Topic: Dividing multivariable polynomials

Question: Find the quotient.

$$\frac{x^3 + y^3}{x + y}$$

Answer choices:

A $x^2 + xy + y^2$

B $x^2 - xy - y^2$

C $x^2 - xy + y^2$

D $x^2 + 2xy + y^2$

Solution: C

If we use long division to find the quotient, we get

$$
\begin{array}{r}
x^2-xy+y^2 \\
x+y\,\overline{)\,x^3+0x^2y+0xy^2+y^3} \\
-(x^3+x^2y) \\
\hline
-x^2y+0xy^2 \\
-(-x^2y-xy^2) \\
\hline
xy^2+y^3 \\
-(xy^2+y^3) \\
\hline
0
\end{array}
$$

Topic: Dividing multivariable polynomials

Question: Find the quotient.

$$\frac{2x^3 + 15yx^2 + 24y^2x - 16y^3}{x + 4y}$$

Answer choices:

A $2x^2 + 7xy - 4y^2$

B $2x^2 - 5xy - 4y^2$

C $2x^2 + 3xy - 4y^2$

D $2x^2 - 4xy - 4y^2$

Solution: A

If we use long division to find the quotient, we get

$$
\begin{array}{r}
2x^2+7xy-4y^2 \\
x+4y \overline{)\,2x^3+15yx^2+24y^2x-16y^3} \\
-(2x^3+8yx^2) \\
\hline
7yx^2+24y^2x \\
-(7yx^2+28y^2x) \\
\hline
-4y^2x-16y^3 \\
-(-4y^2x-16y^3) \\
\hline
0
\end{array}
$$

Topic: Dividing multivariable polynomials

Question: Find the quotient.

$$\frac{3x^3 - 7x^2y - 7xy^2 + 3y^3}{x - 3y}$$

Answer choices:

A $3x^2 + 2xy - 3y^2$

B $3x^2 - 2xy - 3y^2$

C $3x^2 - 2xy + y^2$

D $3x^2 + 2xy - y^2$

Solution: D

If we use long division to find the quotient, we get

$$
\begin{array}{r}
3x^2+2xy-y^2 \\
x-3y \;\overline{)\; 3x^3-7x^2y-7xy^2+3y^3} \\
\underline{-(3x^3-9x^2y)} \\
2x^2y-7xy^2 \\
\underline{-(2x^2y-6xy^2)} \\
-xy^2+3y^3 \\
\underline{-(-xy^2+3y^3)} \\
0
\end{array}
$$