

## 13F

- 1)  $3X + 7 = 43$   
 $3X = 43 - 7$   
 $3X = 36$   
 $X = 12$
- 2)  $3(12) + 7 = 43$   
 $36 + 7 = 43$   
 $43 = 43$
- 3)  $7Q + 3 = 3Q + 7 + 40$   
 $7Q - 3Q = 7 + 40 - 3$   
 $4Q = 44$   
 $Q = 11$
- 4)  $7(11) + 3 = 3(11) + 7 + 40$   
 $77 + 3 = 33 + 7 + 40$   
 $80 = 80$
- 5)  $11A - 4A - 18 = 2A + A + 10$   
 $7A - 18 = 3A + 10$   
 $7A - 3A = 10 + 18$   
 $4A = 28$   
 $A = 7$
- 6)  $11(7) - 4(7) - 18 = 2(7) + (7) + 10$   
 $77 - 28 - 18 = 14 + 7 + 10$   
 $31 = 31$
- 7)  $-2(X + 7) + 4X = 4(X - 9)$   
 $-2X - 14 + 4X = 4X - 36$   
 $2X - 14 = 4X - 36$   
 $2X - 4X = -36 + 14$   
 $-2X = -22$   
 $X = 11$

- 8)  $-2((11) + 7) + 4(11) = 4((11) - 9)$   
 $-2(18) + 44 = 4(2)$   
 $-36 + 44 = 8$   
 $8 = 8$
- 9)  $5^2 + 12^2 = H^2$   
 $25 + 144 = H^2$   
 $169 = H^2$   
 $H = 13$  miles
- 10)  $\frac{10}{16} = \frac{5}{8}$
- 11)  $\frac{13}{16}$
- 12)  $\frac{4}{16} = \frac{1}{4}$
- 13)  $\frac{3}{8} \times \frac{1}{7} = \frac{3}{56}$
- 14)  $\frac{3}{4} + \frac{1}{8} = \frac{3}{4} \times \frac{2}{2} = \frac{6}{8} + \frac{1}{8} = \frac{7}{8}$
- 15)  $\frac{6}{7} + \frac{5}{14} = \frac{6}{7} \times \frac{2}{2} + \frac{5}{14} = \frac{12}{14} + \frac{5}{14} = \frac{17}{14} = 2\frac{2}{14} = 2\frac{1}{7}$
- 16)  $3\frac{3}{5} + 2\frac{7}{10} = 5 + \frac{30}{50} + \frac{35}{50} = 5 + \frac{65}{50} = 5 + 1\frac{15}{50} = 6\frac{3}{10}$
- 17)  $2\frac{9}{10} + 4\frac{5}{8} = 6 + \frac{72}{80} + \frac{50}{80} = 6\frac{122}{80} = 6 + 1\frac{42}{80} = 7\frac{21}{40}$
- 18)  $3\frac{1}{2} + 1\frac{3}{4} = 4 + \frac{4}{8} + \frac{6}{8} = 4\frac{10}{8} = 4 + 1\frac{2}{8} = 5\frac{1}{4}$
- 19)  $\frac{6}{8} + \frac{2}{8} = \frac{6}{8} \times \frac{3}{3} + \frac{2}{8} = \frac{18}{8} + \frac{2}{8} = \frac{20}{8} = 2\frac{4}{8} = 2\frac{1}{2}$
- 20)  $4N + 8N = 24$   
 $12N = 24$   
 $N = 2$

## 14A

- 1) done
- 2)  $20 \times 9 - 14 \div 7 =$   
 $180 - 2 = 178$
- 3)  $120 \div 10 - 2 \times 3 + 5 =$   
 $12 - 6 + 5 = 11$
- 4)  $8^2 \div 2 - 6 \times 2^2 =$   
 $64 \div 2 - 6 \times 4 =$   
 $32 - 24 = 8$
- 5)  $5 \times 3 + 6^3 - 10 \times 3 =$   
 $5 \times 3 + 216 - 10 \times 3 =$   
 $15 + 216 - 30 = 201$
- 6)  $11^2 \times 5 - 7 \times 8 - 16 =$   
 $121 \times 5 - 7 \times 8 - 16 =$   
 $605 - 56 - 16 = 533$
- 7)  $(16 + 9) + (8 + 3) \times 8 =$   
 $25 + 11 \times 8 =$   
 $25 + 88 = 113$
- 8)  $(4 + 6) \times 9^2 - 6 \times 5 =$   
 $10 \times 81 - 6 \times 5 =$   
 $810 - 30 = 780$
- 9)  $112 - (2^2 + 3) \times 5 =$   
 $112 - (4 + 3) \times 5 =$   
 $112 - 7 \times 5 =$   
 $112 - 35 = 77$
- 10)  $(18 \times 9 + 3)^2 - 10^2 =$   
 $(162 + 3)^2 - 10^2 =$   
 $165^2 - 10^2 =$   
 $27,225 - 100 = 27,125$
- 11)  $15^2 + (12 \div 3)^3 - (6 \div 3)^2 =$   
 $15^2 + 4^3 - 2^2 =$   
 $225 + 64 - 4 = 285$
- 12)  $(8 + 1)^2 \div 3 + 9 \times 3^2 =$   
 $9^2 \div 3 + 9 \times 3^2 =$   
 $81 \div 3 + 9 \times 9 =$   
 $27 + 81 = 108$
- 13) done
- 14) done
- 15) done
- 16)  $9(2(4) - 6) = 2(7) + 2^2$   
 $9(8 - 6) = 14 + 4$   
 $9(2) = 18$   
 $18 = 18$
- 17)  $4^2 - 2^2 + 5 \times 3 = A$   
 $16 - 4 + 5 \times 3 = A$   
 $16 - 4 + 15 = A$   
 $27 = A$
- 18)  $4^2 - 2^2 + 5 \times 3 = (27)$   
 $16 - 4 + 5 \times 3 = 27$   
 $16 - 4 + 15 = 27$   
 $27 = 27$

14B

- 1)  $8 \times 6 + 9 \times 3 =$   
 $48 + 27 = 75$
- 2)  $48 + 6 - 2 \times 3 = 8 - 6 = 2$
- 3)  $69 \div 3 + 5 \times 8 - 6 =$   
 $23 + 40 - 6 = 57$
- 4)  $9^2 + 2 - 6 \times 3^2 =$   
 $81 + 2 - 6 \times 9 =$   
 $81 + 2 - 54 = 29$
- 5)  $10^2 \div 5 - 4^3 - 12 =$   
 $100 \div 5 - 64 - 12 =$   
 $20 - 64 - 12 = -56$
- 6)  $150 - 1^2 + 6^3 \div 12 =$   
 $150 - 121 + 216 \div 12 =$   
 $150 - 121 + 18 = 47$
- 7)  $(17 + 9) \times 5 - (18 \times 6) =$   
 $26 \times 5 - 108 =$   
 $130 - 108 = 22$
- 8)  $(5 + 3) \times (8^2 - 2) \times 20 =$   
 $8 \times (64 - 2) \times 20 =$   
 $8 \times 62 \times 20 = 9,920$
- 9)  $148 - (4^2 + 3) \times 6 =$   
 $148 - (16 + 3) \times 6 =$   
 $148 - 19 \times 6 =$   
 $148 - 114 = 34$
- 10)  $(72 \div 12 \times 5)^2 - 18 \times 3^2 =$   
 $(30)^2 - 18 \times 3^2 =$   
 $900 - 18 \times 9 =$   
 $900 - 162 = 738$

- 11)  $8^2 - 4^2 \div (3+1)^2 + 6 =$   
 $8^2 - 4^2 \div (4)^2 + 6 =$   
 $64 - 16 \div 16 + 6 =$   
 $64 - 1 + 6 = 69$
- 12)  $(3+9)^2 - (2+3)^3 \div (90 \div 10) =$   
 $12^2 - 5^3 \div 9 =$   
 $144 - 125 \div 9 = 28$
- 13)  $2(5 - 4 + 1) + F - 2 = 5$   
 $2(2) + F - 2 = 5$   
 $4 + F - 2 = 5$   
 $F = 5 - 4 + 2$   
 $F = 3$
- 14)  $2(5 - 4 + 1) + (3) - 2 = 5$   
 $2(2) + 3 - 2 = 5$   
 $4 + 3 - 2 = 5$   
 $5 = 5$
- 15)  $-X(-2+1) = 5^2 + 2^3$   
 $-X(-1) = 5^2 + 2^3$   
 $X = 25 + 8$   
 $X = 33$
- 16)  $-(33)(-2+1) = 5^2 + 2^3$   
 $-33(-1) = 25 + 8$   
 $33 = 33$
- 17)  $(3+X) - (2 \cdot 2) + 6 = 9$   
 $3 + X - 4 + 6 = 9$   
 $X = 9 - 3 + 4 - 6$   
 $X = 4$
- 18)  $(3+(4)) - (2 \cdot 2) + 6 = 9$   
 $7 - 4 + 6 = 9$   
 $9 = 9$

14C

- 1)  $8 \times 9 + 18 \div 3 =$   
 $72 + 6 = 78$
- 2)  $14 + 18 \times 5 - 100 \div 5 =$   
 $14 + 90 - 20 = 84$
- 3)  $36 + 120 \div 12 - 6 \times 3 =$   
 $36 + 10 - 18 = 28$
- 4)  $5^2 - 3 \times 6 + 4^3 - 10 =$   
 $25 - 3 \times 6 + 64 - 10 =$   
 $25 - 18 + 64 - 10 = 61$
- 5)  $6^2 \times 5 - 24 + 18 \times 2 =$   
 $36 \times 5 - 24 + 18 \times 2 =$   
 $180 - 24 + 36 = 192$
- 6)  $9^2 + 7^2 - 5^3 + 3^3 - 2^5 =$   
 $81 + 49 - 125 + 27 - 32 = 0$
- 7)  $(18 + 3) \times 6 - (20 \times 2) =$   
 $21 \times 6 - 40 =$   
 $126 - 40 = 86$
- 8)  $(6 + 5) \times (4^3 - 10) \times 5 =$   
 $11 \times (64 - 10) \times 5 =$   
 $11 \times 54 \times 5 = 2,970$
- 9)  $498 - (5^3 + 3) \times 3 =$   
 $498 - (125 + 3) \times 3 =$   
 $498 - 128 \times 3 =$   
 $498 - 384 = 114$
- 10)  $(64 \div 16 \times 3)^3 - 20 \times 4^3 =$   
 $(12)^3 - 20 \times 4^3 =$   
 $1728 - 20 \times 64 =$   
 $1728 - 1280 = 448$
- 11)  $12^2 - 5^2 \div (2+3)^2 + 7^2 =$   
 $144 - 25 \div (5)^2 + 49 =$   
 $144 - 25 \div 25 + 49 =$   
 $144 - 1 + 49 = 192$
- 12)  $(4+5)^3 - (7+8)^2 \div (5 \times 2)^3 =$   
 $9^3 - 15^2 \div 10^3 =$   
 $729 - 225 \div 1,000 = 1,504$
- 13)  $A + 2^2 - 6 \cdot 8 + 2 = -41$   
 $A + 4 - 48 + 2 = -41$   
 $A - 42 = -41$   
 $A = -41 + 42$   
 $A = 1$
- 14)  $(1) + 2^2 - 6 \cdot 8 + 2 = -41$   
 $1 + 4 - 48 + 2 = -41$   
 $-41 = -41$
- 15)  $3(Q-6) = 2(2Q+7) + 10$   
 $3Q - 18 = 4Q + 14 + 10$   
 $3Q - 4Q = 14 + 10 + 18$   
 $-Q = 42$   
 $Q = -42$
- 16)  $3((-42) - 6) = 2(2(-42) + 7) + 10$   
 $3(-48) = 2(-84 + 7) + 10$   
 $-144 = 2(-77) + 10$   
 $-144 = -154 + 10$   
 $-144 = -144$
- 17)  $8^2(F-1) = 5(6F-6)$   
 $64(F-1) = 30F-30$   
 $64F-64 = 30F-30$   
 $64F-30F = -30+64$   
 $34F = 34$   
 $F = 1$
- 18)  $8^2((1)-1) = 5(6(1)-6)$   
 $64(0) = 5(0)$   
 $0 = 0$

## 14D

- 1)  $6 \times 7 + 9 \times 3 =$   
 $42 + 27 = 69$
- 2)  $30 \times 6 - 35 \div 7 =$   
 $180 - 5 = 175$
- 3)  $140 \div 10 - 3 \times 4 + 16 =$   
 $14 - 12 + 16 = 18$
- 4)  $5^3 \div 5^2 \times 6 - 9 \times 1 =$   
 $125 \div 25 \times 6 - 9 \times 1 =$   
 $30 - 9 = 21$
- 5)  $2X(-8 - 4) + 3^2 = -5X(2^3) - 7$   
 $2X(-12) + 9 = -5X(8) - 7$   
 $-24X + 9 = -40X - 7$   
 $-24X + 40X = -7 - 9$   
 $16X = -16$   
 $X = -1$
- 6)  $2(-1)(-8-4) + 3^2 = -5(-1)(2^3) - 7$   
 $2(-1)(-12) + 9 = -5(-1)(8) - 7$   
 $24 + 9 = 40 - 7$   
 $33 = 33$
- 7)  $5X - X + 4 - 5 = 3X + 2X - 3$   
 $4X - 1 = 5X - 3$   
 $4X - 5X = -3 + 1$   
 $-X = -2$   
 $X = 2$
- 8)  $5(2) - (2) + 4 - 5 = 3(2) + 2(2) - 3$   
 $10 - 2 + 4 - 5 = 6 + 4 - 3$   
 $7 = 7$
- 9)  $(-8)(-8) = 64$
- 10) -16
- 11) -1
- 12)  $-\frac{1}{4}$
- 13) done
- 14) done
- 15)  $5\frac{1}{4} = 5\frac{3}{12} = 4\frac{15}{12}$   
 $-\frac{1\frac{2}{3}}{3} = -\frac{1\frac{8}{12}}{12} = -\frac{1\frac{8}{12}}{12}$   
 $3\frac{7}{12}$
- 16)  $7\frac{1}{2} - 3\frac{2}{3} = 7\frac{3}{6} - 3\frac{4}{6} = 6\frac{9}{6} - 3\frac{4}{6} = 3\frac{5}{6}$
- 17)  $3^2 + 6^2 = 8^2$   
 $9 + 36 = 64$   
 $45 \neq 64; \text{ no}$
- 18)  $2M = 4 \times 5$   
 $2M = 20$   
 $M = 10$

## 14E

- 1)  $8 \times 3 + 7^3 - 12 \times 5 =$   
 $8 \times 3 + 343 - 12 \times 5 =$   
 $24 + 343 - 60 = 307$
- 2)  $12^2 \times 2^6 + 3^3 - 4^3 =$   
 $144 \times 64 + 27 - 64 =$   
 $9,216 + 27 - 64 = 9,179$
- 3)  $(20 \times 11) + (12 - 8) \times 10 =$   
 $220 + 4 \times 10 =$   
 $220 + 40 = 260$
- 4)  $(5 + 8) + (6^2 - 7) \times 8 =$   
 $13 + (36 - 7) \times 8 =$   
 $13 + 29 \times 8 =$   
 $13 + 232 = 245$
- 5)  $4A = 3^2(10 - 6)$   
 $4A = 9(4)$   
 $A = 9$
- 6)  $4(9) = 3^2(10 - 6)$   
 $36 = 9(4)$   
 $36 = 36$
- 7)  $1 \cdot 2 \cdot 3 \cdot 4 - A(5 \cdot 6) = -7(8A + 4)$   
 $24 - 30A = -56A - 28$   
 $-30A + 56A = -28 - 24$   
 $26A = -52$   
 $A = -2$
- 8)  $1 \cdot 2 \cdot 3 \cdot 4 - (-2)(5 \cdot 6) = -7(8(-2) + 4)$   
 $24 - (-2)(30) = -7(-16 + 4)$   
 $24 + 60 = -7(-12)$   
 $84 = 84$
- 9) 9
- 10)  $5 \times 5 = 25$
- 11) -16
- 12)  $\frac{9}{16}$
- 13)  $6\frac{1}{3} - 5\frac{4}{5} = 6\frac{5}{15} - 5\frac{12}{15} =$   
 $5\frac{20}{15} - 5\frac{12}{15} = \frac{8}{15}$
- 14)  $9 - 6\frac{3}{8} = 8\frac{8}{8} - 6\frac{3}{8} = 2\frac{5}{8}$
- 15)  $8\frac{2}{3} - 7\frac{1}{8} = 8\frac{16}{24} - 7\frac{3}{24} = 1\frac{13}{24}$
- 16)  $9\frac{3}{4} - 2\frac{1}{2} = 9\frac{6}{8} - 2\frac{4}{8} =$   
 $7\frac{2}{8} = 7\frac{1}{4} \text{ ft.}$
- 17)  $\frac{15}{1} \times \frac{1}{8} = \frac{15}{8} = 1\frac{7}{8}$
- 18)  $2M + 20 = 80$   
 $2M = 60$   
 $M = 30 \text{ mph}$

14F

$$1) (6^3 \times 5) - (5^2 + 54) \times 3 =$$

$$(216 \times 5) - (25 + 54) \times 3 =$$

$$1,080 - 79 \times 3 =$$

$$1,080 - 237 = 843$$

$$2) (24 \times 11 + 6)^2 - (154 \div 11)^3 =$$

$$(264 + 6)^2 - (14)^3 =$$

$$270^2 - 14^3 =$$

$$72,900 - 2,744 = 70,156$$

$$3) 18^2 + (14 \div 7)^6 - (8 \div 2)^2 =$$

$$18^2 + 2^6 - 4^2 =$$

$$324 + 64 - 16 = 372$$

$$4) (9 + 3)^2 \div 9 + 8 \times 4^4 =$$

$$12^2 \div 9 + 8 \times 4^4 =$$

$$144 \div 9 + 8 \times 256 =$$

$$16 + 2,048 = 2,064$$

$$5) 3(X+2) + 5X = 6X + 14$$

$$3X + 6 + 5X = 6X + 14$$

$$8X + 6 = 6X + 14$$

$$8X - 6X = 14 - 6$$

$$2X = 8$$

$$X = 4$$

$$6) 3((4) + 2) + 5(4) = 6(4) + 14$$

$$3(6) + 20 = 24 + 14$$

$$18 + 20 = 38$$

$$38 = 38$$

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

$$2A + 6 = 32 + 6$$

$$2A = 32$$

$$A = 16$$

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

$$2(19) = 32 + 6$$

$$38 = 38$$

$$9) \pm 10$$

$$10) \pm A$$

$$11) -9$$

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

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

$$7\frac{72}{45} - 2\frac{40}{45} = 5\frac{32}{45}$$

$$14) 5\frac{1}{4} - 1\frac{5}{6} = 5\frac{6}{24} - 1\frac{20}{24} =$$

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

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

$$3\frac{56}{32} - 1\frac{28}{32} = 2\frac{28}{32} = 2\frac{7}{8}$$

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

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

$$18) 7N - 4 = 4N + 20$$

$$7N - 4N = 20 + 4$$

$$3N = 24$$

$$N = 8$$

15A

$$1) \text{ done}$$

$$2) (4 \times 4) \times 6 = 96 \text{ sq. ft.}$$

$$3) 2(6 \times 10) + 2(6 \times 15) + 2(10 \times 15) =$$

$$2(60) + 2(90) + 2(150) =$$

$$120 + 180 + 300 = 600 \text{ sq. in.}$$

$$4) 2(5 \times 16) + 2(5 \times 10) + 2(16 \times 10) =$$

$$2(80) + 2(50) + 2(160) =$$

$$160 + 100 + 320 = 580 \text{ sq. ft.}$$

$$5) \text{ done}$$

$$6) 4(6 \times 8 \times 1/2) + (6 \times 6) =$$

$$4(24) + 36 =$$

$$96 + 36 = 132 \text{ sq. in.}$$

$$7) 2(20 \times 30) =$$

$$2(600) = 1,200 \text{ sq. ft.}$$

$$8) 1,200 \div 100 = 12 \text{ squares}$$

15B

$$1) 2(5 \times 6) + 2(6 \times 4) + 2(5 \times 4) =$$

$$2(30) + 2(24) + 2(20) =$$

$$60 + 48 + 40 = 148 \text{ sq. ft.}$$

$$2) 6(7 \times 7) =$$

$$6(49) = 294 \text{ sq. units}$$

$$3) 2(8 \times 10) + 2(8 \times 3) + 2(10 \times 3) =$$

$$2(80) + 2(24) + 2(30) =$$

$$160 + 48 + 60 = 268 \text{ sq. ft.}$$

$$4) 2(2 \times 7) + 2(7 \times 5) + 2(2 \times 5) =$$

$$2(14) + 2(35) + 2(10) =$$

$$28 + 70 + 20 = 118 \text{ sq. yds.}$$

$$5) 4(5 \times 8 \times 1/2) + (5 \times 5) =$$

$$4(20) + 25 = 80 + 25 = 105 \text{ sq. units}$$

$$6) 4(5 \times 4 \times 1/2) + (4 \times 4) =$$

$$4(10) + 16 = 40 + 16 = 56 \text{ sq. in.}$$

$$7) 2(24 \times 10) + 2(30 \times 10) + 2(16 \times 24 \times 1/2) =$$

$$2(240) + 2(300) + 2(192) =$$

$$480 + 600 + 384 = 1,464 \text{ sq. ft.}$$

$$8) 15 \text{ squares}$$