 + 77x - 20$,
 - a) Graph $y = f(x)$ to find its integer root.
Window: $0 \leq x \leq 5, -100 \leq y \leq 25$
 - b) Use synthetic division to factor $y = f(x)$ into three linear factors.
 - c) State the three roots of $y = f(x)$.

(a) $x=4$ is a root, $x-4$ is a factor

$$\begin{array}{r|rrrr} 4 & 16 & -82 & 77 & -20 \\ & & 64 & -72 & 20 \\ \hline & 16 & -18 & 5 & 0 \end{array}$$

$$f(x) = (x-4)(16x^2 - 18x + 5)$$

$$ac = (16)(5) = 80 = 2^4 \cdot 5 = 4 \cdot 20$$

$$b = -18 = 4 + u, \quad 4 = -10, \quad u = -9$$

$$16x^2 - 18x + 5 = 2x(8x - 5) - 1(8x - 5)$$

$$= (2x-1)(8x-5)$$

$$f(x) = (x-4)(2x-1)(8x-5)$$

$$(c) \quad x=4, \quad x=\frac{3}{2}, \quad x=\frac{5}{8}$$

- 2) Write $y = f(x) = (x+3)(7x+3)(5x-8)$ in standard form.

$$\begin{aligned} (7x+3)(5x-8) &= 35x^2 - 56x + 15x - 24 = \\ &= 35x^2 - 41x - 24 \end{aligned}$$

$$\begin{aligned} f(x) &= (x+3)(35x^2 - 41x - 24) = \\ &= 35x^3 - 41x^2 - 24x + 105x^2 - 123x - 72 = \\ &= 35x^3 + 64x^2 - 147x - 72 \end{aligned}$$

3B.5 CLASSWORK

- 3) For $y = f(x) = x^3 - 22x^2 + 148x - 304$,
 - a) Graph $y = f(x)$ to find its integer root.
Window: $0 \leq x \leq 15, -40 \leq y \leq 40$
 - b) Use synthetic division and the Quadratic Formula to find the other two roots of $y = f(x)$.
 - c) State the x - and y -intercepts of $y = f(x)$.

(a) $x=4$ is a root, $x-4$ is a factor

$$\begin{array}{r|rrrr} 4 & 1 & -22 & 148 & -304 \\ & & 4 & -72 & 304 \\ \hline & 1 & -18 & 76 & 0 \end{array}$$

$$x^2 - 18x + 76 = 0$$

$$x = \frac{18 \pm \sqrt{(-18)^2 - 4(1)(76)}}{2(1)} = \frac{18 \pm \sqrt{20}}{2} =$$

$$= \frac{18 \pm \sqrt{4} \sqrt{5}}{2} = \frac{18 \pm 2\sqrt{5}}{2} = 9 \pm \sqrt{5}$$

(c) x -ints: $x=4, x=9+\sqrt{5}, x=9-\sqrt{5}$
 y -int: $y=f(0) = -304$

- 4) For $y = f(x) = x^3 - 8x^2 + 29x - 102$,

- a) Graph $y = f(x)$ to find its integer root.
Window: $0 \leq x \leq 8, -100 \leq y \leq 150$
- b) Use synthetic division and the Quadratic Formula to find the other two roots of $y = f(x)$.
- c) State the x - and y -intercepts of $y = f(x)$.

(a) $x=6$ is a root, $x-6$ is a factor

$$\begin{array}{r|rrrr} 6 & 1 & -8 & 29 & -102 \\ & & 6 & -12 & 102 \\ \hline & 1 & -2 & 17 & 0 \end{array}$$

$$x^2 - 2x + 17 = 0$$

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(17)}}{2(1)} = \frac{2 \pm \sqrt{-64}}{2} =$$

$$= \frac{2 \pm 8i}{2} = 1 \pm 4i$$

(c) x -ints: $x=6$
 y -int: $y=f(0) = -102$