1) $\left(\frac{-2}{5}\right)^{-2} = \frac{(-2)^{-2}}{5^{-2}} = \frac{5^2}{(-2)^2} = \boxed{\frac{25}{4}}$

2) $\left(\frac{2}{3}\right)^{-3} = \frac{(-2)^{-3}}{3^{-3}} = \frac{3^3}{(-2)^3} = \boxed{\frac{27}{8}}$

3) $49^{-\frac{1}{2}} = \frac{1}{49^{\frac{1}{2}}} = \boxed{\frac{1}{7}}$

4) $64^{-\frac{1}{3}} = \frac{1}{64^{\frac{1}{3}}} = \boxed{\frac{1}{4}}$

5) $8^{\frac{4}{3}} = (8^{\frac{1}{3}})^4 = 2^4 = \boxed{16}$

6) $25^{\frac{3}{2}} = (25^{\frac{1}{2}})^3 = 5^3 = \boxed{125}$

7) $\frac{9^{\frac{1}{3}}}{9^{-\frac{1}{2}}} = 9^{\frac{1}{3} - -\frac{1}{2}} = 9^{\frac{2}{6} + \frac{3}{6}} = \boxed{9^{\frac{5}{6}}}$

8) $\frac{5^{\frac{2}{3}}}{5^{\frac{1}{4}}} = 5^{\frac{2}{3} - \frac{1}{4}} = 5^{\frac{8}{12} - \frac{3}{12}} = \boxed{5^{\frac{5}{12}}}$

9) $2^{\frac{1}{4}} \cdot 2^{\frac{4}{3}} = 2^{\frac{1}{4} + \frac{4}{3}} = 2^{\frac{3}{12} + \frac{16}{12}} = \boxed{2^{\frac{19}{12}}}$

10) $10^{\frac{4}{5}} \cdot 10^{-\frac{1}{2}} = 10^{\frac{4}{5} + -\frac{1}{2}} = 10^{\frac{8}{10} - \frac{5}{10}} = \boxed{10^{\frac{3}{10}}}$

11) $\left(3^{\frac{1}{7}} \cdot 3^{\frac{3}{7}}\right)^7 = \left(3^{\frac{1}{7} + \frac{3}{7}}\right)^7 = \left(3^{\frac{4}{7}}\right)^7 = 3^4 = \boxed{81}$

12) $\left(8^{\frac{7}{9}} \cdot 8^{\frac{-2}{9}}\right)^9 = \left(8^{\frac{7}{9} + \frac{-2}{9}}\right)^9 = \left(8^{\frac{5}{9}}\right)^9 = \boxed{8^5}$

$\frac{1}{n^{-3}} = \boxed{n^3}$

14. $\frac{1}{x^{-4}} = \boxed{x^4}$

15. $(-27)^{\frac{2}{3}} = \left((-27)^{\frac{1}{3}}\right)^2 = (-3)^2 = \boxed{9}$

16. $(-8)^{\frac{2}{3}} = \left((-8)^{\frac{1}{3}}\right)^2 = (-2)^2 = \boxed{4}$

17. $\left(15^{\frac{1}{2}}\right)^{\frac{3}{4}} = \boxed{15^{\frac{3}{8}}}$

18. $\left(20^{\frac{2}{3}}\right)^{\frac{3}{8}} = 20^{\frac{6}{24}} = \boxed{20^{\frac{1}{4}}}$

19. $\sqrt{40} = \boxed{2\sqrt{10}}$

$\sqrt{4}\ \sqrt{10}$

20. $5\sqrt{24} = 5 \cdot 2\sqrt{6} = \boxed{10\sqrt{6}}$

$\sqrt{4}\ \sqrt{6}$

21. $\sqrt{25x^2} = (25x^2)^{\frac{1}{2}} = 25^{\frac{1}{2}}(x)^{\frac{1}{2}}$ $\boxed{5x}$

22. $\sqrt[4]{81x^{20}} = 81^{\frac{1}{4}} x^{20 \cdot \frac{1}{4}} = \boxed{3x^5}$

23. $\sqrt[3]{32x^{10}} = (32x^{10})^{\frac{1}{3}} = 8^{\frac{1}{3}} 4^{\frac{1}{3}} x^{9 \cdot \frac{1}{3}} x^{1 \cdot \frac{1}{3}} = \boxed{2x^3 \sqrt[3]{4x}}$

24. $\sqrt[3]{54x^5} = (54x^5)^{\frac{1}{3}} = \left(27^{\frac{1}{3}} 2^{\frac{1}{3}} x^{3 \cdot \frac{1}{3}} x^{2 \cdot \frac{1}{3}}\right) = \boxed{3x \sqrt[3]{2x^2}}$

$$\frac{6a^4bc^{-3}}{(a^{-2}b^4c)^4} = \frac{6a^4bc^{-3}}{a^{-8}b^{16}c^4} = 6a^{4-(-8)}b^{1-16}c^{-3-4} = 6a^{12}b^{-15}c^{-7}$$

$$\boxed{\frac{6a^{12}}{b^{15}c^7}}$$

26. $$\frac{5ab^2c^{-2}}{(a^{-4}bc^3)^3} = \frac{5ab^2c^{-2}}{a^{-12}b^3c^9} = 5a^{1-12}b^{2-3}c^{-2-9} = 5a^{-11}b^{-1}c^{-11} = \boxed{\frac{5}{a^{11}bc^{11}}}$$

27. $$\frac{20x^{-5}}{14y^2} \div \frac{5x^{-2}}{7y^{-3}} = \frac{20x^{-5}}{14y^2} \cdot \frac{7y^{-3}}{5x^{-2}} = \frac{140x^{-5}y^{-3}}{70x^{-2}y^2}$$

$$= 20x^{-5+2}y^{-3-2} = 20x^{-1}y^{-5} = \boxed{\frac{2}{x^3y^5}}$$

28. $$\frac{\cancel{12}x^2}{\cancel{9}y^{-5}} \cdot \frac{\cancel{18}y^{-1}}{\cancel{8}x^{-6}} = \frac{36x^2y^{-1}}{12x^{-6}y^{-5}} = 3x^{2-(-6)}y^{-1-(-5)} = \boxed{3x^8y^4}$$

29. $$(-5x^0y^{-4})^2(2x^{-3}y^5) = (-5)^2y^{-8}(2x^{-3}y^5) = 25y^{-8}\cdot(2x^{-3}y^5) = 50x^{-3}y^{-5}$$

$$= \boxed{\frac{50}{x^3y^5}}$$

30. $$(-5x^4y^{-2})^3(x^{-3}y^0) = (-5)^3(x^4)^3(y^{-2})^3(x^{-3}y^0)$$

$$= -125x^{12}y^{-6}\cdot x^{-3} = -125x^9y^{-6} = \boxed{\frac{-125x^9}{y6}}$$

31. $$(8x^5y^{-3})^{-2} = \frac{1}{(8x^5y^{-3})^2} = \frac{1}{64x^{10}y^{-6}} = \boxed{\frac{y6}{64x^{10}}}$$

32. $$(3xy^{-4})^{-3} = \frac{1}{(3xy^{-4})^3} = \frac{1}{27x^3y^{-12}} = \boxed{\frac{y^{12}}{27x^3}}$$

(33) $\frac{24x^7y^{-3}}{6x^2y^{-2}} = 4x^{7-2}y^{-3--2} = 4x^5y^{-1} = \boxed{\frac{4x^5}{y}}$

(34) $\frac{30x^2y^{-7}}{20x^4y} = \frac{3x^{2-4}y^{-7-1}}{2} = \frac{3x^{-2}y^{-8}}{2} = \boxed{\frac{3}{2x^2y^8}}$

(35) $\frac{8x^5y^{-1}}{3xy^2} \cdot \frac{-6x^2}{x^{-2}y^5} = \frac{-48x^7y^{-1}}{3x^{-1}y^7} = -16x^{7--1}y^{-1-7} = -16x^8y^{-8} = \boxed{\frac{-16x^8}{y^8}}$

(36) $\frac{9x^2y^{-5}}{4xy} \cdot \frac{-8x^4}{x^{-4}y^3} = \frac{-72x^6y^{-5}}{4x^{-3}y^4} = -18x^{6--3}y^{-5-4} = -18x^9y^{-9} = \boxed{\frac{-18x^9}{y^9}}$

(37) $(12)^{\frac{2}{3}} = \boxed{\sqrt[3]{12^2}}$

(38) $3^{\frac{5}{2}} = \boxed{\sqrt[2]{3^5}}$

(43) $y = A\left(\frac{1}{3}\right)^{\frac{t}{200}}$ when $t = 400$ and $A = 2700$

$= 2700\left(\frac{1}{3}\right)^{\frac{400}{200}} = 2700\left(\frac{1}{3}\right)^2 = 2700\left(\frac{1}{9}\right) = \frac{2700}{9} = \boxed{300 \text{ years}}$

(45) $P = A(4)^{\frac{t}{7}}$ when $A = 2700$ and $t = 21$ years

$6400 = A(4)^{\frac{21}{7}} \Rightarrow 6400 = A(4)^3 \Rightarrow \frac{6400}{64} = \frac{64A}{64}$

$\boxed{A = 100}$