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# 5, 7, 11, 13, 17, 21-32

5. a)  $x^2$       b) 1

7. a)  $\frac{a}{3}$       b)  $\frac{a}{3a+1}$

11. a)  $\frac{ab}{b-a}$       b)  $ab$

13. COST IN 10 YEARS: \$1214  
COST IN 20 YEARS: \$4910

17. VALUE IN 3 YEARS: \$27,422  
VALUE IN 6 YEARS: \$11,569

21.  $(3a^{-2})^3 \cdot 3a^5 = 3^3 a^{-6} \cdot 3a^5 = 81a^{-1} = \boxed{\frac{81}{a}}$

22.  $(-4x^3)^2 \cdot 3x^{-2} = 16x^6 \cdot 3x^{-2} = \boxed{48x^4}$

23.  $(3n^2)^{-1} (3n^2)^7 = 3^{-1} n^{-2} \cdot 3^7 n^{14} = 3^6 n^{12} = \boxed{729n^{12}}$

24.  $(2r^{-1})^4 (4r^2)^{-2} = 2^4 r^{-4} \cdot 4^{-2} r^{-4} = 16 \cdot \frac{1}{16} \cdot r^{-8} = \boxed{\frac{1}{r^8}}$

25.  $\frac{(2a^{-1})^2}{(2a^{-1})^{-2}} = \frac{2^2 a^{-2}}{2^{-2} a^2} = 2^4 a^{-4} = \boxed{\frac{16}{a^4}}$

$$26. \frac{(-3n^{-3})^2}{-9n^{-4}} = \frac{-3^2 n^{-6}}{-9n^{-4}} = \frac{9n^{-6}}{-9n^{-4}} = -1n^{-2} = \boxed{\frac{-1}{n^2}}$$

$$27. \left(\frac{a}{b^2}\right)^{-2} \left(\frac{a}{b^2}\right)^{-3} = \left(\frac{a^{-2}}{b^{-4}}\right) \left(\frac{a^{-3}}{b^{-6}}\right) = \frac{a^{-5}}{b^{-10}} = \boxed{\frac{b^{10}}{a^5}}$$

$$28. \frac{(-2r)^4}{(-2r)^{-2}} = \frac{-2^4 r^4}{-2^{-2} r^{-2}} = -2^6 r^6 = \boxed{64r^6}$$

$$29. 2x^{-3}(x^5 - 2x^3) = 2x^2 - 4x^0 = \boxed{2x^2 - 4}$$

$$30. xy^{-2}(xy^2 - 3y^3) = x^2 y^0 - 3xy^1 = \boxed{x^2 - 3xy}$$

$$31. \frac{6a^{-2} + 9a^2}{3a^{-2}} = \frac{6a^{-2}}{3a^{-2}} + \frac{9a^2}{3a^{-2}} = 2a^0 + 3a^4 = \boxed{2 + 3a^4}$$

$$32. \frac{8n^4 - 4n^{-2}}{2n^{-2}} = \frac{8n^4}{2n^{-2}} - \frac{4n^{-2}}{2n^{-2}} = 4n^6 - 2n^0 = \boxed{4n^6 - 2}$$