**Binomial Expansion**

**Type 1**

1. 
2. 
3. 
4. 

**Type 2a**

1. 
2. 
3. 
4. 

**Type 2b**

1. 
2. 
3. 
4. 

**Type 3**

1. 
2. 
3. 
4. 

**Type 4a**

1. 
2. 
3. 

**Type 4b**

1. 
2. 
3. 

**Type 5a**

1. 
2. 
3. 
4. 

**Type 5b**

1. 
2. 
3. 
4. 

**Type 5c**

1. 
2. 
3. 
4. 

**Binomial Expansion - Answers**

Type 1

$$x^{2}+2x+1$$

$$x^{3}+3x^{2}+3x+1$$

$$x^{4}+4x^{3}+6x^{2}+4x+1$$

$$x^{5}+5x^{4}+10x^{3}+10x^{2}+5x+1$$

Type 2a

$$x^{3}+6x^{2}+12x+8$$

$$x^{3}+9x^{2}+27x+27$$

$$x^{4}+8x^{3}+24x^{2}+32x+16$$

$$x^{5}+20x^{4}+160x^{3}+640x^{2}+1280x+1024$$

Type 2b

$$x^{3}-6x^{2}+12x-8$$

$$x^{3}-12x^{2}+48x-64$$

$$x^{5}-10x^{4}+40x^{3}-80x^{2}+80x-32$$

$$x^{6}-12x^{5}+60x^{4}-160x^{3}+240x^{2}-192x+64$$

Type 3

$$8x^{3}+12x^{2}+6x+1$$

$$81x^{4}+108x^{3}+14x^{2}+12x+1$$

$$16x^{4}+32x^{3}+24x^{2}+8x+1$$

$$1024x^{5}+1280x^{4}+640x^{3}+160x^{2}+20x+1$$

Type 4a

$$x^{3}+3x^{2}+3x+1$$

$$x^{4}+12x^{3}+54x^{2}+108x+81$$

$$x^{7}+14x^{6}+84x^{5}+250x^{4}+560x^{3}+672x^{2}+448x+128$$

Type 4b

$$1-3x+3x^{2}-x^{3}$$

$$243-405x+270x^{2}-90x^{3}+15x^{4}-x^{5}$$

$$256-1024x+1792x^{2}-1792x^{3}+1120x^{4}-148x^{5}+112x^{6}-16x^{7}+x^{8}$$

Type 5a

$$8x^{3}+36x^{2}+54x+27$$

$$16x^{4}+160x^{3}+600x^{2}+1000x+625$$

$$243x^{5}+810x^{4}+1080x^{3}+720x^{2}+240x+32$$

$$4096x^{6}+12288x^{5}+15360x^{4}+10240x^{3}+3840x^{2}+768x+64$$

Type 5b

$$8x^{3}-36x^{2}+54x-27$$

$$16x^{4}-128x^{3}+384x^{2}-512x+256$$

$$125x^{3}-150x^{2}+60x-8$$

$$16x^{4}+16x^{3}+6x^{2}+x+\frac{1}{16}$$

Type 5c

$$64-144x+108x^{2}-27x^{3}$$

$$625-1000x+600x^{2}-160x^{3}+16x^{4}$$

$$2401+686x+\frac{147}{2}x^{2}-\frac{7}{2}x^{3}+\frac{1}{16}x^{4}$$