

## RULES OF EXPONENTS

Simplify – Write all answers with positive exponents.

1.  $\frac{a^2 b^3 c^7}{a^6 b c^5}$

6.  $\frac{a^{3n-2} b^{n+1}}{a^{2n+1} b^{2n+2}}$

2.  $\frac{-4x^3 y^{-2}}{(2x)^2}$

7.  $\frac{y^{2n}}{-y^{8n}}$

3.  $\left( (2x^4 y^2)^3 \right)^{-2}$

8.  $6a^0 \cdot 5a^{-4}$

4.  $\frac{28x^0 y^{15} z^{-4}}{4x^{-1} y^6 z}$

9.  $\left( \frac{2k}{p^5} \right)^{-4}$

5.  $\left( \frac{3f^{-4} g^3 h^7}{3^6 f^{-5} g^{-7} h^2} \right)^4$

10.  $(4x^2 y^{-2})^{-3} (5x^{-6} y^{-1})^2$

$$11. \frac{(2^{-3}a^4b^{-7}c^2)^{-2}(2^{-7}a^6b^{-3}c^{-5})^3}{2^{-12}a^{-5}b^{12}c^{11}}$$

$$14. 3x^0y^0 + \frac{7}{(6x^2y^{-5})^0}$$

Simplify using scientific notation only. *Do not convert to standard numbers!*

$$15. (7.2 \times 10^5)(8.1 \times 10^3)$$

$$12. \left(\frac{p}{4q^{-4}}\right)^3 \left(\frac{-12qr^8}{p^3}\right) (q^{-7}r^{11})^{-2}$$

$$16. \frac{8 \times 10^{-1}}{16 \times 10^{-4}}$$

$$17. \frac{(3.6 \times 10^5)(9.8 \times 10^{-8})}{1.4 \times 10^7}$$

$$13. \left(\frac{8x^3y^{-1}}{9x^{-4}y^2}\right)^{-2} \left(\frac{2x^{-1}y^2}{3x^{-5}y^3}\right)^3$$

$$18. \frac{2.3436 \times 10^{14}}{(9.3 \times 10^3)(5.6 \times 10^2)}$$

## ANSWERS

1.  $\frac{b^2c^2}{a^4}$

2.  $-\frac{x}{y^2}$

3.  $\frac{1}{64x^{24}y^{12}}$

4.  $\frac{7xy^9}{z^5}$

5.  $\frac{f^4g^{40}h^{20}}{3^{20}}$

6.  $\frac{a^{n-3}}{b^{n+1}}$

7.  $-\frac{1}{y^{6n}}$

8.  $\frac{30}{a^4}$

9.  $\frac{p^{20}}{16k^4}$

10.  $\frac{25y^4}{64x^{18}}$

11.  $\frac{a^{15}}{8b^7c^{30}}$

12.  $\frac{-3q^{27}}{16r^{14}}$

13.  $\frac{3y^3}{8x^2}$

14. 10

15.  $5.832 \times 10^9$

16.  $5 \times 10^2$

17.  $2.52 \times 10^{-9}$

18.  $4.5 \times 10^7$



## ALGEBRA II HANDOUT

Simplify each expression.

1.  $-\sqrt{144b^2c^6}$

2.  $\sqrt[3]{(2x-y)^3}$

3.  $\sqrt{4y^2+12y+9}$

4.  $\sqrt[3]{-192}$

5.  $\sqrt[4]{112}$

6.  $(2\sqrt[3]{24})(7\sqrt[3]{128})$

7.  $\sqrt[4]{32x^4y^5n^{10}}$

8.  $\sqrt[3]{54f^8g^{13}h^{29}}$

9.  $\sqrt{48m^6n^{11}p^{14}}$

10.  $\sqrt[5]{96h^{17}j^{42}k^6}$

11.  $\sqrt{3a^2b^4c^3} \cdot \sqrt{15a^6b^6c}$

12.  $\sqrt[4]{6x^2y^9z^6} \cdot \sqrt[4]{8x^{10}y^4z^{12}}$

13.  $\sqrt[3]{24} + \sqrt[3]{375} - \sqrt{48}$

## ANSWERS

1.  $-12|bc^3|$

2.  $2x - y$

3.  $|2y + 3|$

4.  $-4\sqrt[3]{3}$

5.  $2\sqrt[4]{7}$

6.  $112\sqrt[3]{6}$

7.  $2|x|yn^2\sqrt[4]{2yn^2}$

8.  $3f^2g^4h^9\sqrt[3]{2f^2gh^2}$

9.  $4n^5|m^3p^7|\sqrt{3n}$

10.  $2h^3j^8k^2\sqrt[3]{3h^2j^2k}$

11.  $3a^4|b^5|c^2\sqrt{5}$

12.  $2|x^3|y^3z^4\sqrt[4]{3yz^2}$

13.  $7\sqrt[3]{3} - 4\sqrt{3}$

**ALGEBRA 2 HANDOUT**  
**Graphing Powers & Roots**

Graph each of the following functions on graph paper. Plot as many points as possible with y-coordinates between -20 and 20. **Show T-tables of values for each graph.**

1.  $y = (x - 3)^3$

2.  $y = -(x + 5)^2 + 4$

3.  $y = \sqrt{x + 4}$

4.  $y = \sqrt[3]{-x} - 2$

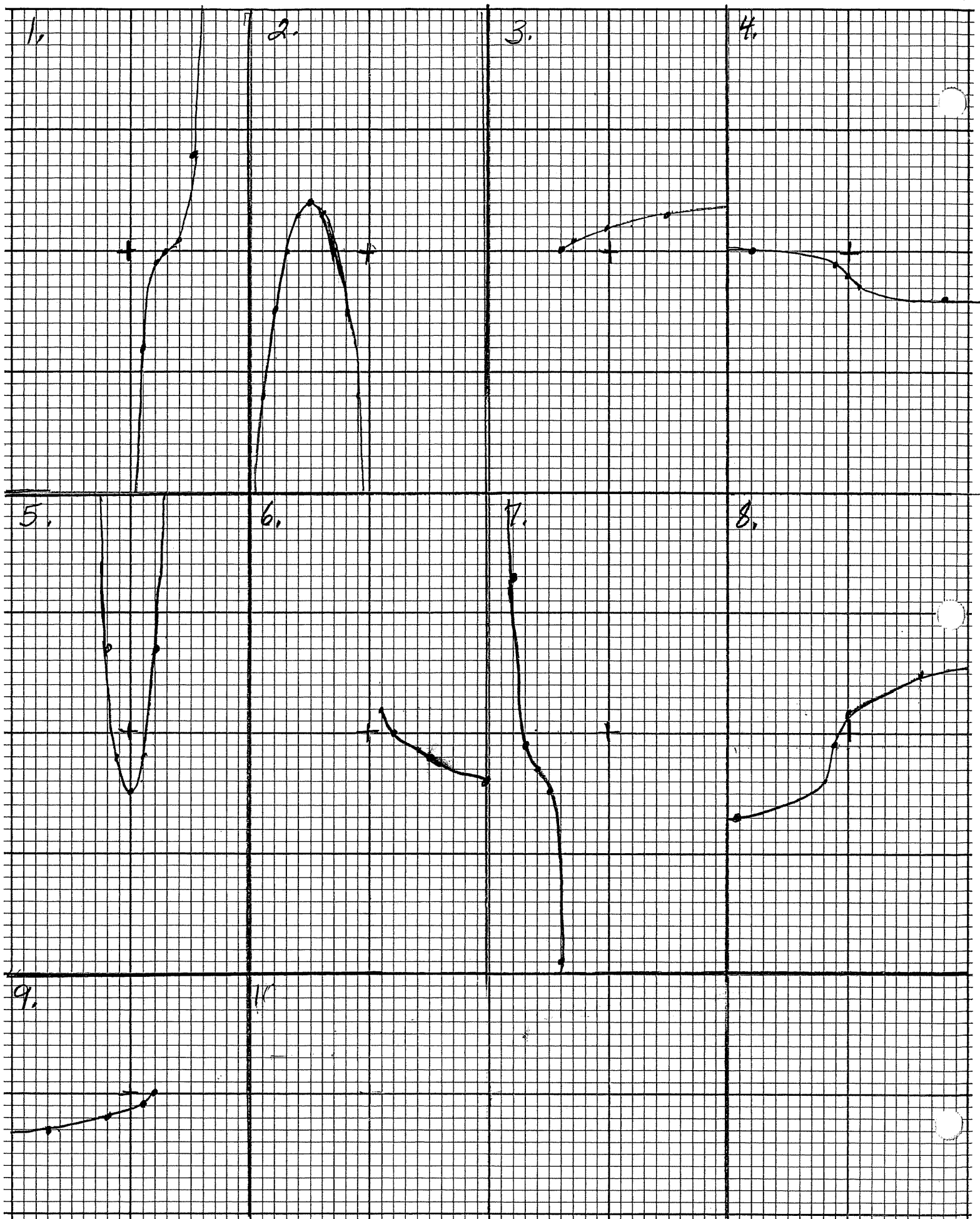
5.  $y = 3x^2 - 5$

6.  $y = -2\sqrt{x - 1} + 2$

7.  $y = -2(x + 6)^3 - 3$

8.  $y = 3\sqrt[3]{x + 1} - 1$

9.  $y = -\sqrt{2 - x}$





## ALGEBRA II WORKSHEET

Express in simplest radical form.

1.  $\sqrt{6x^3y^2} \cdot \sqrt[4]{2xy^5}$

2.  $\sqrt[3]{a^2b^5} \cdot \sqrt[5]{a^6b}$

Evaluate the expression without using a calculator.

3.  $16^{\frac{1}{2}}$

4.  $\left(-\frac{125}{27}\right)^{\frac{2}{3}}$

5.  $100^{\frac{3}{2}}$

6.  $32^{\frac{3}{5}}$

7.  $\left(\frac{16}{81}\right)^{\frac{3}{4}}$

8.  $\left(\frac{32}{3125}\right)^{\frac{2}{5}}$

Write as a single radical then simplify the result.

9.  $\sqrt{\sqrt[4]{2x^{11}}}$

10.  $\sqrt{\sqrt[3]{64a^9b^{14}}}$

Use a calculator to approximate the number. Round to 3 decimal places.

11.  $\sqrt[8]{5623}$

12.  $15.25^{\frac{7}{5}}$

Solve the following expressions in quadratic form by factoring.

13.  $x^4 - 4x^2 - 45 = 0$

14.  $x^{\frac{2}{3}} + 8x^{\frac{1}{3}} + 7 = 0$

15.  $x^{\frac{1}{2}} - 5x^{\frac{1}{4}} + 6 = 0$

### ANSWERS

1.  $xy^2\sqrt[4]{72x^3y}$  2.  $ab^{15}\sqrt[13]{a^{13}b^{13}}$  3. 4 4.  $\frac{25}{9}$  5.  $\frac{1}{1000}$  6.  $\frac{1}{8}$  7.  $\frac{27}{8}$  8.  $\frac{25}{4}$

9.  $x^8\sqrt{2x^3}$  10.  $2ab^{26}\sqrt[3]{a^3b^2}$  11. 2.943 12. 0.022 13.  $\pm 3$  14. -343, -1 15. 16, 81

Assignment:

1-8) 6      18-24) 5      31-32) 2  
9-10) All    25-28) 3      33-34) 2  
11-17) 5    29-30) 1      35-38) 3

Name \_\_\_\_\_

## ALGEBRA II REVIEW

### Exponents & Roots

Simplify.

$$1. \left(\frac{-3}{4}x^2y^3\right)^2 \left(\frac{8}{9}xy^4\right)$$

$$2. \frac{6^{24} \cdot 6^{-9}}{6^6}$$

$$3. \frac{(3^3x^{-3}y)^{-4} (3^{10}x^{-1}y^{-4})^2}{3^{-2}x^4y^3}$$

$$4. \left(\frac{10x^2y^{-2}}{9x^{-3}y^3}\right)^{-2} \left(\frac{2x^{-3}y^8}{3x^{-5}y^6}\right)^3$$

$$5. \frac{4a^0b^{-1}}{7a^0+(3a^2b^4)^0}$$

$$6. \frac{(4f^{-5}g^3h)^3 (f^{-7}g^6h^{-1})^{-5}}{(6f^3g^{-4}h^{-5})^2 (11f^{-4}g^{13}h^{-8})^0}$$

$$7. \left(\frac{4p^5}{m^3}\right)^{-2} \left(\frac{9p^3r^{-5}}{m^7}\right) \left(\frac{m^4p^2}{3r^7}\right)^3$$

$$8. \left(\frac{3x}{2x^{-2}}\right)^{-2}$$

Evaluate *using scientific notation*. Show work and write answers in scientific notation. Do NOT convert to decimal numbers.

$$9. \frac{1.5 \times 10^{-5}}{6 \times 10^2}$$

$$10. \frac{(8.4 \times 10^7)(4 \times 10^{-5})}{1.6 \times 10^{-3}}$$

Express each of the following in simplest radical form.

$$11. \sqrt[3]{108m^4n^{15}p^{29}}$$

$$12. \sqrt{4r^2 + 12r + 9}$$

$$13. \sqrt[4]{\sqrt{14s^{15}t^{16}}}$$

$$14. \sqrt[4]{6b^6r^7t^{10}} \cdot \sqrt[4]{8b^2r^2t^4}$$

$$15. \sqrt{125m^2n} \cdot \sqrt{32m^4n^6}$$

$$16. \sqrt[4]{f^6g^3} \cdot \sqrt[5]{fg^4}$$

Evaluate 18-24 without using a calculator.

17.  $\sqrt[6]{p^5q^2} \cdot \sqrt{p^3q}$

18.  $\sqrt[4]{32} + 3\sqrt[4]{162} - \sqrt{98}$

19.  $3\sqrt[3]{192} \cdot 2\sqrt[3]{250}$

20.  $\sqrt[3]{125^4}$

21.  $\left(9^{\frac{3}{4}}\right)^{\frac{2}{3}}$

22.  $100^{-\frac{1}{2}}$

23.  $144^{-\frac{3}{2}}$

24.  $\left(\frac{729}{64}\right)^{\frac{5}{6}}$

Use a calculator to evaluate 25-28. Round decimal values to 4 decimal places.

25.  $\sqrt[3]{89}$

26.  $\sqrt[4]{4096}$

27.  $262,144^{\frac{5}{6}}$

28.  $\left(25^{\frac{2}{3}}\right)^{\frac{3}{4}}$

Solve each equation.

$$29. 2\sqrt[3]{m-1} - 14 = -8$$

$$30. \sqrt{4x^2 - 3x + 2} - 2x - 5 = 0$$

$$31. \sqrt{x+11} - \sqrt{15+2x} = 1$$

$$32. \sqrt{7-x} + \sqrt{x-2} = 3$$

33.  $x^6 - 13x^3 + 36 = 0$

34.  $x^{\frac{2}{7}} + x^{\frac{1}{7}} - 2 = 0$

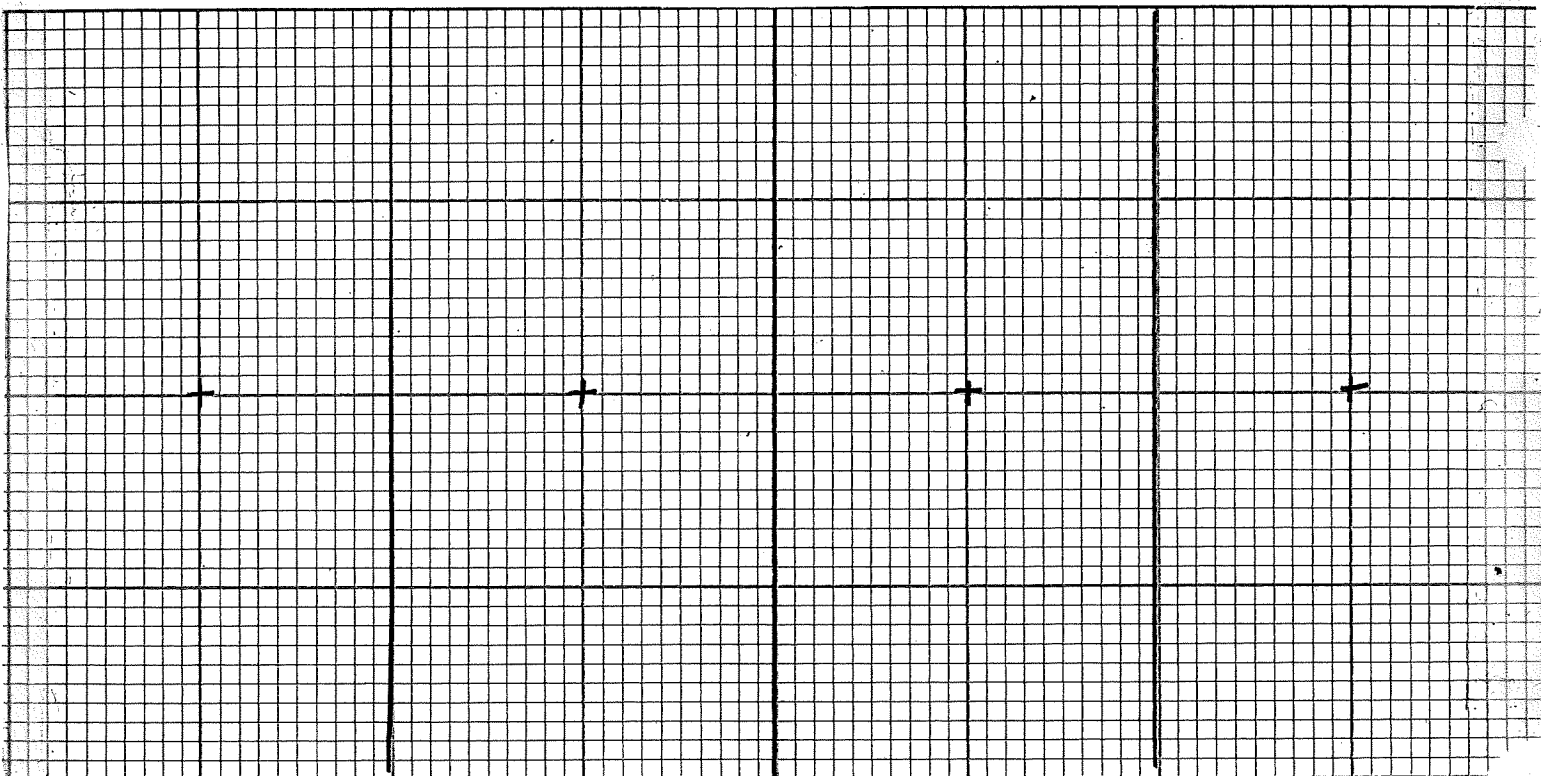
Graph each of the following.

35.  $y = (x+2)^3 - 1$

36.  $y = -3x^2 + 8$

37.  $y = \sqrt{9-x}$

38.  $y = 3\sqrt[3]{x-2} - 4$



41. The table below lists the life expectancies, in years, of girls born from 1920 to 1990. Create a scatter plot of the following data. ***Enter the years with two digits only.*** Then find a power regression curve that fits the data. Record the equation. Predict the life expectancy of a girl born in the year 2010 using your equation.

<b>Year of Birth</b>	1920	1930	1940	1950	1960	1970	1980	1990
<b>Life Expectancy</b>	54.6	61.6	65.2	71.1	73.1	74.4	77.4	78.8

## REVIEW ANSWERS

- |   |   |   |
|---|---|---|
| <p>1. <math>\frac{1}{2}x^5y^{10}</math></p> <p>2. <math>6^9</math></p> <p>3. <math>\frac{3^{10}x^6}{y^{15}}</math></p> <p>4. <math>\frac{6y^{16}}{25x^4}</math></p> <p>5. <math>\frac{1}{2b}</math></p> <p>6. <math>\frac{16f^{14}h^{18}}{9g^{13}}</math></p> <p>7. <math>\frac{m^{11}}{48pr^{26}}</math></p> <p>8. <math>\frac{4}{9x^6}</math></p> <p>9. <math>2.5 \times 10^{-8}</math></p> <p>10. <math>2.1 \times 10^6</math></p> <p>11. <math>3mn^5p^9\sqrt[3]{4mp^2}</math></p> | <p>12. <math> 2r+3 </math></p> <p>13. <math>st^2\sqrt[8]{14s^7}</math></p> <p>14. <math>2b^2r^2 t^3 \sqrt[4]{3rt^2}</math></p> <p>15. <math>20 m^3 n^3\sqrt{10n}</math></p> <p>16. <math>fg\sqrt[20]{f^{14}g^{11}}</math></p> <p>17. <math>p^2\sqrt[6]{p^2q^5}</math></p> <p>18. <math>11\sqrt[4]{2} - 7\sqrt{2}</math></p> <p>19. <math>120\sqrt[3]{6}</math></p> <p>20. 625</p> <p>21. 3</p> <p>22. <math>\frac{1}{10}</math></p> | <p>23. <math>\frac{1}{1728}</math></p> <p>24. <math>\frac{32}{243}</math></p> <p>25. 1.898</p> <p>26. 8</p> <p>27. 32,768</p> <p>28. 5</p> <p>29. 28</p> <p>30. -1 (must check)</p> <p>31. -7 (must check)</p> <p>32. 3, 6 (must check)</p> <p>33. <math>\sqrt[3]{4}, \sqrt[3]{9}</math></p> <p>34. -128, 1</p> <p>35.—38. See graphs</p> <p>39. <math>y = 26.723598x^{0.2432556}</math><br/>83.8 years</p> |
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