

Unit Test I

- 1) $(2^0)(2^{-3})(2^3) = 2^{0+(-3)+3} = 2^0 = 1$
- 2) $X^9 + X^3 = X^{9-3} = X^6$
- 3) $(4Q^3)^2 = 4^2 Q^{3 \cdot 2} = 16Q^6$
- 4) $\frac{X^3 Y^{-2}}{Y^2 X^4} = X^{3-4} Y^{-2-2} = X^{-1} Y^{-4}$ or $\frac{1}{XY^4}$
- 5) $\frac{3}{4A} - \frac{8}{4B} = \frac{3B}{4AB} - \frac{8A}{4AB} = \frac{3B-8A}{4AB}$
- 6) $\frac{R}{R} + R^0 = 1 + 1 = 2$
- 7) $\frac{2Y}{X+Y} + \frac{Y}{X-Y} = \frac{2Y(X-Y)}{X+Y(X-Y)} + \frac{Y(X+Y)}{X-Y(X+Y)} = \frac{2XY - 2Y^2 + XY + Y^2}{X^2 - Y^2} = \frac{-Y^2 + 3XY}{X^2 - Y^2}$
- 8) $4R^6 TR^{-2} + 5R^4 T - 2T = 4R^4 T + 5R^4 T - 2T = 9R^4 T - 2T$
- 9) $(5.6 \times 10^{-3})(3.4 \times 10^{-2}) = (5.6 \times 3.4)(10^{-5}) = 19.04 \times 10^{-5} = 1.904 \times 10^{-4}$
- 10) $(4.55 \times 10^4)(2.1 \times 10^7) = 4.5 \times 2.1 \times 10^4 \times 10^7 = 9.555 \times 10^{11}$
- 11) $(3.2 \times 10^4) \div (1.6 \times 10^{-4}) = 2 \times 10^8$
- 12) $(2.3 \times 10^{-4})(1.6 \times 10^2) + (2.0 \times 10^{-3}) = 1.84 \times 10^1$
- 13) $(4\sqrt{5})(5\sqrt{3}) = 20\sqrt{15}$
- 14) $5\sqrt{6} + 2\sqrt{6} = 7\sqrt{6}$
- 15) $\frac{6}{\sqrt{2}} + \frac{1}{\sqrt{3}} = \frac{6\sqrt{2}}{2} + \frac{\sqrt{3}}{3} = \frac{3(6\sqrt{2}) + 2\sqrt{3}}{6} = \frac{18\sqrt{2} + 2\sqrt{3}}{6} = \frac{9\sqrt{2} + \sqrt{3}}{3}$
- 16) $\sqrt{36X^4} = 6X^2$
- 17) $\sqrt{\frac{16}{25}} = \frac{4}{5}$
- 18) $\sqrt{\sqrt{16}} = \sqrt{4} = 2$

- 19) $(X+5)(3X+2)$
- 20) $3(X^2 - 3X + 2) = 3(X-1)(X-2)$
- 21) $(X^4 - 1) = (X^2 + 1)(X^2 - 1) = (X^2 + 1)(X+1)(X-1)$
- 22) $2X^2 + 3X - 2 = (2X-1)(X+2)$
- 23) $X^2 - 10X = -18 - X$
 $X^2 - 9X + 18 = 0$
 $(X-3)(X-6) = 0$
 $X = 3; X = 6$
- 24) $2X^2 + 2X + 14 = 32 + 2X$
 $2X^2 - 18 = 0$
 $X^2 - 9 = 0$
 $(X+3)(X-3) = 0$
 $X = \pm 3$
- 25) $2X + 15 = X^2$
 $0 = X^2 - 2X - 15$
 $(X+3)(X-5) = 0$
 $X = -3; X = 5$
- 26) $X^3 = 16X$
 $X^3 - 16X = 0$
 $X(X^2 - 16) = 0$
 $(X)(X+4)(X-4) = 0$
 $X = 0, 4, -4$
- 27) $\sqrt{-144} = \sqrt{-1} \sqrt{144} = 12i$
- 28) $\sqrt{-8} + \sqrt{-4} = \sqrt{-2} \sqrt{4} + \sqrt{-1} \sqrt{4} = 2\sqrt{2} + 2i$
- 29) $(4\sqrt{-5})(2\sqrt{-6}) = 4i\sqrt{5} \cdot 2i\sqrt{6} = -8\sqrt{30}$
- 30) $(i^3)^2 = i^6 = i \cdot i \cdot i \cdot i \cdot i \cdot i = -1 \cdot -1 \cdot -1 = -1$
- 31) $\frac{X}{8+2i} \cdot \frac{8-2i}{8-2i} = \frac{X(8-2i)}{64-(-4)} = \frac{8X-2Xi}{68} = \frac{4X-Xi}{34}$
- 32) $\frac{2}{1+\sqrt{2}} = \frac{1-\sqrt{2}}{1-\sqrt{2}} = \frac{2-2\sqrt{2}}{1-2} = \frac{2-2\sqrt{2}}{-1} = -2+2\sqrt{2}$
- 33) $10X^3 Y^2$
- 34) $4A^3 B$
- 35) $-5/2 D^3$

Unit Test II

- 1) $X^2 + 6X = 6$
 $X^2 + 6X + 9 = 15$
 $(X+3)(X+3) = 15$
 $X+3 = \pm\sqrt{15}$
 $X = -3 \pm \sqrt{15}$
- 2) $X^2 + 4X = -1$
 $X^2 + 4X + 4 = 3$
 $(X+2)(X+2) = 3$
 $X+2 = \pm\sqrt{3}$
 $X = -2 \pm \sqrt{3}$
- 3) $\frac{-8 \pm \sqrt{(8)^2 - 4(1)(-5)}}{2(1)} = \frac{-8 \pm \sqrt{64 - (-20)}}{2} = \frac{-8 \pm \sqrt{84}}{2} = \frac{-8 \pm 2\sqrt{21}}{2} = -4 \pm \sqrt{21}$
- 4) $\frac{-3 \pm \sqrt{(3)^2 - 4(2)(6)}}{2(2)} = \frac{-3 \pm \sqrt{9 - 48}}{4} = \frac{-3 \pm \sqrt{-39}}{4} = \frac{-3 \pm i\sqrt{39}}{4}$
- 5) $b^2 - 4ac$
 $X^2 + 3X - 10 = 0$
 $(3)^2 - 4(1)(-10)$
 $9 + 40 = 49$
 real, rational, unequal
- 6) $12^2 - 4(1)(36)$
 $144 - 144 = 0$
 real, rational, equal
- 7) $4X^2 - 8X + 20$
 $(-8)^2 - 4(4)(20)$
 $64 - 320 = -256$
 imaginary
- 8) $X^2 - 5X + 3 = 0$
 $(-5)^2 - 4(1)(3)$
 $25 - 12 = 13$
 real, irrational, unequal
- 9) $WXY = Z$
 $W = \frac{Z}{XY}$
- 10) $\frac{TR}{A} = \frac{X}{B}$
 $TRB = AX$
 $A = \frac{TRB}{X}$
- 11) $\frac{X}{Y} - A = 0$
 $\frac{X}{Y} = A$
 $X = AY$
- 12) $\frac{1}{Y} = \frac{1}{T}$
 $Y = T$
- 13) $.20(2,345) = \$469$ discount
 $2,345 - 469 = \$1,876$ new price
- 14) $\$1,876(.06) = \112.56 tax
 $\$112.56 + \$1,876 = \$1,988.56$ total
- 15) $12 + (2)(16) = 44$ total weight
 $12 = WP \times 44$
 $\frac{12}{44} = WP$
 $WP = .27$ (rounded)
 27%
- 16) $\frac{B}{G} = \frac{6}{8}$
 $\frac{36}{G} = \frac{6}{8}$
 $6G = 36(8)$
 $G = 6(8) = 48$
- 17) $\frac{B}{T} = \frac{5}{5+9}$
 $\frac{B}{56} = \frac{5}{14}$
 $14B = (5)(56)$
 $B = (5)(4)$
 $B = 20$
- 18) $400 \div 16 = 25$ lbs.

- 19) $.62 \times 8 = 4.96$ mi.
- 20) $50 \times 6 = 300$ mi.
- 21) $280 \div 20 = 14$ hours
- 22) $60 \text{ mph} \times 1 \text{ hr} = 60$ mi.
 $60 \div 3 = 20$ mph
 $60 \text{ mi.} \div 20 \text{ mph} = 3$ hrs.
- 23) $D_L = R_L T_L$
 $D_C = R_C T_C$
 $R_C = R_L + 2$
 $D_L = D_C$
 $D_L = R_L(5)$
 $D_C = R_C(4)$
 $D_C = (R_L + 2)(4)$
 $R_L(5) = (R_L + 2)(4)$
 $5R_L = 4R_L + 8$
 $R_L = 8$ mph
 $R_C = 8 + 2 = 10$ mph
- 24) $D_J = R_J T_J$
 $D_D = R_D T_D$
 $D_J + D_D = 230$
 $R_J = 35$
 $R_D = 45$
 $T_D = T_J - 2$
 $D_J = (35) T_J$
 $230 - D_J = (45)(T_J - 2)$
 $230 - D_J = 45T_J - 90$
 $320 - D_J = 45T_J$
 $320 - 45T_J = D_J$
 $320 - 45T_J = 35T_J$
 $320 = 80T_J$
 $T_J = 4$ hrs
 $T_D = 4 - 2 = 2$ hrs
 2 hrs after 3:00 = 5:00 PM
- 25) $D_J = (35)(4)$
 $D_J = 140$ mi.
 $D_D = (45)(2)$
 $D_D = 90$ mi.
 check: $90 + 140 = 230$