

4.5 Powers of Binomials · Form A

All work must be completed on a separate page. Final answers only on this WS.

Examples 1

Use Pascal's triangle to expand each binomial.

$$1. (a+b)^4 \quad a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4 \quad 2. (m+1)^4 \quad m^4 + 4m^3 + 6m^2 + 4m + 1$$

$$3. (d+2)^5 \quad d^5 + 10d^4 + 40d^3 + 80d^2 + 80d + 32$$

Example 2

4. **BASKETBALL** Hector shot 8 free throws at practice, making 4 free throws and missing 4 free throws. If it is as likely to make a free throw as to miss a free throw, find the probability of this outcome by expanding $(m+n)^8$. Round to the nearest percent if necessary. **11%**

Example 3

Expand each binomial. $4096a^6 + 18432a^5b + 34560a^4b^2 + 34560a^3b^3 + 19440a^2b^4 + 5832ab^5 + 729b^6$

$$5. (2c-2d)^7 \quad 128c^7 - 896c^6d + 2688c^5d^2 - 4480c^4d^3 + 4480c^3d^4 - 2688c^2d^5 + 896cd^6 - 128d^7$$

$$6. (4a+3b)^6$$

Mixed Exercises

Expand each binomial.

$$7. \left(x + \frac{1}{2}\right)^5 \quad x^5 + \frac{5}{2}x^4 + \frac{5}{2}x^3 + \frac{5}{4}x^2 + \frac{5}{16}x + \frac{1}{32}$$

$$8. \left(x - \frac{1}{3}\right)^4 \quad x^4 - \frac{4}{3}x^3 + \frac{2}{9}x^2 - \frac{4}{27}x + \frac{1}{81}$$

$$9. \left(2b + \frac{1}{4}\right)^5$$

$$32b^5 + 20b^4 + 5b^3 + \frac{5}{8}b^2 + \frac{5}{128}b + \frac{1}{1024}$$

$$10. \left(3c + \frac{1}{3}d\right)^3$$

$$27c^3 + 9c^2d + cd^2 + \frac{1}{27}d^3$$

11. **STRUCTURE** Out of 12 frames, Vince bowled 6 strikes. If Vince is as likely bowl a strike as to not bowl a strike in one frame, find the probability of this outcome. Round to the nearest percent if necessary. **23%**
12. **REGULARITY** A group of 10 choir members are selected at random to perform solos. If there are an equal number of boys and girls in the choir, find the probability of the choir members selected being 7 boys and 3 girls. Round to the nearest percent if necessary. **12%**
13. **USE A MODEL** A company is developing a robotic welder that produces circuit boards. At this stage in its development, the robotic welder only produces 50% of the circuit boards correctly. Use the Binomial Theorem to find the probability that 5 of 7 circuit boards chosen at random are correct. **16%**
14. **USE A MODEL** Diego flips a fair coin 12 times. What is the probability that the coin lands on tails 3 times? 5 times? 9 times?
5.4% 19.3% 5.4%
15. **REASONING** A test consists of 10 true-false questions. Matthew forgets to study and must guess on every question. What is the probability that he gets 8 or more correct answers on the test? Show your work using Pascal's Triangle. **5.5%**
16. **REGULARITY** Use Pascal's Triangle to find the fourth term in the expansion of $(2x+7)^6$. Why is it the same as the fourth term in the expansion of $(7+2x)^6$? **20**