

6.1 Review p 902

$$1. x^7 \cdot x^3 \cdot x = x^{7+3+1} = \boxed{x^{11}}$$

$$4. (-3)^4 (-3) = (-3)^{4+1} = (-3)^5 = \boxed{-243}$$

$$7. \frac{6^5}{6^3} = 6^{5-3} = 6^2 = \boxed{36}$$

$$10. (3^5)^7 = 3^{5(7)} = \boxed{3^{35}}$$

$$13. (x^2)^5 = x^{2(5)} = \boxed{x^{10}}$$

$$16. 3x^0 = 3 \cdot 1 = \boxed{3}$$

$$19. -3^{-2} = \frac{-1}{3^2} = \boxed{\frac{-1}{9}}$$

$$22. \left( \frac{5a^7}{2b^5c} \right)^3 = \frac{5^3 a^{7(3)}}{2^3 b^{5(3)} c^3} = \boxed{\frac{125 a^{21}}{8 b^{15} c^3}}$$

6.2 Review p. 902

1.  $(4x^3 + 5x - 7x^2) + (-2x^3 + 5x^2 - 7y^2)$   
 $4x^3 - 2x^3 - 7x^2 + 5x^2 + 5x - 7y^2$   
 $2x^3 - 2x^2 + 5x - 7y^2$

4.  $(-3x^2 + 7x + 23) - (-8x^2 - 5x + 13)$   
 $-3x^2 + 8x^2 + 7x + 5x + 23 - 13$   
 $5x^2 + 12x + 10$

7.  $(2x - 3)(4x + 7)$  {USE FOIL!}  
 $8x^2 + 14x - 12x - 21$   
 $8x^2 + 2x - 21$

10.  $(2x + 5)(2x - 5)$  {Diff of Squares}  
 $4x^2 - 25$

13.  $(2a^2 + 8)(2a^2 - 8)$  {Diff of Squares}  
 $4a^4 - 64$

16.  $(5x + 6)^2$   
 $(5x + 6)(5x + 6)$  {Use FOIL}  
 $25x^2 + 30x + 30x + 36$   
 $25x^2 + 60x + 36$

\* We could have seen this was a Perfect Square trinomial!

## 6.2 Review continued

$$19. \quad -\frac{1}{2} a^2 (a^3 - 6a^2 + 5a) \quad \left\{ \text{Distribute} \right\}$$

$$= \left[ -\frac{1}{2} a^5 + 3a^4 - \frac{5}{2} a^3 \right]$$

## 6.3 Review p. 903

$$1. \quad p(x) = 7x - 3$$

$$p(5) = 7(5) - 3 \\ = \boxed{32}$$

$$p(-1) = 7(-1) - 3 \\ = \boxed{-10}$$

$$4. \quad p(x) = -13x^3 + 5x^2$$

$$p(5) = -13(5)^3 + 5(5)^2 \\ = -13(125) + 5(25) \\ = -1625 + 125 \\ = \boxed{-1500}$$

$$p(-1) = -13(-1)^3 + 5(-1)^2 \\ = -13(-1) + 5(1) \\ = 13 + 5 \\ = \boxed{18}$$

$$7. \quad p(x) = x^3 + x^2 - x + 1$$

$$p(5) = 5^3 + 5^2 - 5 + 1 \\ = 125 + 25 - 5 + 1 \\ = \boxed{146}$$

$$p(-1) = (-1)^3 + (-1)^2 - (-1) + 1 \\ = -1 + 1 + 1 + 1 \\ = \boxed{3}$$

$$p(x) = -2x^2 + 5x + 1$$

$$q(x) = x^3 - 1$$

$$10. \quad q(n) = (n)^3 - 1 \\ = \boxed{n^3 - 1}$$

$$13. \quad p(3m^2) = -2(3m^2)^2 + 5(3m^2) + 1 \\ = -2(9m^4) + 15m^2 + 1 \\ = \boxed{-18m^4 + 15m^2 + 1}$$

$$16. \quad q(a^2 - 2) = (a^2 - 2)^3 - 1 \\ = (a^2 - 2)(a^2 - 2)(a^2 - 2) - 1 \quad \text{Foil} \\ = (a^2 - 2)(a^4 - 4a^2 + 4) - 1 \\ = a^2(a^4 - 4a^2 + 4) - 2(a^4 - 4a^2 + 4) - 1 \\ = a^6 - 4a^4 + 4a^2 - 2a^4 + 8a^2 - 8 - 1 \\ = \boxed{a^6 - 6a^4 + 12a^2 - 9}$$

$$19. \quad q(n-2) + q(n^2)$$

$$q(n-2) = (n-2)^3 - 1$$

$$= (n-2)(n-2)(n-2) - 1$$

$$= (n-2)(n^2 - 4n + 4) - 1$$

$$= n(n^2 - 4n + 4) - 2(n^2 - 4n + 4) - 1$$

$$= n^3 - 4n^2 + 4n - 2n^2 + 8n - 8 - 1$$

$$= n^3 - 6n^2 + 12n - 9$$

$$q(n^2) = (n^2)^3 - 1$$

$$= n^6 - 1$$

$$q(n-2) + q(n^2) = n^3 - 6n^2 + 12n - 9 + n^6 - 1$$

$$= \boxed{n^6 + n^3 - 6n^2 + 12n - 10}$$

## 6.4 Review p 903

1.  $f(x) = x^3 + x^2 - 3x$

x	y
-3	-9
-2	2
-1	3
0	0
1	-1
2	4
3	27

b. Look @ sign changes in y-value or  $y=0$

- between  $x = -3, -2$   
 - at  $x = 0$   
 - between  $x = 1, 2$

c. Look at 3 consecutive y values.  
 Low - high - low (rel max)  
 high - low - high (rel min)

rel max at  $x = -1$   
 rel min at  $x = 1$

4.  $f(x) = 2x^5 + 3x^4 - 8x^2 + x + 4$

x	y
-3	-314
-2	-46
-1	-4
0	4
1	2
2	86
3	664

b. Real zero between  $x = -1,$

c. Rel max at  $x = 0$   
 Rel min at  $x = 1$

7.  $f(x) = -x^3 - 8x^2 + 3x - 7$

x	y
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-3 | -61

-2 | -37

-1 | -17

0 | -7

1 | -13

2 | -41

b. no real o's.

c. only a rel max at  $x=0$

No rel Min

} high

10.  $f(x) = x^4 - 5x^3 + x^2 - x - 3$

x	y
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-3 | 225

-2 | 59

-1 | 5

0 | -3

1 | -7

2 | -25

b. real 0 between  $x=-1, 0$

c. no rel max or min

} high

13.  $f(x) = x^5 - x^3 - x + 1$

x	y
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-3 | -212

-2 | -21

-1 | 2

0 | 1

1 | 0

2 | 23

3 | 214

b. one real 0 between

$x = -2, -1$

c. rel max at  $x = -1$

rel Min at  $x = 1$

} high

} low

## 6.4 Review Continued p 903

16.  $f(x) = -x^3 - x^2 - x - 1$

x	y
-3	20
-2	5
-1	0
0	-1
1	-4

b. one real 0 bet.  
 $x = -1, 0$

c. no rel Max or Min

## 6.5 Review

1.  $14a^3b^3c - 21a^2b^4c + 7a^2b^3c$   
 $7a^2b^3c(2a - 3b + 1)$

GCF

4.  $2x^2 + 5x + 3$   
 $2x^2 + 2x + 3x + 3$   
 $2x(x+1) + 3(x+1)$   
 $(2x+3)(x+1)$

AC Method

$$2 \cdot 3 = 6$$

$$\wedge$$

$$2 + 3 = 5$$

7.  $x^2 - 6x + 2$  Prime

10.  $24x^2 - 76x + 40$   
 $4(6x^2 - 19x + 10)$   
 $4(6x^2 - 15x - 4x + 10)$   
 $4[3x(2x-5) - 2(2x-5)]$   
 $4(3x-2)(2x-5)$

GCF

AC Method

$$6 \cdot 10 = 60$$

$$3 \cdot 20$$

$$4 + 5 = 19$$

13.  $x^2 + 49 - 14x$

$x^2 - 14x + 49$

$(x-7)^2$  (or  $(x-7)(x-7)$ )

Rewrite  
Perfect Sq. tri.

16.  $x^2 + 16$  Prime

19.  $x^3 - 8x^2 + 15x$

$x(x^2 - 8x + 15)$

$x(x-5)(x-3)$

GCF

22.  $3x^2 - 42x + 40$

Prime

AC Method

$3 \cdot 40 = 120$   
 $\quad \quad \quad \wedge$   
 $\quad \quad \quad - -$

25.  $35ac - 3bd - 7ad + 15bc$

$35ac - 7ad + 15bc - 3bd$

$7a(5c-d) + 3b(5c-d)$

$(7a+3b)(5c-d)$

Rewrite

28.  $\frac{x^2 + x - 2}{x^2 - 6x + 5} = \frac{(x+2)(x-1)}{(x-5)(x-1)} = \frac{x+2}{x-5}$



6.1e Review Page 904

$$1. \frac{18r^3s^2 + 36r^2s^3}{9r^2s^2}$$

$$= \frac{18r^3s^2}{9r^2s^2} + \frac{36r^2s^3}{9r^2s^2}$$

$$= \boxed{2r + 4s}$$

$$4. \begin{array}{r} b+c \overline{) 5bh + 5ch} \\ \underline{\ominus 5bh + 5ch} \\ 0 \end{array}$$

$$\text{Factors: } \boxed{5h(b+c)}$$

$$7. \frac{33m^5 + 55mn^5 - 11m^3}{11m}$$

$$= \frac{33m^5}{11m} + \frac{55mn^5}{11m} - \frac{11m^3}{11m}$$

$$= \boxed{3m^4 + 5n^5 - m^2}$$

$$10. \begin{array}{r} 2k-7 \overline{) 8k^2 - 56k + 98} \\ \underline{\ominus 8k^2 + 28k} \\ -28k + 98 \\ \underline{\oplus -28k + 101} \\ 3 \end{array}$$

$$\boxed{4k-14 + \frac{3}{2k-7}}$$

$$\begin{array}{r}
 5y^2 + 4 \\
 2y^2 - 1 \overline{) 10y^4 + 3y^2 - 7} \\
 \underline{\ominus 10y^4 \oplus 5y^2} \quad \downarrow \\
 8y^2 - 7 \\
 \underline{\ominus 8y^2 \oplus 4} \\
 -3
 \end{array}$$

$$5y^2 + 4 - \frac{3}{2y^2 - 1}$$

$$\begin{array}{r}
 -2x^2 + 21x - 73 \\
 x + 3 \overline{) -2x^3 + 15x^2 - 10x + 3} \\
 \underline{\oplus -2x^3 \oplus 6x^2} \quad \downarrow \\
 21x^2 - 10x \\
 \underline{\oplus 21x^2 \oplus 63x} \quad \downarrow \\
 -73x + 3 \\
 \underline{\oplus -73x \oplus 219} \\
 222
 \end{array}$$

$$-2x^2 + 21x - 73 + \frac{222}{x+3}$$

$$19. \quad z^4 - 3z^3 - z^2 - 11z - 4 \div (z - 4)$$

$$\begin{array}{r}
 4 \overline{) 1 \quad -3 \quad -1 \quad -11 \quad -4} \\
 \underline{\downarrow 4 \quad 4 \quad 12 \quad 4} \\
 1 \quad 1 \quad 3 \quad 1 \quad 0
 \end{array}$$

$$z^3 + z^2 + 3z + 1$$

# 6.7 Review P 904

1.  $f(x) = x^2 - 6x + 2$

$f(3)$

$$\begin{array}{r|rrr} 3 & 1 & -6 & 2 \\ & \downarrow & 3 & -9 \\ \hline & 1 & -3 & -7 \end{array}$$

$f(3) = -7$

$f(-4)$

$$\begin{array}{r|rrr} -4 & 1 & -6 & 2 \\ & \downarrow & -4 & 40 \\ \hline & 1 & -10 & 42 \end{array}$$

$f(-4) = 42$

4.  $f(x) = -3x^3 + 5x^2 + 7x - 3$

$f(3)$

$$\begin{array}{r|rrrr} 3 & -3 & 5 & 7 & -3 \\ & \downarrow & -9 & -12 & -15 \\ \hline & -3 & -4 & -5 & -18 \end{array}$$

$f(3) = -18$

$f(-4)$

$$\begin{array}{r|rrrr} -4 & -3 & 5 & 7 & -3 \\ & \downarrow & 12 & -68 & 244 \\ \hline & -3 & 17 & -61 & 241 \end{array}$$

$f(-4) = 241$

$$7. \quad x^3 - x^2 + x + 14 \quad (x+2)$$

$$\begin{array}{r} -2 \mid 1 \quad -1 \quad 1 \quad 14 \\ \quad \downarrow -2 \quad 6 \quad -14 \\ \hline 1 \quad -3 \quad 7 \quad 0 \end{array}$$

$$x^2 - 3x + 7 \text{ - Prime}$$

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

$$10. \quad (x^3 - 8) \quad (x-2)$$

$$x^3 + 0x^2 + 0x - 8$$

$$\begin{array}{r} 2 \mid 1 \quad 0 \quad 0 \quad -8 \\ \quad \downarrow 2 \quad 4 \quad 8 \\ \hline 1 \quad 2 \quad 4 \quad 0 \end{array}$$

$$x^2 + 2x + 4 \text{ Prime}$$

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

$$13. \quad (x^3 - 8x^2 + x + 42); (x-7)$$

$$\begin{array}{r} 7 \mid 1 \quad -8 \quad 1 \quad 42 \\ \quad \downarrow 7 \quad -7 \quad -42 \\ \hline 1 \quad -1 \quad -6 \quad 0 \end{array}$$

$$x^2 - x - 6$$

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

$$16. \quad \frac{6x^3 - 17x^2 + 6x + 8}{3} \quad \frac{(3x-4)}{3}$$

$$2x^3 - 17/3 x^2 + 2x + 8/3 \quad x - 4/3$$

$$\begin{array}{r} 4/3 \mid 2 \quad -17/3 \quad 2 \quad 8/3 \\ \quad \downarrow 8/3 \quad -4 \quad -8/3 \\ \hline 2 \quad -3 \quad -2 \quad 0 \end{array}$$

$$2x^2 - 3x - 2$$

$$2x^2 - 4x + x - 2$$

$$2x(x-2) + 1(x-2)$$

$$(2x+1)(x-2)(3x-4)$$