

Practice Problems for MTE 6 – Exponents, Factoring, and Polynomial Equations

1. Simplify the expression $(-7x^8)x^3$.
2. Simplify the expression $\frac{5^6u^6v^8}{5^8u^6v^4}$. Assume that neither u nor v is zero.
3. Simplify the expression $(s^6t)^2$.
4. Find the value of $(-2)^{-6}$.
5. Rewrite the expression $\frac{5w^3}{4z^{-3}}$ using only positive exponents. Assume that z is not zero.
6. Use the rules of exponents to simplify the expression $(2x^9y^8)^{-4}$ using only positive exponents. Assume that neither x nor y is 0.
7. Rewrite the expression using only positive exponents, and simplify. Assume that any variables in the expression are nonzero.

$$\frac{(2a^{-2}b^4)^4 b}{(6a^2b)^3}$$

8. Perform the indicated operations. Write each answer in scientific notation and then without exponents.

a) $\frac{9.5 \times 10^4}{5.3 \times 10^{-3}}$

b) $(9.3 \times 10^{-5})(6 \times 10^3)$

9. Is the polynomial below a monomial, binomial, trinomial, or none of these?

$$8x^3 + 4x$$

10. Find the sum $17x + 5x$
11. Multiply $(-5y^3)(-3y^4)$.
12. Perform the division.

$$\frac{10z^3 + 3z^2 - 2z}{2z}$$

13. Find the sum $(9x + 4) + (6x - 6)$.
14. Find the difference $(-5x + 4) - (-3x + 7)$.
15. Multiply $(5x + 6)(9x + 7)$ and simplify.
16. Find the difference $(5x^2 - 2x - 3) - (3x^3 - 9x^2 - 3)$.

Perform the indicated operations and simplify.

17. $(-5x^4 + 8x^2 + 2) + 7(5x^4 - 3x^2)$
18. Find the difference $(-7x^2 - 7x - 7) - [(7x^3 - 9x^2 - 20) + (4x - 11)]$.

19. Multiply $(x^2 + 4x - 3)(5x^2 + 7)$ and simplify.

20. Find the greatest common factor of $9g^8h^7$, $3g^9h^8$, and $3g^2h^8$,

21. Factor the polynomial $3xy + 15x^2y - 21x^6y^6$.
22. Factor the polynomial by grouping, if possible. $4y^3 + 3y^2 + 28y + 21$
23. Factor the trinomial, if possible. $z^2 + 14z + 48$
24. Factor the trinomial, if possible. $m^2 - 7m - 120$
25. Factor the given polynomial $3z^2 + 30z + 27$ completely.
26. Factor the trinomial, if possible. $20g^2 - 63g - 21$
27. Factor the difference of two squares: $25x^2 - 81y^2$
28. Factor the polynomial, if possible. $27m^3 + 64n^3$
29. Factor the polynomial below, if possible. $z^3 - 125$
30. Solve the equation $2x^2 = 76x$ by factoring.
31. Solve the equation below by factoring. $a^2 + 8a + 29 = 13$
32. Solve the equation below by factoring. $x^3 - 17x^2 + 72x = 0$
33. An object is thrown upward from a height of 192 feet with an initial velocity of 64 feet per second. The height h (in feet) of the object after t seconds is modeled by the equation

$$h = -16t^2 + 64t + 192.$$

How long will it take for the object to reach the ground?

34. The revenue R from the sale of x cameras is given by $R = 55x - x^2$. The cost C of producing x cameras is given by $C = 99 + 35x$. How many cameras must be produced and sold in order to break even?