

1. Evaluate (use the properties of exponents):

a. $\frac{3^{10} \cdot (3^2)^4}{(3^5)^3 \cdot 3}$

b. $\frac{(5^2)^6 \cdot (5^7 : 5^4)}{(-125)^5}$

c. $\frac{(-3)^9 \cdot 9^2 \cdot 81^3}{-27^{10} : 3^5}$

d. $\frac{32^4 \cdot (-2)^8 : 64^3}{-128^3 : (-8)^4}$

2. Prove that

$25^6 - 5$ is divisible by 4

$16^8 + 2^{27}$ is divisible by 33

3. What should be placed instead of n for the equalities to hold?

a. $x^n \cdot x^6 = x^{18}$;

b. $(x^n)^x \cdot x^6 = x^{18}$

c. $(y^{10})^n = y^{40}$;

d. $y^{10} \cdot y^n = y^{40}$

4. Represent a^{24} as an exponent with the base

a. a^2 ; b. a^3 ; c. a^4 ; d. a^6 ; e. a^8 ; f. a^{12}

Example:

$a^{24} = (a^2)^{12}$

5. 5 hamsters will eat 5 bags of hamster food in 5 days. How many days 10 hamsters need to eat 10 bags of food?
6. *A farmer has a cow, a goat and a goose. The cow and the goat will eat all the grass on his meadow in 45 days, the cow and the goose will eat all the grass on the same meadow in 60 days, and the goat and the goose will eat all the grass on the meadow in 90 days. How many days will it take them altogether to eat all the grass on the meadow? (we assume that the new grass is not growing.)

7. Fill up the empty places for the equality to hold (:

a. $5 \cdot (4 + 7) = 5 \cdot \square + \square \cdot 7$

b. $\square \cdot (11 - 7) = \square - 21$

c. $(\square - \square) \cdot 20 = 80 - 60$

d. $(35 + a) \cdot 2 = \square + 2a$

e. $10 \cdot (\square - \square) = 140 - 10x$

f. $9c + \square = (9 + 1)c$

Example:

$$(\square - \square) \cdot 20 = 80 - 60 = 4 \cdot 20 + 3 \cdot 20 = (4 + 3) \cdot 20$$

8. Reduce the following fractions and bring them to the common denominator:

a. $\frac{88}{275}$ and $\frac{36}{135}$;

b. $\frac{8ab}{48bc}$ and $\frac{5bnk}{15cnk}$;

c. $\frac{9c - 9t}{9t}$ and $\frac{5a + 3a}{56at}$

9. Evaluate:

a. $4\frac{1}{6} \cdot \left(1\frac{1}{2} - \frac{3}{5}\right) + \left(\frac{3}{4} + \frac{5}{6}\right) \cdot 6$;

b. $\left(6 - 2\frac{4}{5}\right) \cdot 3\frac{1}{8} - 1\frac{3}{5} : \frac{1}{4}$;

c. $24 - \left(3\frac{3}{5} - 1\frac{7}{9}\right) : \left(\frac{1}{2} - \frac{1}{3}\right)$;

d. $4 \cdot \left(2\frac{1}{2} + 1\frac{3}{4}\right) - \left(6\frac{2}{3} + 4\frac{4}{5}\right) : 2$;