**Identify which type of variation the following equations represent:**

1. $y=kx$ **Direct**
2. $y=\frac{k}{x}$ **Inverse**
3. $y=kxz$ **Joint**
4. $y=\frac{kx}{z}$ **Combined**
5. $y=\frac{x}{7}$ **Direct**
6. $y=4x$ **Direct**
7. $y=\frac{2x}{z}$ **Combined**
8. $y=$**9xy Joint**
9. $y=\frac{3xy}{z}$ **Combined**

**Simplify the following expressions and find the excluded values:**

1. $\frac{x+3}{x+2}÷\frac{\left(x-1\right)(x+3)}{(x-1)^{2}}$

$\frac{x-1}{x+2} $**Excluded Values {-2,1,-3}**

1. $\frac{10x^{2}-20x}{40x^{3}-80x^{2}}×\frac{16x^{3}+80x^{2}}{6x+30}$

$\frac{2x}{3} $**Excluded Values {0,2,-5}**

1. $\frac{4x+20}{-5-x}$

**-4 Excluded Values {-5}**

1. $\frac{x^{5}-4x^{3}-x^{2}-4}{x^{3}-2x^{2}+x-2}÷\frac{3x^{3}+3x^{2}+3x}{x^{2}-1}×\frac{6x}{x^{2}-2x+1}$

**This question had a typo, correct it and try again (Look at the red number in the problem, it was supposed to be in there).** $\frac{2\left(x+1\right)(x+2)}{x^{2}+1}$ **Excluded Values {-1,0,1,2}**

1. $\frac{3x-2}{x+2}+\frac{2x}{4x-1}$

$\frac{14x^{2}-7x+2}{4x^{2}+7x-2}$ **Excluded Values {-2,1/4}**

1. $\frac{x}{2x+3}-\frac{2x+1}{2x-3}$

$\frac{-2x^{2}-11x-3}{4x^{2}-9}$ **Excluded Values {3/2,-3/2}**

1. $\frac{\frac{3x-2}{x^{2}-4}}{\frac{5x+1}{x^{2}+x-6}}$

$\frac{\left(3x^{2}-2\right)(x+3)}{\left(5x+1\right)(x+2)}$ **Excluded Values{-3,-2,2}**

**Solve the following word problems:**

1. The dosage *d* of a drug that a physician prescribes varies directly as the patient’s mass *m*, and *d*=100 mg when *m*=55kg. Find *d* to the nearest milligram when *m*=70 k. $k=\left(\frac{20}{11}\right);d=127mg$
2. The heat *Q* required to raise the temperature of water varies jointly as the mass *m* of the water and the amount of temperature change *T*, and *Q*=20,930 joules (J) when *m*=1 kg and *T*=5⁰C. Find m when *Q*=8372 J and *T*= 10⁰C.

$k=4186;.2kg$