

(12)

$$\begin{array}{r}
 x^3 + 9x^2 - 18x + 20 - \frac{80}{x+2} \\
 (x+2) \overline{) x^4 + 11x^3 + 0x^2 - 16x - 40} \\
 \underline{-(x^4 + 2x^3)} \\
 9x^3 + 0x^2 \\
 \underline{-(9x^3 + 18x^2)} \\
 -18x^2 - 16x - 40 \\
 \underline{-(-18x^2 - 36x)} \\
 20x - 40 \\
 \underline{-(20x + 40)} \\
 -80
 \end{array}$$

Warm Up:

More Examples:

Divide $2x^3 - 9x^2 + 15$ by $2x - 5$ Divide $4x^4 + 3x^3 + 2x + 1$ by $x^2 + x + 2$

$$\begin{array}{r}
 x^2 - 2x - 5 - \frac{10}{2x-5} \\
 (2x-5) \overline{) 2x^3 - 9x^2 + 0x + 15} \\
 \underline{-(2x^3 - 5x^2)} \quad \downarrow \\
 -4x^2 + 0x \\
 \underline{-(-4x^2 + 10x)} \quad \downarrow \\
 -10x + 15 \\
 \underline{-(-10x + 25)} \\
 -10
 \end{array}$$



What is the quotient when $10x^3 - 3x^2 - 7x + 3$ is divided by $2x - 1$?

- 1) $5x^2 + x + 3$
- 2) $5x^2 - x + 3$
- 3) $5x^2 - x - 3$
- 4) $5x^2 + x - 3$

Determine the quotient and remainder when $(6a^3 + 11a^2 - 4a - 9)$ is divided by $(3a - 2)$.

Express your answer in the form $q(a) + \frac{r(a)}{d(a)}$.



If $p(x) = 2x^3 - 3x + 5$, what is the remainder of $p(x) \div (x-5)$? $x=5$

- 1) -230 2) 0 3) 40 4) 240



$$\begin{array}{r}
 2x^2 + 10x + 47 + \frac{240}{x-5} \\
 (x-5) \overline{) 2x^3 + 0x^2 - 3x + 5} \\
 \underline{-(2x^3 - 10x^2)} \\
 10x^2 - 3x \\
 \underline{-(10x^2 - 50x)} \\
 47x + 5 \\
 \underline{-(47x - 235)} \\
 240
 \end{array}$$

Not a factor

x	y
0	5
1	4
2	15
3	50
4	121
5	240
6	419

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 $g(x)$.

factor $(x+4)$
 $x = -4$

More Examples:

Write in standard form

Divide $(x^3 - 2x^2 + 6x - 6) \div (x - 3)$

$(-2x^2 + x^3 - 75) \div (x - 5)$

$$x^2 + x + 9 + \frac{21}{x-3}$$

$$x^2 + 3x + 15$$

Divide $(3h^3 - 4h^2 + 2h + 4) \div (h^2 - 2h + 2)$

$(3x^6 - 7x^5 - 53x^3 - 26x^2 - 43x - 34) \div (3x + 2)$

$$3h + 2$$

$$x^5 - 3x^4 + 2x^3 - 19x^2 + 4x - 17$$

Divide $4x^3 + 2x^2 - 10x$ by $2x^2 - 4$

$$2x + 1 + \frac{-2x + 4}{2x^2 - 4}$$

Name: _____

SoftSchools

Polynomial Long Division.

1) $(6a^2 + 7a - 10) \div (a + 1)$

3) $(7a^2 - 20a + 24) \div (a - 3)$

5) $(6z^2 - 8z + 10) \div (z - 2)$

7) $(10c^2 + 12c - 15) \div (c + 3)$

9) $(9n^2 + 11n - 16) \div (n + 9)$

11) $(7m^4 + 16m^3 - 19m - 46) \div (m + 5)$

13) $(4c^4 + 10c^3 - 14c - 32) \div (c + 11)$

15) $(10a^4 + 19a^3 - 22a - 49) \div (a + 9)$

17) $(7c^4 - 4c^3 + 11c^2 - 8c - 8) \div (c - 3)$

19) $(4q^4 - 4q^3 + 20q^2 - 5q) \div (q - 10)$

2) $(7m^2 + 10m - 15) \div (m + 8)$

4) $(8b^2 + 10b - 12) \div (b + 2)$

6) $(8c^2 - 14c + 31) \div (c - 2)$

8) $(5y^2 + 8y - 11) \div (y + 7)$

10) $(5n^3 - 20n^2 + 24n - 76) \div (n - 10)$

12) $(x^4 + 11x^3 - 16x - 40) \div (x + 2)$

14) $(7n^4 - 6n^3 + 13n^2 - 6n) \div (n - 6)$

16) $(12z^4 - 10z^3 + 18z^2 - 6z - 12) \div (z - 7)$

18) $(8n^4 - 3n^3 + 8n^2 - 3n - 6) \div (n - 9)$

20) $(11y^4 - 8y^3 + 16y^2 - 10y - 11) \div (y - 6)$