

Factor:

a.  $x^2 - 3x - 40$   
 $(x+5)(x-8)$

Factor pairs for -40:  
 -40  
 1·40  
 2·20  
 4·10  
 5·8 (boxed)  
 +5, -8

b.  $5x^2 + 7xy + 2y^2$

Factor pairs for 10:  
 10  
 1·10  
 2·5

$5x^2 + 2xy + 5xy + 2y^2$   
 $x(5x+2y) + y(5x+2y)$   
 $(5x+2y)(x+y)$

c.  $x^2 - 9$   
 $x^2 + 0x - 9$   
 $(x+3)(x-3)$

Factor pairs for -9:  
 -9  
 1·9  
 3·3  
 3, -3

d.  $9x^2 + 24x + 16$

Factor pairs for 144:  
 144  
 1·144  
 2·72  
 3·48  
 4·36  
 6·24  
 8·18  
 9·16  
 12·12 (boxed)

$9x^2 + 12x + 12x + 16$   
 $3x(3x+4) + 4(3x+4)$   
 $(3x+4)(3x+4)$   
 or  
 $(3x+4)^2$

Alternative factoring:  
 $9x^2 + 24x + 16$   
 $(3x+4)^2$

More practice:

$$a. \frac{6x^2}{2} + \frac{8x}{2} - \frac{30}{2}$$

$$2(3x^2 + 4x - 15)$$

$$2\left(\frac{3x^2}{x} - \frac{5x}{x} + \frac{9x}{3} - \frac{15}{3}\right)$$

$$2[x(3x-5) + 3(3x-5)]$$

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

\* Always take out GCF first.

$$\begin{array}{r} -45 \\ 1 \cdot 45 \\ 3 \cdot 15 \\ \hline 5 \cdot 9 \end{array} \quad -5, +9$$

23.  $2x^2 - 27x + 63$

$$\boxed{\begin{array}{r} 2x^2 - 6x - 21x + 63 \\ \hline \cancel{2x} \quad \cancel{6x} \quad \cancel{-21x} \quad \cancel{-21x} \end{array}}$$

$$24(x-3) - 21(x-3)$$

$$(x-3)(2x-21)$$

$63 \times 2$

$$\frac{126}{\phantom{00}}$$

$1 \cdot 126$

$2 \cdot 63$

$3 \cdot 42$

$$\boxed{-6 \cdot 21}$$

$7 \cdot 18$

$9 \cdot 14$

25.  $4m^2 - \underline{3m} + 17$

Prime

$$\boxed{\begin{array}{r} 68 \\ \hline 1 \cdot 68 \\ 2 \cdot 34 \\ 4 \cdot 17 \end{array}}$$

$$\frac{77}{\phantom{00}}$$

$$\frac{4}{\phantom{00}}$$

$$\frac{68}{\phantom{00}}$$

$$b. \quad \frac{3x^3}{3x} + \frac{27x^2}{3x} + \frac{42x}{3x}$$

$$3x (x^2 + 9x + 14) \quad \begin{array}{r} 14 \\ 1 \cdot 14 \\ \hline 2 \cdot 7 \end{array}$$

$$3x \left( \frac{x^2}{x} + \frac{2x}{x} + \frac{7x}{x} + \frac{14}{7} \right) \quad \frac{3x(x+2)(x+7)}{\underline{\hspace{2cm}}}$$

$$3x [x(x+2) + 7(x+2)]$$

$$3x (x+2)(x+7)$$

p. 462 (10-30) even