# WHY ISN'T A SNOWMAN VERY SMART?

Write the expression in simplest form. For each exercise set, there is one extra answer. Write the letter of this answer in each box containing the number of that exercise set.

| 6 | 3 | 6 | 2 | 10 | 10 | 8 | 1 | 4 | 7 | 9 | 2 | 5 | 8 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**1**

a. $n^2 \cdot n^3$

b. $n^7 \cdot n^4$

c. $2n^5 \cdot 5n$

d. $10n^3 \cdot n^8$

Answers: (C) $10n^6$ (T) $n^5$ (E) $10n^{11}$ (O) $10n^8$ (J) $n^{11}$

**2**

a. $(y^3)^2$

b. $(y^5)^2$

c. $(7y^2)^2$

d. $(5y^4)^3$

Answers: (B) $125y^{12}$ (A) $15y^8$ (R) $y^{10}$ (U) $49y^4$ (L) $y^6$

**3**

a. $\frac{v^5}{v^2}$ c. $\frac{20v^8}{5v}$

b. $\frac{v^9}{v^4}$ d. $\frac{44v^7}{11v^6}$

Answers: (H) $4v$ (N) $v^5$ (I) $v^3$ (T) $4v^7$ (E) $4v^5$

**4**

a. $2a^3 \cdot 5a^3$

b. $2a^3 + 5a^3$

c. $9a^8 \cdot 4a^8$

d. $9a^8 + 4a^8$

Answers: (L) $10a^6$ (N) $36a^{16}$ (W) $13a^{16}$ (D) $7a^3$ (R) $13a^8$

**5**

a. $(4q)^3$

b. $4q + 4q + 4q$

c. $(q^3)^4$

d. $q^3 + q^3 + q^3 + q^3$

Answers: (T) $12q$ (I) $4q^{12}$ (R) $64q^3$ (P) $4q^3$ (F) $q^{12}$

**6**

a. $\frac{m^8}{m^3}$ d. $\frac{8m^4}{40m^{11}}$

b. $\frac{m^3}{m^8}$

c. $\frac{40m^{11}}{8m^4}$

Answers: (G) $\frac{1}{m^5}$ (H) $5m^{15}$ (T) $m^5$ (B) $\frac{1}{5m^7}$ (M) $5m^7$

**7**

a. $t^6 \cdot t^5$

b. $t^6 + t^5$

c. $3t \cdot 8t^3$

d. $3t + 8t^3$

Answers: (K) $24t^4$ (L) $t^{11}$ (N) $3t + 8t^3$ (B) $11t^8$ (C) $t^6 + t^5$

**8**

a. $(15k)^2$

b. $15k + 15k$

c. $(2k^6)^5$

d. $(2k^5)^6$

Answers: (L) $30k$ (D) $225k^2$ (N) $30k^{30}$ (R) $32k^{30}$ (G) $64k^{30}$

**9**

a. $\frac{49x^7}{7x^2}$ d. $\frac{7x^2}{49x^7}$

b. $\frac{49x^2}{7x^7}$

c. $\frac{7x^7}{49x^2}$

Answers: (M) $\frac{x^5}{7}$ (U) $\frac{1}{7x^5}$ (R) $7x$ (Y) $\frac{7}{x^5}$ (L) $7x^5$

**10**

a. $(-w^3)^2$

b. $(-w^3)^3$

c. $(-w^3)^4$

d. $(-w^3)^5$

Answers: (T) $w^6$ (F) $w^{12}$ (D) $-w^{15}$ (P) $-w^9$ (S) $-w^{12}$





What Did Professor Utterbunk Say When Asked:

# Have You Ever Heard of the Planet Saturn?

Simplify each expression. Write the letter of the answer in the box containing the exercise number.

1. $5^3$
2. $5^{-3}$
3. $3^{-5}$
4. $(-5)^{-3}$
5. $(-12)^{-2}$
6. $-12^{-2}$
7. $(-12)^0$
8. $(-4)^{-3}$

Answers 1-8: (T) $\frac{1}{144}$ (M) $\frac{1}{125}$ (P) $-1$ (R) $-\frac{1}{64}$ (I) $125$ (L) $144$ (U) $1$ (N) $\frac{1}{243}$ (O) $-\frac{1}{125}$ (F) $-125$ (E) $\frac{1}{64}$ (S) $-\frac{1}{144}$

9. $-4^{-3}$
10. $10^{-5}$
11. $(-10)^{-5}$
12. $10^0$
13. $75^{-1}$
14. $-75^{-1}$
15. $(-2)^{-4}$
16. $-2^{-4}$

Answers 9-16: (O) $16$ (I) $\frac{1}{75}$ (T) $-\frac{1}{75}$ (E) $-\frac{1}{64}$ (A) $-\frac{1}{16}$ (N) $\frac{1}{1000}$ (T) $1$ (R) $-75$ (S) $-64$ (H) $\frac{1}{16}$ (B) $\frac{1}{100{,}000}$ (U) $-\frac{1}{100{,}000}$

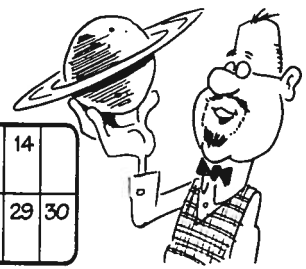
17. $7ab^0$
18. $7ab^{-4}$
19. $\frac{7}{ab^{-4}}$
20. $\frac{7^{-2}a}{b^{-1}}$
21. $2x^3y^{-8}$
22. $\frac{2x^{-3}}{y^{-8}}$
23. $\frac{2^{-1}x^{-3}}{y^8}$

Answers 17-23: (I) $\frac{2y^8}{x^3}$ (A) $\frac{7a}{b^4}$ (R) $2x^3y^8$ (O) $7ab^4$ (F) $\frac{7b^4}{a}$ (L) $\frac{1}{2x^3y^8}$ (S) $7a$ (A) $\frac{ab}{49}$ (M) $\frac{2x^3}{y^8}$ (N) $\frac{b}{49a}$

24. $\frac{3n^2}{t^{-5}}$
25. $3^4n^{-2}t^5$
26. $\frac{3^{-4}t^{-5}}{n^{-2}}$
27. $\frac{8^2c^{-1}d^{-6}}{5}$
28. $\frac{(-8)^2c^0}{5^{-1}d^{-6}}$
29. $\frac{(-8)^{-2}d^{-6}}{5c^{-1}}$
30. $\frac{-8^{-2}}{5^{-1}cd^0}$

Answers 24-30: (T) $\frac{64c}{5d^6}$ (G) $-\frac{5}{64c}$ (I) $3n^2t^5$ (I) $320d^6$ (R) $\frac{n^2}{81t^5}$ (A) $\frac{81t^5}{n^2}$ (E) $320cd^6$ (S) $81n^2t^5$ (R) $\frac{64}{5cd^6}$ (N) $\frac{c}{320d^6}$

| 1 | 2 | | 3 | 4 | 5 | | 6 | 7 | 8 | 9 | | 10 | 11 | 12 | | 13 | 14 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 16 | 17 | | 18 | | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | 27 | 28 | 29 | 30 |



# Why [illegible] the Deck of Cards Always in Trouble?

Simplify the expression. For each set of exercises, there is one extra answer. Write the letter of this answer in each box containing the number of that set.

| | | | | | |
|---|---|---|---|---|---|
| 1 | a. $\frac{20x^5}{5x^3}$ | b. $\frac{-28x^4}{7x}$ | P $-4x^3$ | O $-4x$ | V $4x^2$ |
| 2 | a. $\frac{26m^8n^2}{13m^5n}$ | b. $\frac{-60m^9n^6}{-12mn^2}$ | I $5m^3n^2$ | A $2m^3n$ | G $5m^8n^4$ |
| 3 | a. $\frac{2ab^5}{a^4b^2}$ | b. $\frac{-5a^2b^3}{10b^8}$ | F $\frac{2b^3}{a^3}$ | S $-\frac{2a^2}{b^3}$ | T $-\frac{a^2}{2b^5}$ |
| 4 | a. $\frac{(k^2e)^2}{k^3e}$ | b. $\frac{(ke)^2(ke^2)}{k^2e}$ | N $ke^3$ | L $ke$ | D $k^2e^2$ |
| 5 | a. $\frac{(-3c^3d)^2}{2cd^3}$ | b. $\frac{(-c)^3(-d^3)}{5c^8d}$ | A $\frac{9c^5}{2d}$ | R $\frac{d^2}{5c^5}$ | E $\frac{9d}{5c^3}$ |
| 6 | a. $\left(\frac{8x}{y^3}\right)^2$ | b. $\left(\frac{x^5}{-2y^2}\right)^3$ | B $-\frac{x^{15}}{8y^6}$ | T $\frac{x^8}{8y^8}$ | W $\frac{64x^2}{y^6}$ |
| 7 | a. $\left(\frac{6ab^3}{3c^2}\right)^2$ | b. $\left(\frac{a^2b^3c^4}{ac^2}\right)^3$ | R $\frac{4a^3b^9}{c^4}$ | N $a^3b^9c^6$ | V $\frac{4a^2b^6}{c^4}$ |
| 8 | a. $\frac{(-5vt)^2}{-5vt^2}$ | b. $\frac{15(v^2t)^5}{3v^{10}}$ | H $5vt^4$ | L $-5v$ | A $5t^5$ |
| 9 | a. $\frac{(-3wh^3)^2}{9w^5h^8}$ | b. $\frac{-w(-h)^4}{(-wh)^4}$ | J $-\frac{1}{w^2h^2}$ | F $-\frac{1}{w^3}$ | B $\frac{1}{w^3h^2}$ |
| 10 | a. $\left(\frac{5pq^3}{4p^3q}\right)^2$ | b. $\left(\frac{-3q^5}{pq}\right)^3$ | A $-\frac{27q^{12}}{p^3}$ | L $-\frac{27q^6}{p^4}$ | N $\frac{25q^4}{16p^4}$ |
| 11 | a. $\frac{(-2n)^5}{-2n^5}$ | b. $\frac{12n(-n)^3}{-60n^2}$ | G $\frac{n^2}{5}$ | B 16 | K $\frac{n}{8}$ |
| 12 | a. $\left(\frac{a^3}{7b^2}\right)^x$ | b. $\left(\frac{7a^x}{7b^y}\right)^x$ | P $\frac{a^{x^2}}{b^{xy}}$ | M $\frac{a^{3x}}{7^xb^{2x}}$ | W $\frac{a^{3x}}{7b^x}$ |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 8 | 5 | 9 | 1 | 11 | 5 | 7 | 3 | 12 | 5 | 7 | 5 | 12 | 2 | 10 | 4 | | | | | | | |



| PARTNER A (top) | TEAM NAME | PARTNER B (bottom) |
|---|---|---|
| | | |

# What Did People Say After Two Satellite Dishes Got Married?

Simplify the expression. Write the exercise letter in the box containing the number of the answer. Partner A should do the top half and Partner B the bottom half.

A $8^3$ B $8^{-3}$ E $(-8)^3$ L $(-8)^{-3}$ I $(-25)^2$

T $(-25)^{-2}$ E $-25^{-2}$ D $(-44)^0$ T $3^{-4}$ N $-3^{-4}$

U $5ab^{-3}$ W $\frac{5^3a^{-3}}{b}$ D $\frac{5^{-3}a}{b^{-3}}$ H $2^4a^0b^{-8}$ S $\frac{2^{-4}}{a^{-1}b^8}$

W $\frac{7^{-1}k^5}{n^2}$ L $\frac{7^{-2}k^{-5}}{n^{-2}}$ G $\frac{7^{-3}n^{-2}}{k^0}$ D $\frac{(-7)^{-2}}{2kn^{-2}}$ U $\frac{-7^{-2}n^2}{2k^{-5}}$

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 625 | 10 $-\frac{1}{81}$ | 19 $-\frac{1}{512}$ | 22 $\frac{1}{512}$ | 11 $\frac{1}{343n^2}$ | 15 $\frac{a}{16b^8}$ | 23 $\frac{5a}{b^3}$ | 8 $\frac{ab^3}{125}$ | | | | | | | | | | | | | | | | |
| 17 1 | 14 512 | 6 $-\frac{1}{625}$ | 16 −81 | 18 $-\frac{n^2k^5}{98}$ | 4 $\frac{n^2}{343}$ | 20 $\frac{n^2}{49k^5}$ | 2 $\frac{16}{b^8}$ | | | | | | | | | | | | | | | | |
| 12 −625 | 1 $\frac{1}{81}$ | 3 −512 | 24 $\frac{1}{625}$ | 5 $\frac{k^5}{7n^2}$ | 13 $\frac{125}{a^3b}$ | 21 $\frac{k^5}{98n}$ | 7 $\frac{n^2}{98k}$ | | | | | | | | | | | | | | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

O $7^3$ E $7^{-3}$ A $(-7)^3$ H $(-7)^{-3}$ T $(-20)^2$

E $(-20)^{-2}$ A $-20^{-2}$ S $(-99)^0$ E $4^{-4}$ I $-4^{-4}$

T $9ab^{-2}$ E $\frac{9^2a^{-2}}{b}$ T $\frac{9^{-2}a}{b^{-2}}$ W $4^3a^0b^{-10}$ R $\frac{4^{-3}}{a^{-1}b^{10}}$

G $\frac{6^{-1}k^8}{n^3}$ N $\frac{6^{-2}k^{-8}}{n^{-3}}$ C $\frac{6^{-3}n^{-3}}{k^0}$ R $\frac{(-6)^{-2}}{4kn^{-3}}$ P $\frac{-6^{-2}n^3}{4k^{-8}}$

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 $-\frac{1}{400}$ | 13 343 | 17 −343 | 22 $\frac{1}{343}$ | 10 $-\frac{n^3k^8}{144}$ | 16 $\frac{64}{b^{10}}$ | 6 $\frac{a}{64b^{10}}$ | 24 $\frac{9a}{b^2}$ | | | | | | | | | | | | | | | | |
| 1 −256 | 7 $\frac{1}{400}$ | 12 $-\frac{1}{256}$ | 18 1 | 20 $\frac{k^8}{6n^3}$ | 9 $\frac{81}{a^2b}$ | 21 $\frac{n^3}{144k}$ | 19 $\frac{81a}{b^2}$ | | | | | | | | | | | | | | | | |
| 3 $-\frac{1}{343}$ | 11 400 | 15 −625 | 4 $\frac{1}{256}$ | 8 $\frac{1}{216n^3}$ | 5 $\frac{b^{10}}{64a}$ | 14 $\frac{n^3}{36k^8}$ | 2 $\frac{ab^2}{81}$ | | | | | | | | | | | | | | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|