121 §3.5 I #s 5, 8, 9, 17, 22, 27, 31–34, 37, 41, 44

#s 5–16 Discuss the symmetry of the graph of each polynomial function.

(5) $f(x) = x^6$ $\quad f(-x) = (-x)^6 = x^6 = f(x)$

$\Longrightarrow$ Symmetric about the y-axis (EVEN func.)

(8) $f(x) = 5x^2 + 8x + 1$ is a parabola.

$a = 5, b = 8, c = 1$

$-\frac{b}{2a} = -\frac{8}{2(5)} = -\frac{8}{10} = -\frac{4}{5}$

$\boxed{x = -\frac{4}{5}}$ is axis of symmetry

(9) $f(x) = 3x^6 - 5x^2 + 3x$

$f(-x) = 3x^6 - 5x^2 - 3x$. This is neither $f(x)$ nor is it $-f(x)$. So neither symmetry.

#s 17–30 Find the x-intercepts and discuss the behavior of the polynomial function near its x-intercepts.

(17) $f(x) = (x-4)^2$ $\quad$ x-int: $(4, 0)$

Touches @ $x = 4$

(22) $f(x) = x^2 - 5x - 6 = (x-6)(x+1)$

x-int: $(6, 0)$, $(-1, 0)$

Behavior: crosses $\quad$ crosses

121 § 3.5 I #s 27, 31-34, 37, 41, 44

(27) $f(x) = 2x^3 - 5x^2 + 4x - 1$

3 or 1 positive zeros. Just need one...

$\frac{p}{q}$: $\pm 1, \pm \frac{1}{2}$

$$\begin{array}{r|cccc} 1 & 2 & -5 & 4 & -1 \\ & & 2 & -3 & 1 \\ \hline & 2 & -3 & 1 & 0 \end{array} \qquad (x-1)(2x^2-3x+1)$$

$f(x) = (x-1)(2x-1)(x-1)$

$(1,0)$	$(\frac{1}{2},0)$	$(1,0)$
crosses	crosses	crosses

#s 31-36 Determine whether $y \to \pm\infty$ as $x \to \infty$

(31) $y = 2x^3 - x^2 + 9$

as $x \to \infty$, $y \xrightarrow{x\to\infty} 2x^3 \xrightarrow{x\to\infty} +\infty$

(32) $y = -3x + 7$, $y \xrightarrow{x\to\infty} -3x \xrightarrow{x\to\infty} -\infty$

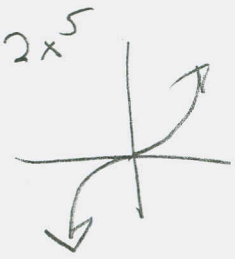
(33) $y = -3x^4 + 5$, $y \xrightarrow{x\to\infty} -3x^4 \xrightarrow{x\to\infty} -\infty$

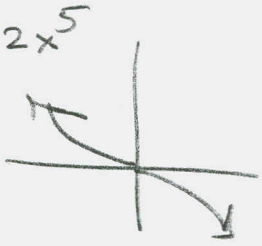
(34) $y = 6x^4 - 5x^2 - 1$, $y \xrightarrow{x\to\infty} 6x^4 \xrightarrow{x\to\infty} +\infty$

121 § 3.5 I #s 37, 41, 44

#s 37–40 Use leading coefficient test to determine whether $y \to \infty$ or $y \to -\infty$ as $x \to -\infty$. (Similar to #s 31–34)

(37) $y = -2x^5 - 3x^2$





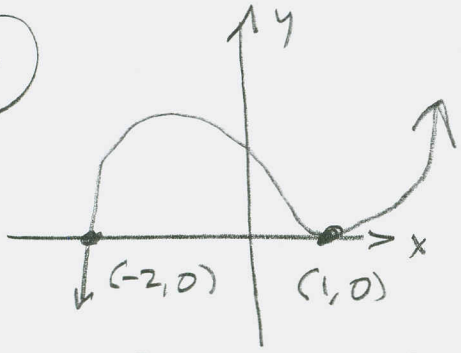
As $x \to -\infty$,

$-2x^5 \to +\infty$

(see it getting taller as x goes far left?)

#s 41–44 Discuss symmetry of each graph, whether it crosses or touches x-axis a x-intercepts, and whether $y \to \infty$ or $y \to -\infty$ as $x \to \infty$ and $x \to -\infty$

(41)



$y = x^3 - 3x + 2 = f(x)$

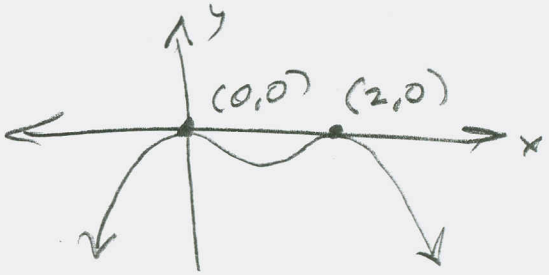
$\lim_{x \to -\infty} f(x) = -\infty$

$\lim_{x \to +\infty} f(x) = +\infty$

(-2,0) cross

(1,0) touch

(44)



$\lim_{x \to -\infty} f(x) = -\infty$

$\lim_{x \to +\infty} f(x) = -\infty$

(0,0) touch

(2,0) cross