

1A

- 1) $(-3)^2 = (-3)(-3) = 9$
- 2) $-3^2 = -9$
- 3) $(6)(-5) = -30$
- 4) $(-8)(-5) = 40$
- 5) $8 + 6 = 6 + 8$
 $14 = 14$ true (commutative property)
- 6) $9 \times 5 = 5 \times 9$
 $45 = 45$ true (commutative property)
- 7) $8 - 4 = 4 - 8$
 $4 = -4$ false
- 8) $36 \div 4 = 4 \div 36$
 $9 = 4/36$ or $1/9$ false
- 9) $(2 + 9) + 8 = 2 + (9 + 8)$
 $11 + 8 = 2 + 17$
 $19 = 19$ true (associative property)
- 10) $(4 \times 5) \times 6 = 4 \times (5 \times 6)$
 $20 \times 6 = 4 \times 30$
 $120 = 120$ true (associative property)
- 11) $(11 - 4) - 2 = 11 - (4 - 2)$
 $7 - 2 = 11 - 2$
 $5 = 9$ false
- 12) $(9 \div 3) \div 3 = 9 \div (3 \div 3)$
 $3 \div 3 = 9 \div 1$
 $1 = 9$ false
- 13) false; see #7
- 14) true; see #9
- 15) true; see #6 and #10

1B

- 1) $(-3) + (-10) = -13$
- 2) $(-3) - (10) = -13$
- 3) $6 - (-5) = 6 + 5 = 11$
- 4) $(-8) - (-5) = (-8) + 5 = -3$
- 5) $5D - 6C + 8D - 3C + B =$
 $B + (-6C - 3C) + (5D + 8D) =$
 $(B) + (-9C) + (13D) = B - 9C + 13D$
(This could be correctly written in a different order, but putting unknowns in alphabetical order is customary.)
- 6) $2A + B - A + 3B = (2A - A) + (B + 3B) =$
 $A + 4B$
- 7) $5Q + 3C - C + Q + 4Q - 5C =$
 $(3C - C - 5C) + (5Q + Q + 4Q) =$
 $-3C + 10Q$
- 8) $20 + 5X - 6Y + Y + 2X + X - 9 =$
 $(20 - 9) + (5X + 2X + X) + (-6Y + Y) =$
 $11 + 8X - 5Y$
- 9) $2X + 2 - X + 2X =$
 $(2X + 2X - X) + (2) = 3X + 2$
- 10) $3Y - 1 + 2Y - 1 - 4Y =$
 $(3Y + 2Y - 4Y) + (-1 - 1) = Y - 2$
- 11) $5A - 6B - 3B + 10A - 8 =$
 $(5A + 10A) + (-6B - 3B) + (-8) =$
 $15A - 9B - 8$
- 12) $18X - 5Y - 9X + Y =$
 $(18X - 9X) + (-5Y + Y) = 9X - 4Y$
- 13) false; see solution for 1A #12
- 14) true; see solution for 1A #10
- 15) false; see solution for 1A #11

1C

- 1) $4Q + 2C - 2C - 2Q - 3C =$
 $(2C - 2C - 3C) + (4Q - 2Q) = -3C + 2Q$
- 2) $-5M - 7 + 3M - 4 + 5 =$
 $(-5M + 3M) + (-7 - 4 + 5) = -2M - 6$
- 3) $2A - 3B + 4C - A + B + C =$
 $(2A - A) + (-3B + B) + (4C + C) = A - 2B + 5C$
- 4) $4A - 5 - 2A + 7 - 1 =$
 $(4A - 2A) + (-5 + 7 - 1) = 2A + 1$
- 5) $4X - 3Y - 6Y + 10X - 5 =$
 $(4X + 10X) + (-3Y - 6Y) - 5 = 14X - 9Y - 5$
- 6) $15X - 4Y - 6X + Y =$
 $(15X - 6X) + (-4Y + Y) = 9X - 3Y$
- 7) $15X + 6X - 4Y - 5Y - 14X + 10 =$
 $(15X + 6X - 14X) + (-4Y - 5Y) + 10 =$
 $7X - 9Y + 10$
- 8) $3A - 4B + 6A + 7B + 8 =$
 $(3A + 6A) + (-4B + 7B) + 8 = 9A + 3B + 8$
- 9) $(-3)(5) = -15$
- 10) $(-81) \div (-9) = 9$
- 11) $4 \div (-2) = -2$
- 12) $(-5)^2 = (-5)(-5) = 25$
- 13) $4 + (-2) = 2$
- 14) $-4^2 = -(4)(4) = -16$
- 15) $\frac{1}{1} \times \frac{1}{11} \times \frac{1}{1} = \frac{1}{11}$
- 16) $\frac{1}{2} \times \frac{5}{6} \times \frac{11}{12} = \frac{55}{144}$
- 17) $\frac{1}{3} \div \frac{4}{5} = \frac{5}{15} \div \frac{12}{15} = \frac{5}{12}$
- 18) $\frac{15}{2} \div \frac{18}{7} = \frac{105}{14} \div \frac{36}{14} = \frac{105}{36} =$
 $2\frac{11}{12}$
- 19) $\frac{1}{3} \div \frac{4}{5} = \frac{1}{3} \times \frac{5}{4} = \frac{5}{12}$
(note answer for #17)
- 20) $\frac{15}{2} \div \frac{18}{7} = \frac{5}{2} \times \frac{7}{18} = \frac{35}{12} =$
 $2\frac{11}{12}$ (note answer for #18)

1D

1) $2A - 3B + 4A + 4B - 5A = (2A + 4A - 5A) + (-3B + 4B) = A + B$

2) $18X + 5X - 6Y - 8Y - 11X + 10Y = (18X + 5X - 11X) + (-6Y - 8Y + 10Y) = 12X - 4Y$

3) $4A - 4B + 16A + 7B + 18 = (4A + 16A) + (-4B + 7B) + 18 = 20A + 3B + 18$

4) $-5X + 3 + 8X - 4 = (-5X + 8X) + (3 - 4) = 3X - 1$

5) $8K - 6 + 3K - 2K + 3 = (8K + 3K - 2K) + (-6 + 3) = 9K - 3$

6) $10C - 3C - 9D + 3D - C = (10C - 3C - C) + (-9D + 3D) = 6C - 6D$

7) $13A - 8Z - 2A - 12Z = (13A - 2A) + (-8Z - 12Z) = 11A - 20Z$

8) $7D - 4D - 4 + 5D + 8 - 7D = (7D - 4D + 5D - 7D) + (-4 + 8) = D + 4$

9) $(-3)^2 = (-3)(-3) = 9$

10) $-3^3 = -(3)(3)(3) = -27$

11) $(-6)(-2) = +12$

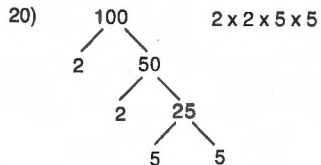
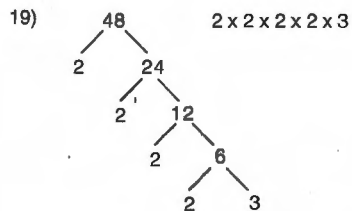
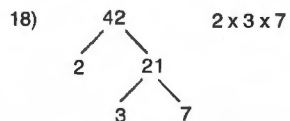
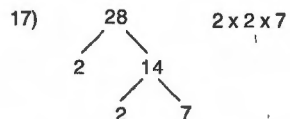
12) $(-4) - (-3) = (-4) + (+3) = -1$

13) $\frac{1}{\cancel{8}^1} \times \frac{1}{2} \times \frac{\cancel{8}^1}{\cancel{2}_2} = \frac{1}{4}$

14) $\frac{1}{\cancel{2}} \times \frac{\cancel{8}^1}{7} \times \frac{2}{\cancel{8}_1} = \frac{2}{7}$

15) $\frac{5}{8} \div \frac{1}{7} = \frac{35}{56} \div \frac{8}{56} = \frac{35}{8} = 4 \frac{3}{8}$

16) $\frac{5}{8} \div \frac{1}{7} = \frac{5}{8} \times \frac{7}{1} = \frac{35}{8} = 4 \frac{3}{8}$



Rules for divisibility.

Number is divisible by	if
2	ends in even number
3	digits add to multiple of 3
9	digits add to multiple of 9
5	ends in 5 or 0

1E

1) $(1 + 4) + 9 \bigcirc 1 + (4 + 9)$
 $14 \bigcirc 14$

2) yes

3) $9 \div 3 \bigcirc 81 \div 9$
 $3 \neq 27$

4) no

5) $12 \times 3 \bigcirc 12 \times 3$
 $36 \bigcirc 36$

6) yes

7) $110 - 4 \bigcirc 11 - 125$
 $106 \neq -114$

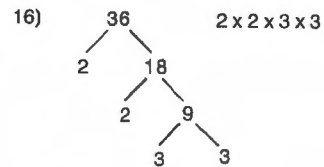
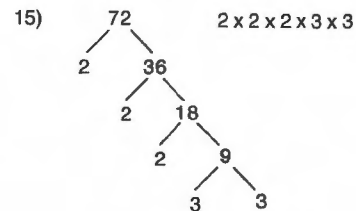
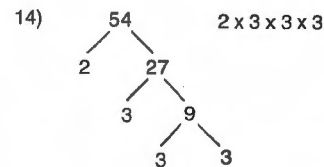
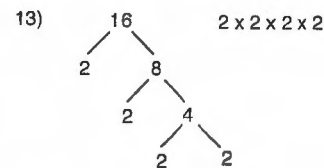
8) no

9) $\frac{1}{4} \times \frac{\cancel{8}^1}{\cancel{8}} \times \frac{\cancel{8}^1}{\cancel{8}_1} = \frac{1}{4}$

10) $\frac{\cancel{11}^1}{\cancel{2}_1} \times \frac{\cancel{8}^1}{\cancel{11}_1} \times \frac{\cancel{4}^2}{7} = \frac{2}{7}$

11) $\frac{7}{4} \div \frac{7}{8} = \frac{56}{32} \div \frac{28}{32} = \frac{56}{28} = 2$

12) $\frac{7}{4} \div \frac{7}{8} = \frac{\cancel{7}^1}{\cancel{4}_1} \times \frac{\cancel{8}^2}{\cancel{7}_1} = 2$



17) $\frac{24}{36} = \frac{2 \times \cancel{12}}{3 \times \cancel{12}} = \frac{2}{3}$ 12 is GCF

18) $\frac{10}{25} = \frac{2 \times \cancel{5}}{5 \times \cancel{5}} = \frac{2}{5}$ 5 is GCF

19) $\frac{30}{45} = \frac{2 \times \cancel{15}}{3 \times \cancel{15}} = \frac{2}{3}$ 15 is GCF

20) $\frac{32}{56} = \frac{4 \times \cancel{8}}{7 \times \cancel{8}} = \frac{4}{7}$ 8 is GCF