14F

1) $(6^3 \times 5) - (5^2 + 54) \times 3 =$
$(216 \times 5) - (25 + 54) \times 3 =$
$1{,}080 - 79 \times 3 =$
$1{,}080 - 237 = 843$

2) $(24 \times 11 + 6)^2 - (154 \div 11)^3 =$
$(264 + 6)^2 - (14)^3 =$
$270^2 - 14^3 =$
$72{,}900 - 2{,}744 = 70{,}156$

3) $18^2 + (14 \div 7)^6 - (8 \div 2)^2 =$
$18^2 + 2^6 - 4^2 =$
$324 + 64 - 16 = 372$

4) $(9 + 3)^2 \div 9 + 8 \times 4^4 =$
$12^2 \div 9 + 8 \times 4^4 =$
$144 \div 9 + 8 \times 256 =$
$16 + 2{,}048 = 2{,}064$

5) $3(X + 2) + 5X = 6X + 14$
$3X + 6 + 5X = 6X + 14$
$8X + 6 = 6X + 14$
$8X - 6X = 14 - 6$
$2X = 8$
$X = 4$

6) $3((4) + 2) + 5(4) = 6(4) + 14$
$3(6) + 20 = 24 + 14$
$18 + 20 = 38$
$38 = 38$

7) $2(A + 3) = 2^5 + 6$
$2A + 6 = 32 + 6$
$2A = 32$
$A = 16$

8) $2((16) + 3) = 2^5 + 6$
$2(19) = 32 + 6$
$38 = 38$

9) ± 10

10) $\pm A$

11) -9

12) $\pm \frac{1}{7}$

13) $8\frac{3}{5} - 2\frac{8}{9} = 8\frac{27}{45} - 2\frac{40}{45} =$
$7\frac{72}{45} - 2\frac{40}{45} = 5\frac{32}{45}$

14) $5\frac{1}{4} - 1\frac{5}{6} = 5\frac{6}{24} - 1\frac{20}{24} =$
$4\frac{30}{24} - 1\frac{20}{24} = 3\frac{10}{24} = 3\frac{5}{12}$

15) $4\frac{3}{4} - 1\frac{7}{8} = 4\frac{24}{32} - 1\frac{28}{32} =$
$3\frac{56}{32} - 1\frac{28}{32} = 2\frac{28}{32} = 2\frac{7}{8}$

16) $2\frac{3}{4} + 1\frac{1}{10} = 2\frac{30}{40} + 1\frac{4}{40} = 3\frac{34}{40} = 3\frac{17}{20}$

17) $\frac{2}{3} \div \frac{1}{4} = \frac{2}{3} \times \frac{4}{1} = \frac{8}{3} = 2\frac{2}{3}$

18) $7N - 4 = 4N + 20$
$7N - 4N = 20 + 4$
$3N = 24$
$N = 8$

15A

1) done

2) (4 x 4) x 6 = 96 sq. ft.

3) 2(6 x 10) + 2(6 x 15) + 2(10 x 15) =
2(60) + 2(90) + 2(150) =
120 + 180 + 300 = 600 sq. in.

4) 2(5 x 16) + 2(5 x 10) + 2(16 x 10) =
2(80) + 2(50) + 2(160) =
160 + 100 + 320 = 580 sq. ft.

5) done

6) 4(6 x 8 x 1/2) + (6 x 6) =
4(24) + 36 =
96 + 36 = 132 sq. in.

7) 2(20 x 30) =
2(600) = 1,200 sq. ft.

8) 1,200 ÷ 100 = 12 squares

15B

1) 2(5 x 6) + 2(6 x 4) + 2(5 x 4) =
2(30) + 2(24) + 2(20) =
60 + 48 + 40 = 148 sq. ft.

2) 6(7 x 7) =
6(49) = 294 sq. units

3) 2(8 x 10) + 2(8 x 3) + 2(10 x 3) =
2(80) + 2(24) + 2(30) =
160 + 48 + 60 = 268 sq. in.

4) 2(2 x 7) + 2(7 x 5) + 2(2 x 5) =
2(14) + 2(35) + 2(10) =
28 + 70 + 20 =118 sq. yds.

5) 4(5 x 8 x 1/2) + (5 x 5) =
4(20) + 25 = 80 + 25 = 105 sq. units

6) 4(5 x 4 x 1/2) + (4 x 4) =
4(10) + 16 = 40 + 16 = 56 sq. in.

7) 2(24 x 10) + 2(30 x 10) + 2(16 x 24 x 1/2) =
2(240) + 2(300) + 2(192) =
480 + 600 + 384 = 1,464 sq. ft.

8) 15 squares

15C

1) $2(4 \times 6) + 2(4 \times 3) + 2(6 \times 3) =$
$2(24) + 2(12) + 2(18) =$
$48 + 24 + 36 = 108$ sq. ft.

2) $6(9 \times 9) = 6(81) = 486$ sq. units.

3) $2(8 \times 12) + 2(12 \times 4) + 2(8 \times 4) =$
$2(96) + 2(48) + 2(32) =$
$192 + 96 + 64 = 352$ sq. in.

4) $2(7 \times 10) + 2(7 \times 20) + 2(20 \times 10) =$
$2(70) + 2(140) + 2(200) =$
$140 + 280 + 400 = 820$ sq. ft.

5) $4(7 \times 9 \times 1/2) + (7 \times 7) =$
$126 + 49 = 175$ sq. units

6) $4(10 \times 12 \times 1/2) + (10 \times 10) =$
$4(60) + 100 =$
$240 + 100 = 340$ sq. in.

7) 1464 sq. ft $\div$ 400 = 3.66 gallons;
4 gallons must be purchased

8) 4 gal x 3 = 12 gal.
12 x \$25 = \$300
(If the student used the unrounded answer from #7 to figure this answer, it would result in an answer of 11 gallons for three coats of paint. The cost in that case would be \$275.)

15D

1) $2(6 \times 8) + 2(8 \times 2) + 2(6 \times 2) =$
$2(48) + 2(16) + 2(12) =$
$96 + 32 + 24 = 152$ sq. in.

2) $4(8 \times 8 \times 1/2) + (8 \times 8) =$
$4(32) + 64 = 128 + 64 = 192$ sq. in.

3) $-2A + 8A - 18 + 5A = -A + 14 - 5A + 2$
$11A - 18 = -6A + 16$
$11A + 6A = 16 + 18$
$17A = 34$
$A = 2$

4) $-2(2)+8(2)-18+5(2) = -(2) + 14 - 5(2) + 2$
$-4 + 16 - 18 + 10 = -2 + 14 - 10 + 2$
$4 = 4$

5) $D(3 - 7) - 12 = 0$
$D(-4) - 12 = 0$
$-4D = 12$
$D = -3$

6) $(-3)(3 - 7) - 12 = 0$
$-3(-4) - 12 = 0$
$12 - 12 = 0$
$0 = 0$

7) $4\frac{5}{8} + 1\frac{1}{4} = 4\frac{20}{32} + 1\frac{8}{32} = 5\frac{28}{32} = 5\frac{7}{8}$

8) $7\frac{3}{4} + 9\frac{3}{5} = 7\frac{15}{20} + 9\frac{12}{20} = 16\frac{27}{20} = 17\frac{7}{20}$

9) $8\frac{3}{5} - 2\frac{8}{9} = 8\frac{27}{45} - 2\frac{40}{45} = 7\frac{72}{45} - 2\frac{40}{45} = 5\frac{32}{45}$

10) $5\frac{1}{4} - 1\frac{5}{6} = 5\frac{6}{24} - 1\frac{20}{24} = 4\frac{30}{24} - 1\frac{20}{24} = 3\frac{10}{24} = 3\frac{5}{12}$

11) done

12) $5\frac{5}{8} \times 1\frac{2}{5} \times 2\frac{1}{7} = \frac{\overset{9}{\cancel{45}}}{8} \times \frac{\cancel{7}}{\cancel{5}} \times \frac{15}{\cancel{7}} = \frac{135}{8} = 16\frac{7}{8}$

13) $1\frac{2}{3} \times 2\frac{1}{3} \times \frac{9}{10} = \frac{\cancel{5}}{\cancel{3}} \times \frac{7}{\cancel{3}} \times \frac{\overset{3}{\cancel{9}}}{\underset{2}{\cancel{10}}} = \frac{7}{2} = 3\frac{1}{2}$

14) $5\frac{2}{8} \times 3\frac{5}{6} \times 1\frac{5}{7} = \frac{\overset{12}{\cancel{42}}}{\underset{2}{\cancel{8}}} \times \frac{23}{\cancel{6}} \times \frac{\overset{3}{\cancel{12}}}{\cancel{7}} = \frac{69}{2} = 34\frac{1}{2}$

15) $\frac{\cancel{2}}{4} \times \frac{1}{\cancel{2}} \times \frac{\cancel{2}}{\cancel{3}} = \frac{1}{4}$

16) $48 \div 4 = 12$; $12 \times 1 = 12$

17) $9^2 + 12^2 = H^2$
$81 + 144 = H^2$
$225 = H^2$
$15\text{ in.} = H$

18) $6N - 7 = N + 33$
$6N - N = 33 + 7$
$5N = 40$
$N = 8$

15E

1) $2(20 \times 30) + 2(30 \times 10) + 2(20 \times 10) =$
$2(600) + 2(300) + 2(200) =$
$1{,}200 + 600 + 400 = 2{,}200$ sq. units

2) $4(4 \times 8 \times 1/2) + 4 \times 4 =$
$4(16) + 16 = 64 + 16 = 80$ sq. in.

3) $X(2+2)+5X-12 = X(4+4)-2$
$4X+5X-12 = 8X-2$
$9X-12 = 8X-2$
$9X-8X = -2+12$
$X = 10$

4) $(10)(2+2) + 5(10) - 12 = (10)(4+4) - 2$
$10(4) + 50 - 12 = 10(8) - 2$
$40 + 50 - 12 = 80 - 2$
$78 = 78$

5) $17 - Y + 8 + 3Y + 2Y = Y(-7+3) + 1^2$
$4Y + 25 = -7Y + 3Y + 1$
$4Y + 25 = -4Y + 1$
$8Y = 1 - 25$
$8Y = -24$
$Y = -3$

6) $17 - (-3) + 8 + 3(-3) + 2(-3) = (-3)(-7+3) + 1^2$
$17 + 3 + 8 - 9 - 6 = -3(-4) + 1$
$13 = 12 + 1$
$13 = 13$

7) $X + 32 \div 4 - 2^2 = 3^2 + 3$
$X + 8 - 4 = 9 + 3$
$X + 4 = 12$
$X = 8$

8) $(8) + 32 \div 4 - 2^2 = 3^2 + 3$
$8 + 8 - 4 = 9 + 3$
$12 = 12$

9) $4\frac{3}{4} - 1\frac{7}{8} = 4\frac{6}{8} - 1\frac{7}{8} = 3\frac{14}{8} - 1\frac{7}{8} = 2\frac{7}{8}$

10) $7\frac{2}{5} - 3\frac{7}{10} = 7\frac{4}{10} - 3\frac{7}{10} =$
$6\frac{14}{10} - 3\frac{7}{10} = 3\frac{7}{10}$

11) $6\frac{3}{4} + 6\frac{5}{6} = 6\frac{18}{24} + 6\frac{20}{24} =$
$12\frac{38}{24} = 13\frac{14}{24} = 13\frac{7}{12}$

12) $3\frac{1}{3} \times 1\frac{7}{8} \times \frac{4}{5} = \frac{\cancel{10}^{5}}{3} \times \frac{15}{\cancel{8}_{2}} \times \frac{\cancel{4}^{2}}{\cancel{5}} = \frac{30}{6} = 5$

13) $2\frac{2}{5} \times 1\frac{1}{4} \times 1\frac{1}{7} = \frac{12}{\cancel{5}} \times \frac{\cancel{5}}{\cancel{4}} \times \frac{\cancel{8}^{2}}{7} = \frac{24}{7} = 3\frac{3}{7}$

14) $\frac{4}{5} \times 2\frac{3}{4} \times 3\frac{1}{3} = \frac{\cancel{4}}{\cancel{5}} \times \frac{11}{\cancel{4}} \times \frac{\cancel{10}^{2}}{3} = \frac{22}{3} = 7\frac{1}{3}$

15) $\frac{\cancel{7}}{\cancel{10}_{2}} \times \frac{\cancel{5}}{6} \times \frac{1}{\cancel{7}} = \frac{1}{12}$

16) $144 \div 12 = 12$; $12 \times 1 = \$12$

17) $L^2 + 16^2 = 20^2$
$L^2 + 256 = 400$
$L^2 = 400 - 256$
$L^2 = 144$
$L = 12$ ft.

18) $2M - 17 = 81$
$2M = 81 + 17$
$2M = 98$
$M = 49$

19) $4(15 \times 14 \times 1/2) = 420$ sq. ft.
100 sq. ft. per square, so 4.2 squares
since you can't buy a part of a square,
you need 5 squares

20) $4(15 \times 9) = 4(135) = 540$ square feet.
100 sq. ft. per square, so 6 squares

15F

1) $6(3 \times 3) = 6(9) = 54$ sq. in.

2) $4(7 \times 12 \times 1/2) + 7 \times 7 =$
$4(42) + 49 = 168 + 49 = 217$ sq. in.

3) $-X + 7 + 2X - 5 - 3X = 3(3 - X) - 4(1 - X)$
$-2X + 2 = 9 - 3X - 4 + 4X$
$-2X + 2 = X + 5$
$-3X = 3$
$X = -1$

4) $-(-1)+7+2(-1)-5-3(-1)=3(3-(-1))-4(1-(-1))$
$1 + 7 - 2 - 5 + 3 = 3(4) - 4(2)$
$4 = 12 - 8$
$4 = 4$

5) $3(8+4) + 4^2 - X = 4X + 3 \cdot 4$
$3(12) + 16 - X = 4X + 12$
$36 + 16 - X = 4X + 12$
$36 + 16 - 12 = 4X + X$
$40 = 5X$
$8 = X$

6) $3(8+4) + 4^2 - (8) = 4(8) + 3 \cdot 4$
$3(12) + 16 - 8 = 32 + 12$
$36 + 16 - 8 = 44$
$44 = 44$

7) $-5R + (9^2 - 3^2) + 13 = 7R + 5R$
$-5R + (81 - 9) + 13 = 12R$
$81 - 9 + 13 = 12R + 5R$
$85 = 17R$
$5 = R$

8) $-5(5) + (9^2 - 3^2) + 13 = 7(5) + 5(5)$
$-25 + (81 - 9) + 13 = 35 + 25$
$60 = 60$

9) $4\frac{1}{6} - 1\frac{1}{2} = 4\frac{1}{6} - 1\frac{3}{6} =$
$3\frac{7}{6} - 1\frac{3}{6} = 2\frac{4}{6} = 2\frac{2}{3}$

10) $6\frac{5}{9} - 1\frac{1}{3} = 6\frac{5}{9} - 1\frac{3}{9} = 5\frac{2}{9}$

11) $9\frac{7}{8} + 2\frac{5}{10} = 9\frac{7}{8} + 2\frac{4}{8} =$
$11\frac{11}{8} = 12\frac{3}{8}$

12) $1\frac{2}{8} \times 3\frac{1}{5} \times 3\frac{1}{5} =$
$\frac{\cancel{10}^{2}}{\cancel{8}} \times \frac{\cancel{16}^{2}}{\cancel{5}} \times \frac{16}{5} = \frac{64}{5} = 12\frac{4}{5}$

13) $2\frac{1}{9} \times 2\frac{1}{4} \times 1\frac{1}{11} =$
$\frac{19}{\cancel{9}} \times \frac{\cancel{9}}{4} \times \frac{\cancel{12}^{3}}{11} = \frac{57}{11} = 5\frac{2}{11}$

14) $\frac{1}{3} \times 2\frac{6}{7} \times 1\frac{1}{5} =$
$\frac{1}{\cancel{3}} \times \frac{\cancel{20}^{4}}{7} \times \frac{\cancel{6}^{2}}{\cancel{5}} = \frac{8}{7} = 1\frac{1}{7}$

15) $2\frac{1}{2} \times \frac{3}{5} \times \frac{1}{3} = \frac{\cancel{5}}{2} \times \frac{\cancel{3}}{\cancel{5}} \times \frac{1}{\cancel{3}} = \frac{1}{2}$

16) $\frac{3}{4} \div \frac{1}{6} = \frac{3}{4} \times \frac{6}{1} = \frac{18}{4} = 4\frac{1}{2}$

17) $10^2 + 12^2 = 15^2$
$100 + 144 = 225$
$244 \neq 225$; no

18) $5P + 4P = 225$
$9P = 225$
$P = 25$

19) $2(24 \times 26) = 2(624) =$
$1{,}248$ sq. ft. or 13 squares

20) $2(15 \times 22 \times 1/2) =$
$2(165) = 330$ sq. ft.