

Page 349 Exercise Set (11-40) all

(12) Not a polynomial (sharp turn)

(14) Polynomial

(16) Power: odd Leading Coefficient: positive

$$\text{as } x \rightarrow -\infty, f(x) \rightarrow -\infty$$

$$\text{as } x \rightarrow \infty, f(x) \rightarrow \infty$$

matches graph c.

(18) Power: odd Leading Coefficient: negative

$$\text{as } x \rightarrow -\infty, f(x) \rightarrow \infty$$

$$\text{as } x \rightarrow \infty, f(x) \rightarrow -\infty$$

matches graph d.

(20) Power: odd Leading Coefficient: positive

$$\text{as } x \rightarrow -\infty, f(x) \rightarrow -\infty$$

$$\text{as } x \rightarrow \infty, f(x) \rightarrow \infty$$

②② Power: even Leading Coefficient: positive
 as $x \rightarrow -\infty$, $f(x) \rightarrow \infty$
 as $x \rightarrow \infty$, $f(x) \rightarrow \infty$

②④ Power: even Leading Coefficient: negative
 as $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$
 as $x \rightarrow \infty$, $f(x) \rightarrow -\infty$

②⑥ $2(x-5)(x+4)^2=0$
 $x-5=0$ $(x+4)^2=0$
 $x=5$ $x=-4; \text{mult } 2$
 crosses tangent

②⑧ $-3(x+\frac{1}{2})(x-4)^3$
 $x+\frac{1}{2}=0$ $(x-4)^3=0$
 $x=-\frac{1}{2}$ $x=4; \text{mult } 3$
 crosses crosses

$$\textcircled{30} \quad x^3 + 4x^2 + 4x = 0$$

$$x(x^2 + 4x + 4) = 0$$

$$x(x+2)(x+2) = 0$$

$$x(x+2)^2 = 0$$

$$x=0 \quad (x+2)^2 = 0$$

$x=0$ $x=-2$; mult 2
crosses tangent

$$\textcircled{32} \quad x^3 + 5x^2 - 9x - 45 = 0$$

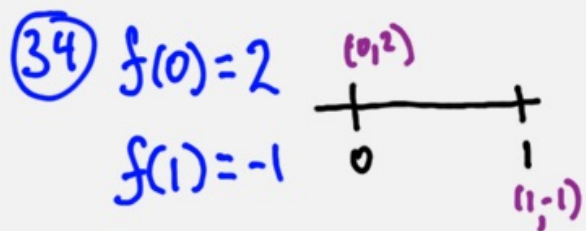
$$(x^3 + 5x^2)(-9x - 45) = 0$$

$$x^2(x+5) - 9(x+5) = 0$$

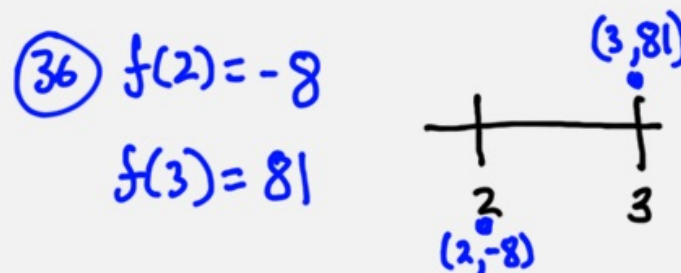
$$(x+5)(x^2 - 9) = 0$$

$$(x+5)(x-3)(x+3) = 0$$

$x=-5$ $x=3$ $x=-3$
crosses crosses crosses

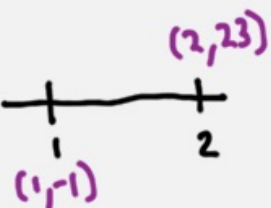


Since $f(x)$ is continuous on the interval $(0, 1)$ and $f(1) < f(c) < f(0)$ there exists at least one value " c " such that $f(c) = 0$ on the interval by the IVT.



Since $f(x)$ is continuous on the interval $(2, 3)$ and $f(2) < f(c) < f(3)$ there exists at least one value " c " such that $f(c) = 0$ on the interval by the IVT.

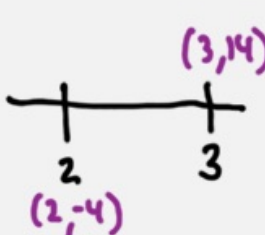
38 $f(1) = -1$ $f(2) = 23$



A horizontal number line with tick marks at 1 and 2. The point (1, -1) is written below the tick mark at 1, and the point (2, 23) is written above the tick mark at 2. A curved line segment connects the two tick marks, representing the interval (1, 2).

Since $f(x)$ is continuous on the interval $(1, 2)$ and $f(1) < f(c) < f(2)$ there exists at least one value "c" such that $f(c) = 0$ on the interval by the IVT.

40 $f(2) = -4$ $f(3) = 14$



A horizontal number line with tick marks at 2 and 3. The point (2, -4) is written below the tick mark at 2, and the point (3, 14) is written above the tick mark at 3. A curved line segment connects the two tick marks, representing the interval (2, 3).

Since $f(x)$ is continuous on the interval $(2, 3)$ and $f(2) < f(c) < f(3)$ there exists at least one value "c" such that $f(c) = 0$ on the interval by the IVT.