3E

1) 9.4×10^3

2) 5.3×10^{-7}

3) 1.2×10^{-2}

4) 1.6×10^5

5) $(9.4 \times 10^3)(1.2 \times 10^{-2}) =$
$(9.4 \times 1.2)(10^3 \times 10^{-2}) =$
$(11.28)(10^1) =$
$(1.128 \times 10^1)(10^1) = 1.128 \times 10^2$

6) $(1.6 \times 10^5)(5.3 \times 10^{-7}) =$
$(1.6 \times 5.3)(10^5 \times 10^{-7}) =$
8.48×10^{-2}

7) $(9.4 \times 10^3) \div (1.2 \times 10^{-2}) =$
$(9.4 \div 1.2)(10^{3-(-2)}) =$
$(7.83)(10^5) =$
7.83×10^5

8) $(1.6 \times 10^5) \div (5.3 \times 10^{-7}) =$
$(1.6 \div 5.3)(10^{5-(-7)}) =$
$(.302)(10^{12}) =$
$(3.02 \times 10^1)(10^{12}) = 3.02 \times 10^{11}$

9) $25X^{-2}Y - 11X^{-2}Y - 2Y^2 = 14X^{-2}Y - 2Y^2$

10) $13XY^{-1} - 7X^3Y^2 + 5XY^{-4}$

11) $3A^2B^{-1} - 4B^2A - 4A^{-2}B$

12) $4B^2 + 3AB - 5B^2 = 3AB - B^2$

13) $\frac{6X^2}{12X} + \frac{4X^3}{12X} = \frac{X}{2} + \frac{X^2}{3}$

14) $\frac{32X^2}{8X} + \frac{4X}{8X} + \frac{16}{8X} =$
$4X + \frac{1}{2} + \frac{2}{X}$

15) $\frac{4(A)}{(A+5)(A)} + \frac{6(A+5)}{A(A+5)} =$
$\frac{4A^2 + 6A + 30}{A(A+5)}$

16) $\frac{X}{X^2Y} + \frac{2Y(X)}{XY(X)} = \frac{X + 2XY}{X^2Y} =$
$\frac{1 + 2Y}{XY}$

17) $(-16)^{-1} = \frac{1}{-16}$

18) $3^4AB^{-2}C^{-4} = 81AB^{-2}C^{-4}$

19) $5^2A^{-2}B^{-3} + 5^2A^3B^{-1} =$
$25A^{-2}B^{-3} + 25A^3B^{-1}$

20) $\frac{X^4}{Y^0} + \frac{Y^3X^2}{YX^3} = X^4 + \frac{Y^2}{X}$

4A

1) $9\sqrt{2}$

2) $5\sqrt{7} - 2\sqrt{5}$

3) $-2\sqrt{X}$

4) $20\sqrt{3}$

5) $6\sqrt{30}$

6) $\frac{\overset{5}{\cancel{10}}\cancel{\sqrt{3}}}{\cancel{2}\cancel{\sqrt{3}}} = 5$

7) $18\sqrt{XY}$

8) $\frac{\overset{2}{\cancel{16}}\overset{\sqrt{2}}{\cancel{\sqrt{20}}}}{\cancel{8}\cancel{\sqrt{10}}} = 2\sqrt{2}$

9) $\frac{5\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{5\sqrt{2}}{2}$

10) $\frac{4\sqrt{6}\sqrt{3}}{\sqrt{3}\sqrt{3}} = \frac{4\sqrt{18}}{3} = \frac{4\sqrt{2\cdot 9}}{3} = \frac{\overset{4}{\cancel{12}}\sqrt{2}}{3} = 4\sqrt{2}$

11) $\frac{\sqrt{12}}{\sqrt{6}} = \sqrt{2}$

12) $\frac{9\sqrt{27}\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{9\sqrt{54}}{2} = \frac{9\sqrt{9\cdot 6}}{2} = \frac{27\sqrt{6}}{2}$

13) $\frac{(6)2\sqrt{5}}{(6)\sqrt{5}} + \frac{(5)4\sqrt{6}}{(5)6} = \frac{\overset{6}{\cancel{12}}\sqrt{5} + \overset{10}{\cancel{20}}\sqrt{6}}{\underset{15}{\cancel{30}}} = \frac{6\sqrt{5} + 10\sqrt{6}}{15}$

14) $-3\sqrt{24} - 2\sqrt{36} = -3\sqrt{4\cdot 6} - 2(6) = -6\sqrt{6} - 12$

15) $\frac{(7)X\sqrt{2}}{(7)2} + \frac{(2)X\sqrt{7}}{(2)7} = \frac{7X\sqrt{2} + 2X\sqrt{7}}{14}$

16) $8\sqrt{10} - 4\sqrt{4\cdot 5} = 8\sqrt{10} - 8\sqrt{5}$

4B

1) $2\sqrt{A}$

2) $6\sqrt{10}$

3) $6\sqrt{3} + 6\sqrt{5}$

4) $-2\sqrt{11}$

5) $9\sqrt{30}$

6) $\frac{\overset{4}{\cancel{24}}\sqrt{\cancel{14}}\sqrt{7}}{\cancel{6}\,\cancel{\sqrt{2}}} = 4\sqrt{7}$

7) 14A

8) $\frac{\overset{2}{\cancel{14}}\cancel{\sqrt{X}}}{\cancel{7}\cancel{\sqrt{X}}} = 2$

9) $\frac{X\sqrt{Y}}{\sqrt{Y}\sqrt{Y}} = \frac{X\sqrt{Y}}{Y}$

10) $\frac{3\sqrt{7}\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{3\sqrt{14}}{2}$

11) $\frac{2\sqrt{3}\sqrt{6}}{\sqrt{6}\sqrt{6}} = \frac{2\sqrt{18}}{6} = \frac{2\sqrt{9\cdot 2}}{6} = \frac{\cancel{6}\sqrt{2}}{\cancel{6}} = \sqrt{2}$

12) $\frac{5\sqrt{5}\sqrt{10}}{\sqrt{10}\sqrt{10}} = \frac{\cancel{5}\sqrt{50}}{\cancel{10}_2} = \frac{\sqrt{25}\sqrt{2}}{2} = \frac{5\sqrt{2}}{2}$

13) $\frac{(7)6\sqrt{2}}{(7)2} + \frac{(2)10\sqrt{7}}{(2)7} = \frac{\overset{21}{\cancel{42}}\sqrt{2} + \overset{10}{\cancel{20}}\sqrt{7}}{\cancel{14}_7} =$

$\frac{21\sqrt{2} + 10\sqrt{7}}{7}$

14) $2\sqrt{42} + 8\sqrt{30}$

15) $\frac{(B)(-B)\sqrt{A}}{(B)A} + \frac{(A)(-A)\sqrt{B}}{(A)B} = \frac{-B^2\sqrt{A} - A^2\sqrt{B}}{AB}$

16) $33\sqrt{24} + 22\sqrt{60} = 33\sqrt{4\cdot 6} + 22\sqrt{4\cdot 15} =$

$66\sqrt{6} + 44\sqrt{15}$

4C

1) $3(13A^2) = 39A^2$

2) $7\sqrt{X}$

3) $12\sqrt{16} = 12\cdot 4 = 48$

4) $6\sqrt{4} + 5\sqrt{16} = 6\cdot 2 + 5\cdot 4 = 32$

5) $5\sqrt{5}$

6) $\sqrt{7}$

7) $2\sqrt{9}\sqrt{3} = 2\cdot 3\sqrt{3} = 6\sqrt{3}$

8) $4\sqrt{25}\sqrt{3} = 4\cdot 5\sqrt{3} = 20\sqrt{3}$

9) $\frac{5\sqrt{3}}{\sqrt{3}\sqrt{3}} = \frac{5\sqrt{3}}{\sqrt{9}} = \frac{5\sqrt{3}}{3}$

10) $\frac{3\sqrt{5}}{\sqrt{5}\sqrt{5}} + \frac{4\sqrt{6}}{\sqrt{6}\sqrt{6}} = \frac{3\sqrt{5}}{\sqrt{25}} + \frac{4\sqrt{6}}{\sqrt{36}} =$

$\frac{3\sqrt{5}}{5}\frac{(6)}{(6)} + \frac{4\sqrt{6}}{6}\frac{(5)}{(5)} = \frac{18\sqrt{5}}{30} + \frac{20\sqrt{6}}{30} =$

$\frac{18\sqrt{5} + 20\sqrt{6}}{30} = \frac{9\sqrt{5} + 10\sqrt{6}}{15}$

11) $(6.1 \times 10^3)(4.5 \times 10^{-5}) =$

$27.45 \times 10^{-2} =$

$(2.745 \times 10^1)(10^{-2}) = 2.745 \times 10^{-1}$

12) $(9.8 \times 10^{-6})(1.4 \times 10^2) =$

$(9.8 \times 1.4)(10^{-6+2}) =$

$(13.72)(10^{-4}) = 1.372 \times 10^{-3}$

13) $(6.3 \times 10^5) \div (9 \times 10^9) =$

$.7 \times 10^{-4}$

$(7 \times 10^{-1})(10^{-4}) = 7.0 \times 10^{-5}$

14) $\frac{(9.3 \times 10^{-5})(\overset{2}{\cancel{6}} \times 10^{-8})}{(\cancel{3} \times 10^2)}$ reduce

$(18.6 \times 10^{-13}) \div (1 \times 10^2)$

$18.6 \times 10^{-15} = 1.86 \times 10^{-14}$

15) $3A^{-3}B^{-2}C^{-2} + 6AB^2C^{-2} - 4AB^2C^{-2} =$

$3A^{-3}B^{-2}C^{-2} + 2AB^2C^{-2}$

16) $\left[\frac{2X}{5} - \frac{3X}{10} = 25\right] \times 10 \Rightarrow$

$4X - 3X = 250$

$X = 250$

17) $-6X^3Y^6$

18) $\frac{36X^5Y^2Z^{-2}}{9X^0Y^4Z^{-3}} = 4X^5Y^{-2}Z$

19) $\frac{\cancel{3}}{1}\cdot\frac{5X}{\cancel{3}} = 30\cdot\frac{3}{1}$

$\frac{5X}{5} = \frac{90}{5}$

$X = 18$

20) $(.3X + 20 = 10 + .5X) \times 10 \Rightarrow$

$3X + 200 = 100 + 5X$

$-3X \quad -100 \quad -100 \quad -3X$

$100 = 2X$

$50 = X$

4D

1) $4(\frac{5}{8}X) = \frac{5}{2}X$

2) $2\sqrt{10} - 3\sqrt{5}$

3) $16\sqrt{121} = 16 \cdot 11 = 176$

4) $8\sqrt{30} - 9\sqrt{15}$

5) $4\sqrt{6}$

6) $\sqrt{42}$

7) $5\sqrt{16}\sqrt{5} = 5 \cdot 4\sqrt{5} = 20\sqrt{5}$

8) $6\sqrt{25}\sqrt{5} = 6 \cdot 5\sqrt{5} = 30\sqrt{5}$

9) $\frac{7\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{7\sqrt{2}}{\sqrt{4}} = \frac{7\sqrt{2}}{2}$

10) $\frac{9\sqrt{3}}{\sqrt{3}\sqrt{3}} + \frac{6\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{\overset{3}{\cancel{9}}\sqrt{3}}{\cancel{3}} + \frac{\overset{3}{\cancel{6}}\sqrt{2}}{\cancel{2}} =$

$3\sqrt{3} + 3\sqrt{2}$

11) $(5.8 \times 10^{1})(3.7 \times 10^{-8}) =$

$21.46 \times 10^{-7} =$

2.146×10^{-6}

12) $(4.6 \times 10^{-9})(8.2 \times 10^{7}) =$

$(37.72 \times 10^{-2}) = 3.772 \times 10^{-1}$

13) $(9.6 \times 10^{-6}) \div (3.2 \times 10^{1}) =$

$(9.6 \div 3.2)(10^{-6-1}) =$

3×10^{-7}

14) $\frac{(\overset{2}{\cancel{12}} \times 10^{-7})(\overset{2}{\cancel{18}} \times 10^{0})}{(\cancel{54} \times 10^{-8})}$

$\frac{(2 \times 2)(10^{-7} \times 10^{0})}{(1 \times 10^{-8})}$

$(4 \times 10^{-7}) \div (1 \times 10^{-8})$

$(4 \div 1)(10^{-7-(-8)}) =$

4×10^{1}

15) $9XZ + 2XYZ^{-1} - 6XYZ^{-1} =$

$9XZ - 4XYZ^{-1}$

16) $\left[\frac{1}{8X} - \frac{1}{7X} = 2\right] 56X \Rightarrow$

$7 - 8 = 112X$

$-1 = 112X$

$X = -1/112$

17) $24XY$

18) $\frac{48D^{-7}E^{5}F^{4}}{16E^{-6}F^{3}} = 3D^{-7}E^{11}F$

19) $\left[X + 6 = \frac{4X}{7}\right] 7 =$

$7X + 42 = 4X$

$3X = -42$

$X = -14$

20) $\left[\frac{3X + 2}{4} - 5 = \frac{X + 8}{2} - 8\right] 4 =$

$3X + 2 - 20 = 2X + 16 - 32$

$3X - 18 = 2X - 16$

$X = 2$

4E

1) $X(7XY) = 7X^{2}Y$

2) $15\sqrt{6}$

3) $30\sqrt{XY}$

4) $\sqrt{42} + 4\sqrt{36} = \sqrt{42} + 4(6) = \sqrt{42} + 24$

5) $10\sqrt{9} = 10(3) = 30$

6) $\sqrt{16} = 4$

7) $\sqrt{100}\sqrt{2} = 10\sqrt{2}$

8) $\frac{1}{3}\sqrt{36}\sqrt{2} - \left(\frac{1}{3}\right)6\sqrt{2} = 2\sqrt{2}$

9) $\frac{8\sqrt{10}}{\sqrt{10}\sqrt{10}} = \frac{8\sqrt{10}}{10} = \frac{4\sqrt{10}}{5}$

10) $\frac{10\sqrt{7}}{\sqrt{7}\sqrt{7}} + \frac{16\sqrt{11}}{\sqrt{11}\sqrt{11}} =$

$\frac{10\sqrt{7}(11)}{7(11)} + \frac{16\sqrt{11}(7)}{11(7)} =$

$\frac{110\sqrt{7} + 112\sqrt{11}}{77}$

11) $(3.4 \times 10^{-4})(2.6 \times 10^{-7}) =$

$(3.4 \times 2.6)(10^{-4+(-7)}) = 8.84 \times 10^{-11}$

12) $(7.7 \times 10^{4})(7.4 \times 10^{8}) =$

$56.9 \times 10^{12} =$

5.698×10^{13}

13) $(49 \times 10^{4}) \div (7 \times 10^{-3}) =$

$(49 \div 7)(10^{4-(-3)})$

7×10^{7}

14) $\frac{(\overset{2}{\cancel{28}} \times 10^{6})(\overset{3}{\cancel{21}} \times 10^{7})}{(\cancel{98} \times 10^{-2})} =$

$\frac{(2 \times 10^{6})(3 \times 10^{7})}{(1 \times 10^{-2})} =$

$\frac{6 \times 10^{13}}{1 \times 10^{-2}} = 6 \times 10^{15}$

15) $2Q^{-3}RT^{-1} - 5Q^{-1}R^{-1}T^{3} + Q^{3}RT^{4}$

16) $\left[\frac{X}{3} - \frac{X}{5} = \frac{2}{15}\right] 15 \Rightarrow$

$5X - 3X = 2$

$2X = 2$

$X = 1$

17) $-7AX^{5}$

18) $\frac{135A^{2}B^{5}C^{-3}}{15A^{-2}B^{-3}} = 9A^{4}B^{8}C^{-3}$

19) $\frac{\cancel{8}}{1} \cdot \frac{3X}{\cancel{8}} = 9 \cdot \frac{8}{1}$

$3X = 72$

$X = 24$

20) $(30 - .15X = .6X - 15)100 \Rightarrow$

$3000 - 15X = 60X - 1500$

$4500 = 75X$

$X = 60$