

Warm-up

$$(c^2 + 1)(c^2 + 2) = c^4 + \boxed{2}c^2 + \boxed{1}c^2 + 2$$

$$c^4 + \boxed{3}c^2 + 2$$

Diagram: A blue circle connects the terms in the expansion. The top arc is labeled 'L', the bottom arc is labeled 'F', and the middle arc is labeled 'O'. The boxed terms in the expansion correspond to these labels: 'L' for the $2c^2$ term, 'O' for the $1c^2$ term, and 'F' for the $3c^2$ term.

$$\left(y - \frac{1}{2}\right)\left(y + \frac{3}{4}\right)$$

$$y\left(y + \frac{3}{4}\right) + -\frac{1}{2}\left(y + \frac{3}{4}\right)$$

$$y \cdot y + y \cdot \frac{3}{4} + \underline{-\frac{1}{2} \cdot y} + \boxed{-\frac{1}{2} \cdot \frac{3}{4}}$$

$$y^2 + \frac{3}{4}y - \frac{1}{2}y - \frac{3}{8}$$

$$\frac{3}{4} + \left(-\frac{1}{2}\right)^2$$

$$\frac{3}{4} + -\frac{2}{4}$$

$$y^2 + \frac{1}{4}y - \frac{3}{8}$$

$$21. (p+q)(p+q)$$

$$p(p+q) + q(p+q)$$

$$p \cdot p + \cancel{p \cdot q} + q \cdot p + q \cdot q$$

$$p^2 + \cancel{1pq} + \cancel{1pq} + q^2$$

$$p^2 + 2pq + q^2$$

$$17. \left(y - \frac{1}{3}\right) \left(y + \frac{5}{9}\right)$$

$$y^2 + \frac{5}{9}y - \frac{1}{3}y - \frac{1}{3} \cdot \frac{5}{9}$$

$$\frac{5}{9} - \frac{1 \cdot 3}{3 \cdot 3} \quad - \frac{5}{27}$$

$$\frac{5}{9} - \frac{3}{9}$$

$$y^2 + \frac{2}{9}y - \frac{5}{27}$$

Sec. 9.5 Common Factors

Factor each polynomial.

a. $4y^3 - 16y^4$ ~~$4 \cdot y \cdot y \cdot y - 4 \cdot 4 \cdot y \cdot y \cdot y$~~

$4y^3(1 - 4y)$ $4y \cdot y \cdot y(1 - 4y)$

$4y^3(1 - 4y)$

b. $\frac{6p}{3p} + \frac{15p^2}{3p} - \frac{9pq}{3p}$

$\frac{3 \cdot 2 \cdot p}{3} + \frac{3 \cdot 5 \cdot p \cdot p}{3p} - \frac{3 \cdot 3 \cdot p \cdot q}{3p}$

$3p(2 + 5p - 3q)$

c. $8r^4 + 17s^4$ ~~$1(8r^4 + 17s^4)$~~

prime
(not factorable)

$$d. \quad \frac{6ab}{3a} + \frac{3a}{3a}$$

$$3a(2b + 1)$$

$$\frac{6ab + 3a}{3}$$

$$3\left(\frac{2ab + 1a}{a}\right)$$

$$3a(2b + 1)$$

$$e. \quad \frac{5x^3}{5x} + \frac{10x^2}{5x} - \frac{20x}{5x}$$

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

$$P. \quad 450(13 - 27) \text{ odd}$$