

Math 6c, homework 18.



1. Factor out the common factor.

Example:

$$abx - acx - adx = x \cdot (ab - ac - ad);$$

$$a(b - c) - 4b + 4c = a(b - c) - (4b - 4c) = a(b - c) - 4(b - c) = (b - c)(a - 4)$$

a. $3x - 9y;$

b. $16zx - 20x^2y;$

c. $7cd - 14c^3d^4;$

d. $xyz + yzd;$

e. $4ab - 2a^2b - 6a^3b^2;$

f. $ab + bd - cd;$

g. $(x + 1) + x(x + 1);$

h. $y(a - y) - y^2(a - y);$

i. $a(a - 1) - (a - 1);$

j. $m^2(n + 1) + 2m(n + 1)$

k. $x(y + z) - 2y - 2z;$

l. $a(b + c) - b - c;$

2. Evaluate:

a. $\frac{5 \cdot 4^{27} - 21 \cdot 4^{26}}{2^{50}};$

b. $\frac{3^{51} - 4 \cdot 3^{50}}{9^{26}};$

3. Prove that

a. $6^5 + 6^4$ is divisible by 7;

b. $9^4 - 9^3$ is divisible by 8

c. $3^4 + 3^5 + 3^6$ is divisible by 13;

d. $2^5 + 2^6 + 2^7 + 2^8$ is divisible by 5

e. $n(2n + 1)(7n + 1)$ is divisible by n for any natural n

4. a) Prove that one of any three consecutive odd numbers is divisible by 3.

b) It is known that $p, p + 2,$ and $p + 4$ are prime numbers. Find p . Prove that no other such p exists.

If the first pipe fills $\frac{1}{4}$ of a pool and then the second pipe fills the remaining $\frac{3}{4}$, the pool will be filled in 5 hours. If, instead, the first pipe fills $\frac{3}{4}$ of the pool and the second pipe fills the remaining $\frac{1}{4}$, the pool will be filled in 7 hours. How long would it take for the second pipe alone to fill the entire pool?