

Name: _____

Show ALL of your work for full credit. Simplify your answers as much as possible. Each problem is worth 6 points unless otherwise specified.

10 1. Completely factor the following polynomials. [5 pts. each]

5 A. $7xy - x^2 + 14y - 2x$
 $= x(7y - x) + 2(7y - x)$
 $= (7y - x)(x + 2)$

5 B. $x^2 + 10x + 25$
 $= (x + 5)^2$

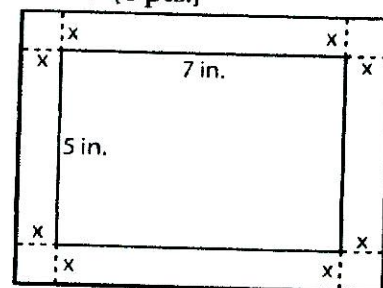
12 2. Solve each equation. Identify any restricted values in each equation. [6 pts. each]

6 A. $-6(x - 2) + 3 = 9 - (x + 4)$
 $-6x + 12 + 3 = 9 - x - 4$
 $-6x + 15 = 5 - x$
 $-6x + x = 5 - 15$
 $-5x = -10$
 $x = 2$

6 B. $\frac{1}{2} - \frac{7}{2x} = \frac{5}{x}$ LCD is $2x$
 $2x \left[\frac{1}{2} \right] - 2x \left[\frac{7}{2x} \right] = 2x \left[\frac{5}{x} \right]$
 $x - 7 = 10$
 $x = 17$

3. A 5 in. by 7 in. rectangular photograph is in a frame that adds a border of x inches on all sides. The perimeter of the frame is 40 in. Find x , the width of the frame border. $P = 2L + 2W$ [8 pts.]

$L = 7 + 2x$ $W = 5 + 2x$
 $P = 2(7 + 2x) + 2(5 + 2x)$
 $40 = 14 + 4x + 10 + 4x$
 $40 = 24 + 8x$
 $16 = 8x$
 $8x = 16$ or $x = 2$ inches



6 4. Multiply and simplify $\frac{x^2 - 9}{x - 1} \cdot \frac{2x + 4}{x^2 + 5x + 6}$
 $= \frac{(x - 3)(x + 3)}{x - 1} \cdot \frac{2(x + 2)}{(x + 3)(x + 2)}$
 $= \frac{x - 3}{x - 1} \cdot 2 = \frac{2(x - 3)}{x - 1}$

5. Your cell phone plan costs \$60.00 a month plus \$0.10 for each additional text sent over the limit.

4 A. Write a model for the cost C of the monthly bill for t additional texts sent over the limit. [4 pts.]

$C(t) = 60 + 0.10t$

4 B. Use this model to compute the cost of the monthly bill if you send 150 texts over the limit. [4 pts.]

$C(150) = 60 + (0.10)(150)$
 $= 60 + 15$
 $= \$75$

6

6. Find the LCD of $\frac{7}{15x^2}$ and $\frac{1}{3x^5}$.

LCD of $15x^2$ and $3x^5$?

LCD of 15 and 3 is 15

LCD of x^2 and x^5 is x^5

So LCD of $15x^2$ and $3x^5$ is $15x^5$

6

7. Simplify $\frac{15c^{13}d^4}{20c^{19}d}$. Write your answer using positive exponents.

$$\begin{aligned}
&= \frac{15}{20} \cdot \frac{c^{13}}{c^{19}} \cdot \frac{d^4}{d} \\
&= \frac{15}{20} c^{-6} d^3 \\
&= \frac{3}{4} \frac{1}{c^6} d^3 \\
&= \frac{3d^3}{4c^6}
\end{aligned}$$

8. Simplify each expression. All variables represent positive real numbers

A. -25^0 [4 pts.]

$$\begin{aligned}
&= -(25)^0 \\
&= -1
\end{aligned}$$

B. $(16)^{3/4}$ [4 pts.]

$$\begin{aligned}
&= (16^{1/4})^3 \\
&= ((2^4)^{1/4})^3 = 2^3 = 8
\end{aligned}$$

C. $2\sqrt{6xy^2} \cdot \sqrt{3x^3y}$ [6 pts.]

$$\begin{aligned}
&2\sqrt{18x^4y^3} \\
&= 2\sqrt{9 \cdot 2(x^2)^2 y^2 \cdot y} \\
&= 2\sqrt{9} \sqrt{(x^2)^2} \sqrt{y^2} \sqrt{2y} \\
&= 2(3) x^2 y \sqrt{2y} \\
&= 6x^2y\sqrt{2y}
\end{aligned}$$

D. $(3\sqrt{x}+5)(2\sqrt{x}-7)$ [6 pts.]

$$\begin{aligned}
&= 3\sqrt{x}(2\sqrt{x}-7) + 5(2\sqrt{x}-7) \\
&= 6x - 21\sqrt{x} + 10\sqrt{x} - 35 \\
&= 6x - 11\sqrt{x} - 35
\end{aligned}$$

6

9. Subtract the polynomials.

$$\begin{aligned}
&(7x^3 + 3x^2 + 2x) - (2x^3 + 3x^2 - 5x - 4) \\
&= 7x^3 + 3x^2 + 2x - 2x^3 - 3x^2 + 5x + 4 \\
&= (7x^3 - 2x^3) + 2x + 5x + 4 \\
&= 5x^3 + 7x + 4
\end{aligned}$$

6

10. Use the Order of Operations to simplify.

$$\begin{aligned}
&6 - \{-12 + 3[(1-6)^2 - 18]\} \\
&= 6 - \{-12 + 3[(5)^2 - 18]\} \\
&= 6 - \{-12 + 3[25 - 18]\} \\
&= 6 - \{-12 + 3(7)\} \\
&= 6 - \{-12 + 21\} \\
&= 6 - 9 = -3
\end{aligned}$$

11. Write the inequality $x \geq 3$ using a number line, intervals, and set notation.

6

Number Line



Interval Notation

$$[3, \infty)$$

Set Notation

$$\{x \mid x \geq 3\}$$

6

12. Perform the following conversions.

A. 2×10^{-3} to standard decimal notation.

$$\begin{aligned}
&= 2 \frac{1}{(10)^3} \\
&= 2 \left(\frac{1}{1000} \right) \\
&= 2(0.001) \\
&= 0.002
\end{aligned}$$

B. 470000 to scientific notation.

$$(4.7) 10^5$$