TT 1, *Foundations and Pre-calculus Mathematics 10* (Pearson), questions 4.a), 4.b), 8.a), 8.c), 10.b), 10.d), 10.f), 16.b), 16.d), 16.f), and 17 on pages 155 and 156

Possible Solutions

4. a) $3x + 12 = 3(x + 4)$

b) $4x^2 + 10x = 2x(2x + 5)$

8. In each case, algebra tiles cannot be used because the binomial involves a cubic term. Algebra tiles cannot accommodate cubic terms.

a) $9b^2 = 3 \times 3 \times b \times b$

$12b^3 = 2 \times 2 \times 3 \times b \times b \times b$

$GCF = 3 \times b \times b = 3b^2$

$9b^2 - 12b^3 = 3b^2(3 - 4b)$

Check:

$3b^2(3 - 4b) = 3b^2(3) - 3b^2(4b)$

$= 9b^2 - 12b^3$

c) $a^2 = a \times a$

$a^3 = a \times a \times a$

$GCF = a \times a = a^2$

$-a^2 - a^3 = -a^2(1 + a)$

Check:

$-a^2(1 + a) = -a^2(1) - a^2(a)$

$= -a^2 - a^3$

10. In each case, algebra tiles cannot be used because the binomial involves a term with an exponent larger than 2 (e.g., n^4, c^4, s^4). Algebra tiles cannot accommodate these terms.

b) $27n = 3 \times 3 \times 3 \times n$

$36 = 2 \times 2 \times 3 \times 3$

$18n^3 = 2 \times 3 \times 3 \times n \times n \times n$

$GCF = 3 \times 3 = 9$

$27n+36-18n^3=9\left(3n+4-2n^3\right)$

Check:

$9\left(3n+4-2n^3\right)=9(3n)+9(4)+9\left(-2n^3\right)$

$=27n+36-18n^3$

d) $3c^2=3\times c\times c$

$13c^4=13\times c\times c\times c\times c$

$12c^3=2\times 2\times 3\times c\times c\times c$

$\text{GCF}=c\times c=c^2$

$-3c^2-13c^4-12c^3=-c^2\left(3+13c^2+12c\right)$

Check:

$-c^2\left(3+13c^2+12c\right)=-c^2(3)-c^2\left(13c^2\right)-c^2(12c)$

$=-3c^2-13c^4-12c^3$

f) $s^4=s\times s\times s\times s$

$s^2=s\times s$

$4s=2\times 2\times s$

$\text{GCF}=s$

$s^4+s^2-4s=s\left(s^3+s-4\right)$

Check:

$s\left(s^3+s-4\right)=s\left(s^3\right)+s(s)-s(4)$

$=s^4+s^2-4s$

16. **b)** $51m^2n=3\times 17\times m\times m\times n$

$39mn^2=3\times 13\times m\times n\times n$

$72mn=2\times 2\times 2\times 3\times 3\times m\times n$

$\text{GCF}=3\times m\times n=3mn$

$51m^2n+39mn^2-72mn=3mn(17m+13n-24)$

Check:

$3mn(17m+13n-24)=3mn(17m)+3mn(13n)+3mn(-24)$

$=51m^2n+39mn^2-72mn$

d) $10a^3b^2 = 2\times5\times a\times a\times a\times b\times b$

$12a^2b^4 = 2\times2\times3\times a\times a\times b\times b\times b\times b$

$5a^2b^2 = 5\times a\times a\times b\times b$

$\text{GCF} = a\times a\times b\times b = a^2b^2$

$10a^3b^2 + 12a^2b^4 - 5a^2b^2 = a^2b^2\left(10a + 12b^2 - 5\right)$

Check:

$a^2b^2\left(10a + 12b^2 - 5\right) = a^2b^2(10a) + a^2b^2\left(12b^2\right) + a^2b^2(-5)$

$= 10a^3b^2 + 12a^2b^4 - 5a^2b^2$

f) $7r^3s^3 = 7\times r\times r\times r\times s\times s\times s$

$14r^2s^2 = 2\times7\times r\times r\times s\times s$

$21rs^2 = 3\times7\times r\times s\times s$

$\text{GCF} = 7\times r\times s\times s = 7rs^2$

$7r^3s^3 + 14r^2s^2 - 21rs^2 = 7rs^2\left(r^2s + 2r - 3\right)$

Check:

$7rs^2\left(r^2s + 2r - 3\right) = 7rs^2\left(r^2s\right) + 7rs^2(2r) + 7rs^2(-3)$

$= 7r^3s^3 + 14r^2s^2 - 21rs^2$

17. a) $2\pi r^2 = 2\times\pi\times r\times r$

$2\pi rh = 2\times\pi\times r\times h$

$\text{GCF} = 2\times\pi\times r = 2\pi r$

$2\pi r^2 + 2\pi rh = 2\pi r(r + h)$

b) $SA = 2\pi r^2 + 2\pi rh$

$= 2\pi(12\text{ cm})^2 + 2\pi(12\text{ cm})(23\text{ cm})$

$= 2638.9\text{ cm}^2$

$SA = 2\pi r(r + h)$

$= 2\pi(12\text{ cm})(12\text{ cm} + 23\text{ cm})$

$= 2638.9\text{ cm}^2$

The factored form of the formula is more efficient since there is less to enter into the calculator.