

Simplify Rationals/Poly Division/Evaluating

Simplify each and state the excluded (restricted) values.

$$1) \frac{n^3 + 2n^2 - 4n - 8}{-5n^4 + 15n^3 - 10n^2}$$

$$2) \frac{2x^2 + 4x - 30}{4x^2 + 20x}$$

$$3) \frac{2p^2 + 12p + 16}{p^2 + p - 2}$$

$$4) \frac{3x^3 + 6x^2 - 24x}{x^2 + x - 6}$$

Divide.

$$5) (p^4 - 12p^3 + 20p^2 + 19p - 2) \div (p - 3)$$

$$6) (x^4 - 9x^3 + 27x^2 - 61x + 51) \div (x - 6)$$

$$7) (n^3 + 11n^2 + 32n + 21) \div (n + 3)$$

$$8) (n^4 + 5n^3 + 6n^2 - 3n + 3) \div (n + 1)$$

Evaluate each function at the given value. Use this information to determine if the given value is a zero of the function.

$$9) f(x) = -6x^4 - 14x^3 + 6x^2 - 16x + 2 \text{ at } x = -3$$

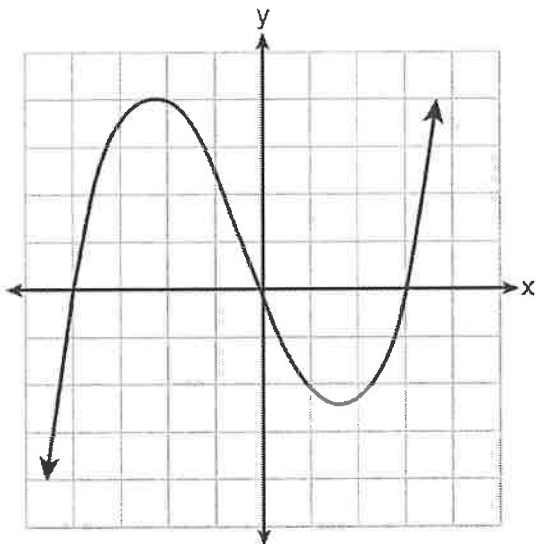
$$10) f(a) = 4a^4 - 15a^3 - 28a^2 + 21a - 28 \text{ at } a = 5$$

$$11) f(a) = -4a^5 + 12a^4 - 6a^3 - 4a^2 - 6a + 10 \text{ at } a = 2$$

$$12) f(a) = -6a^3 - 27a^2 + 18a + 9 \text{ at } a = -5$$

A.APR.B.2: Remainder Theorem

1 The graph of $p(x)$ is shown below.



What is the remainder when $p(x)$ is divided by $x + 4$?

- 1) $x - 4$ 2) -4 3) 0 4) 4
- 2 If $p(x) = 2x^3 - 3x + 5$, what is the remainder of $p(x) \div (x - 5)$?
- 1) -230 2) 0 3) 40 4) 240
- 3 If $x - 1$ is a factor of $x^3 - kx^2 + 2x$, what is the value of k ?
- 1) 0 2) 2 3) 3 4) -3
- 4 Given $P(x) = x^3 - 3x^2 - 2x + 4$, which statement is true?
- 1) $(x - 1)$ is a factor because $P(-1) = 2$.
 2) $(x + 1)$ is a factor because $P(-1) = 2$.
 3) $(x + 1)$ is a factor because $P(1) = 0$. 4) $(x - 1)$ is a factor because $P(1) = 0$.

- 5 When $g(x)$ is divided by $x + 4$, the remainder is 0 . Given $g(x) = x^4 + 3x^3 - 6x^2 - 6x + 8$, which conclusion about $g(x)$ is true?
- 1) $g(4) = 0$ 2) $g(-4) = 0$ 3) $x - 4$ is a factor of $g(x)$. 4) No conclusion can be made regarding $g(x)$.
- 6 Which binomial is a factor of $x^4 - 4x^2 - 4x + 8$?
- 1) $x - 2$ 2) $x + 2$ 3) $x - 4$ 4) $x + 4$
- 7 Which binomial is *not* a factor of the expression $x^3 - 11x^2 + 16x + 84$?
- 1) $x + 2$ 2) $x + 4$ 3) $x - 6$ 4) $x - 7$
- 8 Use an appropriate procedure to show that $x - 4$ is a factor of the function $f(x) = 2x^3 - 5x^2 - 11x - 4$. Explain your answer.
- 9 Show why $x - 3$ is a factor of $m(x) = x^3 - x^2 - 5x - 3$. Justify your answer.
- 10 Determine if $x - 5$ is a factor of $2x^3 - 4x^2 - 7x - 10$. Explain your answer.
- 11 Given $r(x) = x^3 - 4x^2 + 4x - 6$, find the value of $r(2)$. What does your answer tell you about $x - 2$ as a factor of $r(x)$? Explain.
- 12 Determine for which polynomial(s) $(x + 2)$ is a factor. Explain your answer.
- $P(x) = x^4 - 3x^3 - 16x - 12$
 $Q(x) = x^3 - 3x^2 - 16x - 12$
- 13 Evaluate $j(-1)$ given $j(x) = 2x^4 - x^3 - 35x^2 + 16x + 48$. Explain what your answer tells you about $x + 1$ as a factor. Algebraically find the remaining zeros of $j(x)$.
- 14 Given $z(x) = 6x^3 + bx^2 - 52x + 15$, $z(2) = 35$, and $z(-5) = 0$, algebraically determine all the zeros of $z(x)$.