Dividing a Polynomial by a Monomial (ALG.POL.05)

Divide. Determine whether each quotient is a monomial.

1. $\dfrac{18m^3n^2}{6m^2}$ $3mn^2$

The quotient is a monomial.

2. $\dfrac{25ab^2}{10ab}$ $\dfrac{5b}{2} = \dfrac{5}{2}b$

The quotient is a monomial.

3. $\dfrac{-20p^4q^4}{12p^2q^6}$ $\dfrac{-5p^2}{3q^2}$

The quotient is not a monomial.

Divide.

4. $\dfrac{5a+15}{5}$ $a+3$

5. $\dfrac{7h^4+2h^3}{h^3}$ $7h+2$

6. $\dfrac{30a^3+10a^2+3a}{10a}$ $3a^2+a+\dfrac{3}{10}$

7. $\dfrac{2k^4+20k^3-3k^2}{4k}$ $\dfrac{k^3}{2}+5k^2-\dfrac{3}{4}k$

8. $\dfrac{3v^5+4v^3-2v}{-6v}$ $-\dfrac{v^4}{2}-\dfrac{2v^2}{3}+\dfrac{1}{3}$

9. $\dfrac{9r^3+18r^2+6r}{9r^2}$ $r+2+\dfrac{2}{3r}$

10. $\dfrac{32n^3+2n^2+4}{-8n^3}$ $-4-\dfrac{1}{4n}-\dfrac{1}{2n^3}$

11. $\dfrac{7d^8+35d^6-42d^4+14}{14d^5}$ $\dfrac{d^3}{2}+\dfrac{5d}{2}-\dfrac{3}{d}+\dfrac{1}{d^5}$

12. $\dfrac{(x+3)(2x-5)+3x-5}{2x}$ $x+2-\dfrac{10}{x}$

13. $\dfrac{(y-8)(3y-1)+2(y^2+1)}{5y}$ $y-5+\dfrac{2}{y}$

14. $\dfrac{(4d-3)^2+2d^2-3d}{9d}$ $2d-3+\dfrac{1}{d}$

15. $\dfrac{(x+2)^4}{2x}$ $\dfrac{1}{2}x^3+4x^2+12x+16+\dfrac{8}{x}$

16. $\dfrac{(x-3)^3-x(x-3)^2}{-3x^2}$ $1-\dfrac{6}{x}+9/x^2$

17. A certain rectangle has an area of $(14x^3-28x^2+21x)$ square feet and a width of $(7x)$ feet.

a. Write an algebraic expression (in terms of x) that represents the length the rectangle, including units. $L = 2x^2-4x+3$

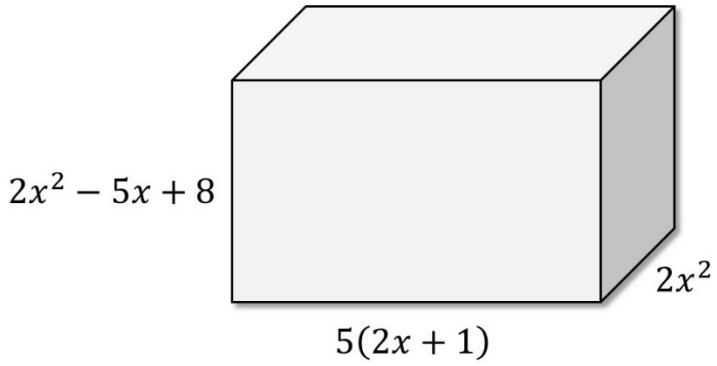
b. If $x = 4$, determine the area of the rectangle, including units. $A = 532$ square feet

c. If $x = 4$, determine the dimensions of the rectangle, including units.
$W = 28$ feet, $L = 19$ feet

d. Do the dimensions found in **part c** correspond to the area in **part b**? Yes, $28 \times 19 = 532$

18. A certain rectangular prism has a volume of $(45x^4 + 75x^3)$ cubic meters. If the width of the prism is $(3x)$ meters and the depth of the prism is $(5x^2)$ meters, then determine its height, including units, in terms of x. $\boldsymbol{H = (3x + 5)}$ **meters**

19. If the volume of the rectangular prism shown in the diagram is $(40x^5 - 80x^4 + 110x^3 + 80x^2)$ cubic inches, then show algebraically that the area of the front face is equal to the volume divided by the depth of the prism.



$$\boldsymbol{5(2x + 1)(2x^2 - 5x + 8) = \frac{40x^5 - 80x^4 + 110x^3 + 80x^2}{2x^2}}$$

$$\boldsymbol{(10x + 5)(2x^2 - 5x + 8) = \frac{40x^5}{2x^2} - \frac{80x^4}{2x^2} + \frac{110x^3}{2x^2} + \frac{80x^2}{2x^2}}$$

$$\boldsymbol{20x^3 - 50x^2 + 80x + 10x^2 - 25x + 40 = 20x^3 - 40x^2 + 55x + 40}$$

$$\boldsymbol{20x^3 - 40x^2 + 55x + 40 = 20x^3 - 40x^2 + 55x + 40}$$