

3.4-3.6 Test Review Key

**SHOW ALL WORK TO RECEIVE ANY CREDIT (when you take the actual test)!!

(#1-5) Perform the operations and write your polynomial in standard form.

$$1) (2a^4 - 4a + 2a^3 + 8) + (-5a^3 - 9a^4 + 11a)$$

Combine like terms (same exponent on variable)

$$-7a^4 + 7a - 3a^3 + 8 = -7a^4 - 3a^3 + 7a + 8$$

$$2) (4n^5 - 3n^2 + 4) + (5n^5 - 2n^3 - 9) - (3n^2 - 4n^5 - 1 + 9n^3)$$

Combine like terms (same exponent on variable)

$$9n^5 - 2n^3 - 3n^2 - 5 - (3n^2 - 4n^5 - 1 + 9n^3) = 13n^5 - 11n^3 - 6n^2 - 4$$

$$3) 3x(x - 7)$$

$$3x \cdot x + 3x \cdot (-7) = 3x^2 - 21x$$

$$4) (x^2 + 7x + 3)(2x - 8)$$

$$x^2 \cdot 2x + x^2 \cdot (-8) + 7x \cdot 2x + 7x \cdot (-8) + 3 \cdot 2x + 3 \cdot (-8) = 2x^3 - 8x^2 + 14x^2 - 56x + 6x - 24 \\ = 2x^3 + 6x^2 - 50x - 24$$

$$5) (x^2 - 4)(x + 3)(x - 2)$$

$$[x^2 \cdot x + x^2 \cdot 3 + (-4) \cdot x + (-4) \cdot (3)](x - 2) = (x^3 + 3x^2 - 4x - 12)(x - 2) \\ = x^3 \cdot x + x^3 \cdot (-2) + 3x^2 \cdot x + 3x^2 \cdot (-2) + (-4x) \cdot x + (-4x) \cdot (-2) + (-12) \cdot x + (-12) \cdot (-2) \\ = x^4 - 2x^3 + 3x^3 - 6x^2 - 4x^2 + 8x - 12x + 24 = x^4 + x^3 - 10x^2 - 4x + 24$$

6) a) Is $(x + 2)$ a factor of $(5x^3 - 2x^2 - 8x - 16)$? Explain your answer.

-2	5	-2	-8	-16	Not a factor because there is a remainder
	↓	-10	24	-32	
	5	-12	16	-48	

b) Divide the polynomials. Write your answer as a polynomial in standard form.

$$5x^2 - 12x + 16 + \frac{-48}{x+2}$$

7) Give two other names for zeros.

Roots, factors, (x-intercepts)

(#8-9) Use division to solve. You may use [Desmos](#) to help you start. List the complete factorization and list ALL the zeros in one spot.

8) $f(x) = 16x^4 - 28x^3 + 6x^2$

4 answers because degree is 4 → from Desmos, one integer x-int is 0

$$\begin{array}{r|rrrrr} 0 & 16 & -28 & 6 & 0 & 0 \\ & \downarrow & & & & \\ & 16 & -28 & 6 & 0 & 0 \end{array}$$

$0 = 16x^3 - 28x^2 + 6x \rightarrow$ from Desmos, one integer x-int is 0

$$\begin{array}{r|rrrr} 0 & 16 & -28 & 6 & 0 \\ & \downarrow & & & \\ & 16 & -28 & 6 & 0 \end{array}$$

$0 = 16x^2 - 28x + 6 \rightarrow$ Factor or Quadratic Formula now

$$0 = 2(8x^2 - 14x + 3) = 2(4x - 1)(2x - 3)$$

$$0 = 4x - 1$$

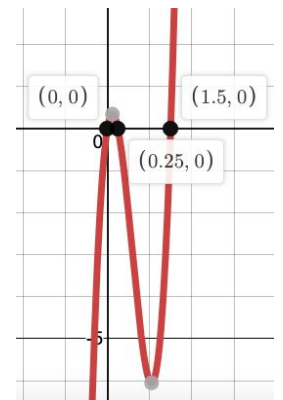
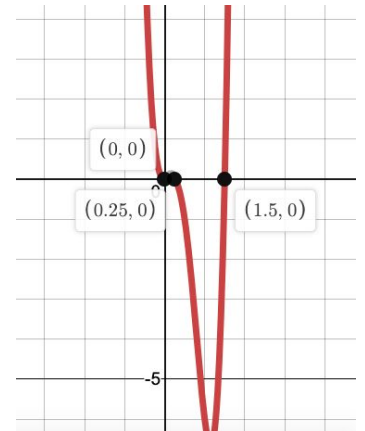
$$1/4 = x$$

$$0 = 2x - 3$$

$$3/2 = x$$

$x = 0, 0, 1/4, 3/2$

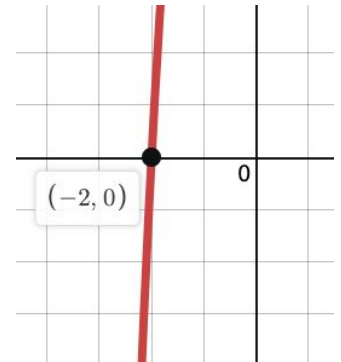
(or could have factored out $2x^2$ from the start for $2x^2(8x^2 - 14x + 3)$ and done it without division if it hadn't been in the directions to do it with division...)



$$9) 2x^3 + x^2 - x + 10 = 0$$

3 answers because degree is 3 → from Desmos, one integer
x-int is -2

$$\begin{array}{r|rrrr}
 -2 & 2 & 1 & -1 & 10 \\
 & \downarrow & -4 & 6 & -10 \\
 \hline
 & 2 & -3 & 5 & 0
 \end{array}$$



$$0 = 2x^2 - 3x + 5$$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(5)}}{2(2)} = \frac{3 \pm \sqrt{9-40}}{4} = \frac{3 \pm \sqrt{-31}}{4} = \frac{3 \pm i\sqrt{31}}{4}$$

$$\mathbf{x = -2, \frac{3+i\sqrt{31}}{4}, \frac{3-i\sqrt{31}}{4}}$$

10) List the transformations for the polynomial: $f(x) = -1/2(x - 3)^4 + 13$

$a = -1/2$ → **reflect, wide**

$h = 3$ → **right 3**

$k = 13$ → **up 13**