

3)

Divide. Find $Q(x)$ and $R(x)$

Cannot use Synthetic Division.

$$\begin{array}{r}
 2x^2 - x + 2 \overline{) 8x^4 + 0x^3 + 6x^2 - 3x + 1} \\
 \underline{-(8x^2 - 4x^3 + 8x^2)} \\
 4x^3 - 2x^2 - 3x \\
 \underline{-(4x^3 - 2x^2 + 4x)} \\
 -7x + 1
 \end{array}$$

$Q(x) = 4x^2 + 2x$

$R(x) = -7x + 1$

4)

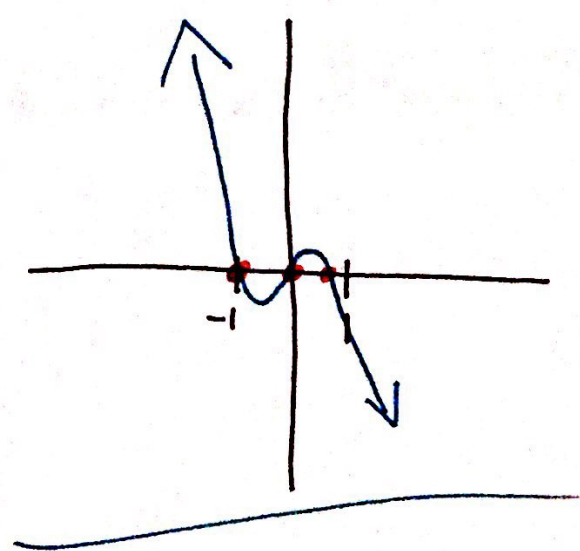
Sketch the graph. (Multiple choice question.)

$p(x) = -2x^3 - x^2 + x$

end behavior
 Since degree is odd opp. directions.
 Since # is neg. (-2) like neg. slope line



Graph



factor

$$\begin{aligned}
 p(x) &= -x(2x^2 + x - 1) \\
 &= -x(2x - 1)(x + 1)
 \end{aligned}$$

Also y-int

Z.P.P.

$-x = 0$	$2x - 1 = 0$	$x + 1 = 0$
$x = 0$	$2x = 1$	$x = -1$
	$x = \frac{1}{2}$	

zeros.

5) Graph

$$P(x) = x^2 (x-1) (x+3)^3$$

Zeros are: 0, 1, -3

Multiplicity of each zero

0; multiplicity is 2 (turn)

1; multiplicity is 1 (cross)

-3; multiplicity is ~~2~~ 3 (cross)

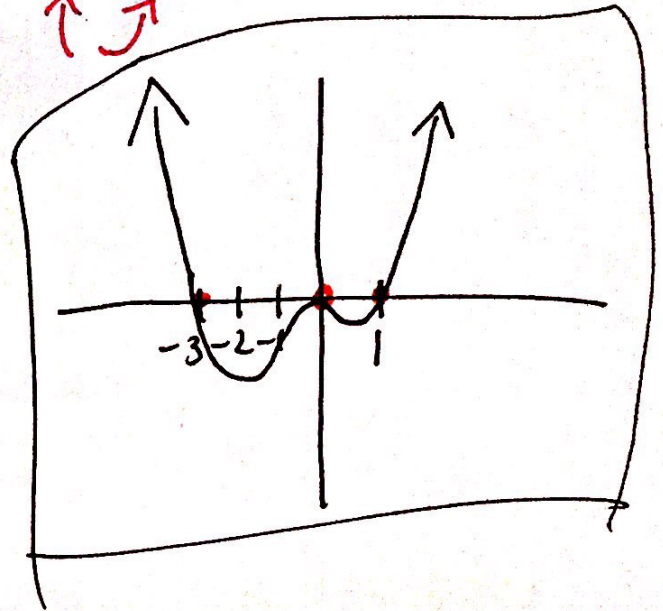
Recall even multiplicity is ~~turning point~~ turning point

odd multiplicity is cross through

This is a 6th degree polynomial (add all powers) with a "+" leading coeff.

So, end behavior is

↑ ↗



6) Divide. Find $Q(x)$ and $R(x)$

$$\frac{3x^3 - 9x^2 + 27x - 27}{x + 2}$$

$x + 2 \rightarrow D(x)$

Use Synthetic Division because $D(x)$ is linear.

$$\begin{array}{r|rrrr} -2 & 3 & -9 & 27 & -27 \\ & \downarrow & -6 & 30 & -114 \\ \hline & 3 & -15 & 57 & -141 \end{array}$$

$Q(x) = 3x^2 - 15x + 57$
 $R(x) = -141$

-141 always $R(x)$

7) Find a polynomial with given zeros and degree 3.

Zeros: $-5, 2, 3$

$x = -5 \quad x = 2 \quad x = 3$

$(x+5)(x-2)(x-3)$

$(x^2 - 2x + 5x - 10)$

$(x^2 + 3x - 10)(x - 3)$

$$\begin{array}{r} x^3 + 3x^2 - 10x \\ -3x^2 - 9x + 30 \\ \hline \end{array}$$

$x^3 - 19x + 30$

$x^3 - 19x + 30$