

Quiz 3

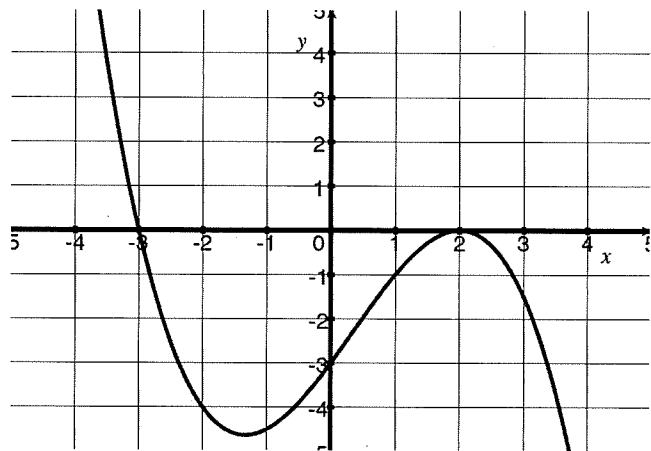
Key

Show *all* your work. No credit is given without reasonable supporting work. There are *two* sides to this quiz.

1. [1] Write down a function that is *not* a polynomial.

There are lots of correct answers for this!

2. [3] (§2.3 #38) The graph of a cubic polynomial f is given. Find the equation for f .



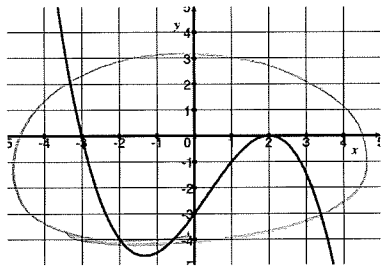
(+1) $\left[\begin{array}{l} -3 \text{ is a root} \Rightarrow (x+3) \text{ or } (x-3) \text{ is a factor} \\ 2 \text{ is a root} \Rightarrow (x-2) \text{ is a factor} \end{array} \right.$

(+1) $\left[\begin{array}{l} @ x = -3 \text{ the curve passes thro the } x\text{-axis} \Rightarrow (x+3) \text{ is a factor} \\ @ x = 2 \text{ the curve touches but does not cross the } x\text{-axis} \\ \Rightarrow (x-2)^2 \text{ is a factor} \end{array} \right.$

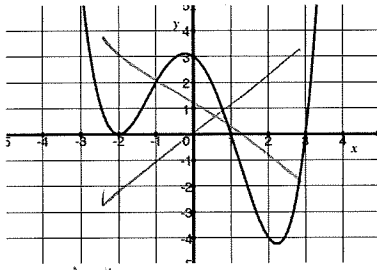
(+1) $\left[\begin{array}{l} \text{So } f(x) = a(x+3)(x-2)^2 \\ \text{graph passes thro } (0, -3) \text{ so } -3 = a(0+3)(0-2)^2 \\ \Rightarrow -3 = a(12) \\ \Rightarrow a = -1/4 \end{array} \right.$

So $f(x) = -1/4(x+3)(x-2)^2$

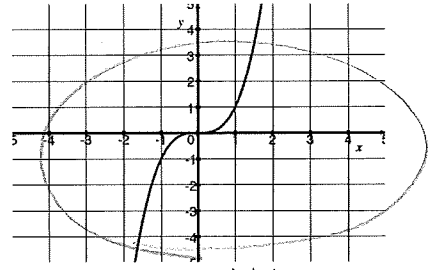
3. [2] (Polynomial Wks #7) Identify which (if any) of the following could be the graph of a degree 3 polynomial.



we found in #2
 $-\frac{1}{4}(x+3)(x-2)^2$



end behavior
 \Rightarrow even deg poly



looks like
 $y = x^3$

4. [4] (§1.2 #85) The area of a rectangle is $4x^4 - 4x^3 + 9x^2 - x + 2$ cm² and the width is known to be $x^2 - x + 2$ cm. Find the length.

(4.5) Area = length \cdot width

$$4x^4 - 4x^3 + 9x^2 - x + 2 = \text{length} \cdot (x^2 - x + 2)$$

(4.5) \Rightarrow length = $\frac{4x^4 - 4x^3 + 9x^2 - x + 2}{x^2 - x + 2}$

$$\begin{array}{r}
 \overset{(4.5)}{4x^2+1} \overset{(4.5)}{R0} \\
 x^2 - x + 2 \overline{) 4x^4 - 4x^3 + 9x^2 - x + 2} \\
 \underline{-(4x^4 - 4x^3 + 8x^2)} \\
 x^2 - x + 2 \\
 \underline{-(x^2 - x + 2)} \\
 0
 \end{array}$$

set up (4.5)

algorithm (4.1)

\therefore length = $4x^2 + 1$