

Practice Test #2 SOLUTIONS

① 5 (Biggest exponent)

② a) As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$
As $x \rightarrow \infty$, $f(x) \rightarrow -\infty$

b) As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$
As $x \rightarrow \infty$, $f(x) \rightarrow \infty$

③ $f(x) = (x-3)^2 + 5$

④ 1) $f(x) = (x-2)^2 + 2$

2) $f(x) = (x-2)^2 + 5$

3) $f(x) = -(x-2)^2 - 5$

⑤ a) $f(-6) = -17$

b) $f(-4) = 4$

c) $f(10) = 130$

d) $f(0) = 0$

⑥ a) $f(-4) = 8$

b) $f(-3) = 5$

c) $f(0) = 1$

d) $f(4) = 9$

e) $f(-1) = -1$

} NOT
ON
TEST
#2

$$\textcircled{7} \quad \begin{array}{r|rrr} 1 & 1 & 3 & 6 \\ & \downarrow & & \\ & 1 & 4 & \\ \hline & 1 & 4 & | 10 \end{array} \quad \frac{x^2+3x+6}{x-1} = x+4 + \frac{10}{x-1}$$

$$\textcircled{8} \quad \begin{array}{r|rrrrr} -2 & 4 & -3 & 0 & 2 & 4 \\ & \downarrow & & & & \\ & -8 & 22 & -44 & 84 & \\ \hline & 4 & -11 & 22 & -42 & | 88 \end{array} = 4x^3 - 11x^2 + 22x - 42 + \frac{88}{x+2}$$

$$\textcircled{9} \quad \begin{array}{r} 4x^2 - 7x + \frac{29}{2} - \frac{89}{2(2x+3)} \\ 2x+3 \overline{) 8x^3 - 2x^2 + 8x - 1} \\ \underline{(-) 8x^3 + 12x^2} \quad \downarrow \\ \quad -14x^2 + 8x \\ \underline{(-) -14x^2 - 21x} \quad \downarrow \\ \qquad 29x - 1 \\ \underline{(-) 29x + \frac{87}{2}} \\ \qquad \qquad \qquad -\frac{89}{2} \end{array}$$

$$\text{Ans: } 4x^2 - 7x + \frac{29}{2} - \frac{89}{4x+6}$$

$$\textcircled{10} \quad \frac{p}{q} = \frac{\pm 1, \pm 2, \pm 3, \pm 6}{\pm 1, \pm 2, \pm 4} = \left\{ \pm 1, \pm \frac{1}{2}, \pm \frac{1}{4}, \pm 2, \pm 3, \pm \frac{3}{2}, \pm \frac{3}{4}, \pm 6 \right\}$$

$$\textcircled{11} \quad \frac{p}{q}: \frac{\pm 1, \pm 2}{\pm 1, \pm 2} \quad \left\{ \pm 1, \pm \frac{1}{2}, \pm 2 \right\}$$

$$\begin{array}{r|rrrr} 1 & 2 & 1 & -5 & 2 \\ & \downarrow & & & \\ & 2 & 3 & -2 & \\ \hline & 2 & 3 & -2 & | 0 \end{array}$$

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

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

$$\textcircled{12} \quad \frac{p}{q}: \frac{\pm 1, \pm 2, \pm 4, \pm 8}{\pm 1, \pm 3} : \left\{ \pm 1, \pm \frac{1}{3}, \pm 2, \pm \frac{2}{3}, \pm 4, \pm \frac{4}{3}, \pm 8, \pm \frac{8}{3} \right\}$$

$$\begin{array}{r|rrrr} 2 & 3 & 7 & -22 & -8 \\ & \downarrow & & & \\ & 6 & 26 & 8 & \\ \hline & 3 & 13 & 4 & | 0 \end{array}$$

$$g(x) = (x-2)(3x^2 + 13x + 4)$$

$$= (x-2)(3x+1)(x+4)$$

Zeros @ $x=2, x=-\frac{1}{3}, x=-4$

$$\textcircled{13} \quad (4+2i)(3-4i) = 12 - 16i + 6i - 8i^2$$

$$= 12 - 10i - 8(-1)$$

$$= 20 - 10i$$

- ⑭ Crosses x-axis at $(x = -1)$
Touches at $(x = 2)$, this means the
Zero repeats.

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

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

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

⑮ $f(x) = 2x^3 - 4x^2 + 3x + 2$

Possible (+) Zeros : 2 or 0
(Real)

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

Possible (-) Zeros : 1
(Real)