

The problems in this packet are designed to help you review topics that are important to your success in Precalculus. The problems should be done correctly, not just attempted. If you have difficulty, it is your responsibility to find help and review the topics thoroughly before the new school year begins. **There will be a quiz on these topics during the first week after we return to school. You will not be allowed to use a calculator on this quiz, and there will be no “retest.”**

On lined paper, copy each problem, show all work, and be neat and organized. No calculator is allowed.

I. Factor the following expressions, if possible:

- |                      |                      |                      |
|----------------------|----------------------|----------------------|
| a. $x^2 + 2x - 8$    | b. $10x^2 + 17x + 3$ | c. $24x^2 + 2x - 15$ |
| d. $3x^2 - 31x + 70$ | e. $x^2 + 10x$       | f. $-4x^3 + 20x^2$   |
| g. $x^2 - 25$        | h. $x^2 + 16$        |                      |

II. Simplify, if possible:

- |                                 |                              |                                              |
|---------------------------------|------------------------------|----------------------------------------------|
| a. $\frac{3x}{9x^2}$            | b. $\frac{(x+2)(2x-3)}{x+2}$ | c. $\frac{6x^2 + x - 1}{8x^2 + 4x}$          |
| d. $2x + 10$                    | e. $\frac{3x+9}{6x+10}$      | f. $\frac{x^3 - 5x^2 - 4x}{x^5 - 5x^2 - 4x}$ |
| g. $\frac{x^3 - 8}{(x-2)(x+4)}$ | h. $\frac{x-5}{x^2 - 25}$    | i. $\frac{x^2 + 16}{x+4}$                    |

III. Solve for  $x$ , showing all algebraic steps:

- |                               |                               |                                |
|-------------------------------|-------------------------------|--------------------------------|
| a. $3x + 2 = 35$              | b. $-4x - 7 = 5$              | c. $5 - \frac{x}{6} = 2$       |
| d. $\frac{1}{4}(8x - 12) = 9$ | e. $-3(2x + 5) = -7(-6x + 9)$ | f. $9 - 3x + 2 = 5x - 51 + 2x$ |
| g. $x^2 - 5x = 0$             | h. $6x^2 - 3x = 0$            | i. $x^2 - 4x - 21 = 0$         |
| j. $2x^2 + 13x = -6$          | k. $3x^2 - 14x + 10 = 2$      | l. $9x^2 = 18x$                |
| m. $(x+2)^2 = 16$             | n. $\sqrt{2x+5} = 20$         | o. $16x^2 - 25 = 0$            |
| p. $ax + b = 4$               | q. $\frac{x}{n} - c = k$      | r. $10x + 20ab = 30ab - 50$    |

IV. Graph each function. State its domain and range:

a.  $y = x$

b.  $y = \sqrt{x}$

c.  $y = e^x$

d.  $y = x^2$

e.  $y = |x|$

V. Given the functions

$$f(x) = \{(3,5), (2,4), (1,7)\}$$

$$g(x) = \sqrt{x-3}$$

$$h(x) = \{(3,2), (4,3), (1,6)\}$$

$$k(x) = x^2 + 5$$

Determine:

a.  $h(4)$

b.  $g(52)$

c.  $f(h(3))$

d.  $g(k(7))$

e.  $g(k(x))$

f.  $k(g(x))$

VI. Simplify without any negative exponents in the final answer:

a.  $x^3 \cdot x^5$

b.  $2x^{-5} \cdot x$

c.  $(2x^6y^{-3})(7x^{-9}y^4)$

d.  $\frac{x^{12}}{x^4}$

e.  $\frac{x^{-2}}{x^6}$

f.  $\frac{-10x^3y^4}{2x^6y}$

g.  $(x^3)^6$

h.  $\left(\frac{x^7}{y^{-3}}\right)^{-1}$

i.  $(2x^5)^4$

j.  $x^3y^0$

k.  $\left(\frac{43\sqrt{x}}{x^7} - |x|\right)^0$

VII. Rewrite in exponential form: a.  $\sqrt[4]{x}$

b.  $\sqrt[3]{x^2}$

VIII. Rewrite in radical form: a.  $x^{1/2}$

b.  $x^{-4/5}$

IX. Simplify:

a.  $\sqrt{36x^4y^{18}}$

b.  $\sqrt{\frac{100x^6}{9}}$

X. Are the following expressions defined? Indicate "yes" or "no":

a.  $\frac{32}{4+2-6}$

b.  $\frac{8x}{x+5}, x=0$

c.  $\frac{x^3}{x-2}, x=2$

d.  $\sqrt{x-9}, x=11$

e.  $\sqrt{x+5}, x=-5$

f.  $\sqrt{x-4}, x=3$