Bell work: Expand the following binomials

1) $(x+2)^2$

$(x+2)(x+2)$

$x^2 + 2x + 2x + 4$

$x^2 + 4x + 4$

(2) $(x-y)^2$

$(x-y)(x-y)$

$x^2 - xy - xy + y^2$

$x^2 - 2xy + y^2$

$(x-y)^3$

$(x-y)(x-y)(x-y)$

Pascal's Triangle

$(a+b)^0$

$(a+b)^1$

$(a+b)^2$

$(a+b)^3$

$(a+b)^4$

$$1$$
$$1 \quad 1$$
$$1 \quad 2 \quad 1$$
$$1 \quad 3 \quad 3 \quad 1$$
$$1 \quad 4 \quad 6 \quad 4 \quad 1$$
$$1 \quad 5 \quad 10 \quad 10 \quad 5 \quad 1$$
$$1 \quad 6 \quad 15 \quad 20 \quad 15 \quad 6 \quad 1$$
$$1 \quad 7 \quad 21 \quad 35 \quad 35 \quad 21 \quad 7 \quad 1$$
$$1 \quad 8 \quad 28 \quad 56 \quad 70 \quad 56 \quad 28 \quad 8 \quad 1$$
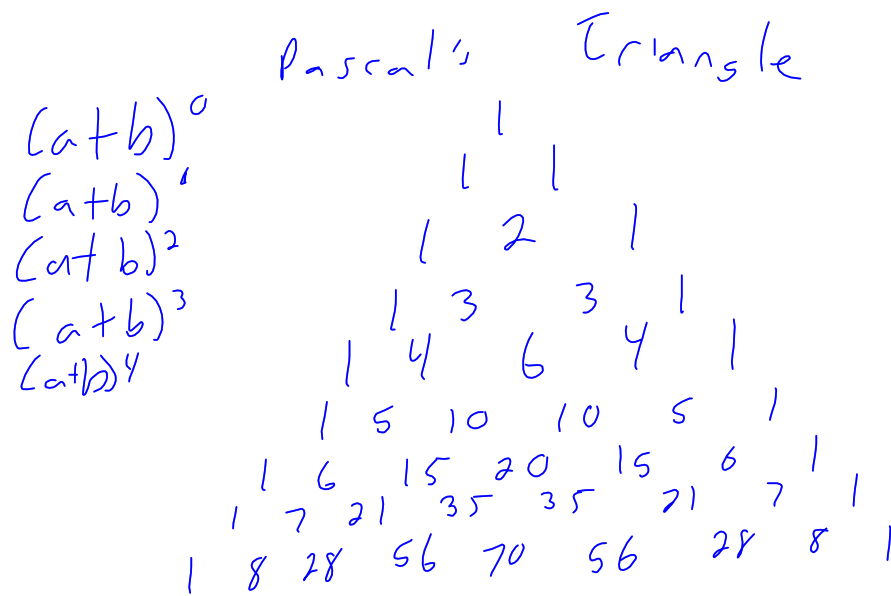
Expand each binomial.

1. $(x+4)^3$ — 4 terms

$(x)^3 + (x)^2(4)^1 + (x)^1(4)^2 + (4)^3$

$(1) \quad (3) \quad (3)$
$x^3 + 4x^2 + 16x + 64 \quad (1)$

$x^3 + 12x^2 + 48x + 64$
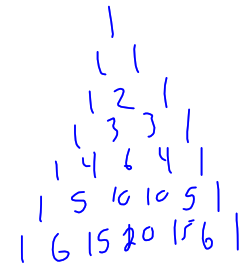
3. $(x-3)^5$

$(x)^5 + (x)^4(-3)^1 + (x)^3(-3)^2 + (x)^2(-3)^3 + (x)^1(-3)^4 + (-3)^5$

$(1) \quad (5) \quad (10) \quad (10) \quad (5) \quad (1)$
$x^5 - 3x^4 + 9x^3 - 27x^2 + 81x - 243$

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

1
$1 \quad 1$
$1 \quad 2 \quad 1$
$1 \quad 3 \quad 3 \quad 1$
$1 \quad 4 \quad 6 \quad 4 \quad 1$
$1 \quad 5 \quad 10 \quad 10 \quad 5 \quad 1$
$1 \quad 6 \quad 15 \quad 20 \quad 15 \quad 6 \quad 1$

Find the specified term of each binomial expansion.

5. second term of $(x - 4)^8$ — 9 terms

$$(x)^8 + (x)^7 (-4)^1$$

$$x^8 - 4x^7 \quad (8)$$

$$x^8 \boxed{-32x^7}$$

7. fourth term of $(x - 2)^7$ — 8 terms

$$(x)^7 + (x)^6 (-2)^1 + (x)^5 (-2)^2 + (x)^4 (-2)^3$$

$$(1) x^7 - \overset{(7)}{2} x^6 + \overset{(21)}{4} x^5 \boxed{-8x^4} (35) \qquad x^7 - 14x^6 + 84x^5 \boxed{-280x^4}$$

State the number of terms in each expansion and give the first two terms.

9. $(2a + b)^7$

$(2a)^7 + (2a)^6 (b)^1$

$^{(1)}128a^7 + ^{(7)}64a^6 b$

$128a^7 + 448a^6 b$

11. $(x + y)^3$

$(x)^3 + (x)^2 (y)^1$

$^{(1)}x^3 + ^{(3)}x^2 y$

-4 terms

$x^3 + 3x^2 y$

13. $(x + y^2)^5$

$(x)^5 + (x)^4 (y^2)^1$

$^{(1)}x^5 + ^{(5)}x^4 y^2$

$x^5 + 5x^4 y^2$

Expand each binomial.

7 terms

21. $(3b+1)^6$

$(3b)^6 + (3b)^5(1)^1 + (3b)^4(1)^2 + (3b)^3(1)^3 + (3b)^2(1)^4 + (3b)^1(1)^5 + 1^6$

(1)   (6)   (15)   (20)   (15)   (6)   (1)

$729b^6 + 243b^5 + 81b^4 + 27b^3 + 9b^2 + 3b + 1$

$729b^6 + 1458b^5 + 1215b^4 + 540b^3 + 135b^2 + 18b + 1$

17. $(2y+8)^3$ 4 terms

$(2y)^3 + (2y)^2(8)^1 + (2y)^1(8)^2 + (8)^3$

$8y^3 + 4y^2(8) + 2y(64) + 512$

(1)   (3)   (3)   (1)

$8y^3 + 32y^2 + 128y + 512$

$8x^3 + 96y^2 + 384y + 512$