

Name: ANSWERSInstructions: No calculators! Answer all problems in the space provided! Do your rough work on scrap paper.

1. Expand and simplify:

(a)  $(x - y)^2 = x^2 - 2xy + y^2$  (b)  $(x + y)(w + z) = xw + xz + yw + yz$

(c)  $a(x + 3) = ax + 3a$  (d)  $(\sqrt{x} + 2)^2 = x + 4\sqrt{x} + 4$

2. Factor:  $3x^3 + 3x^2 - 6x = 3x(x-1)(x+2)$

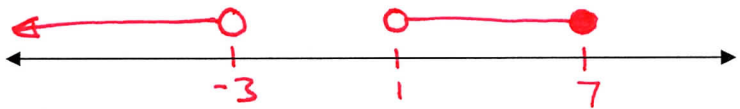
3. Simplify:  $\frac{\frac{6}{x+1} - \frac{4}{x+2}}{\frac{5}{x+2} + \frac{3}{x+1}} = \frac{2x+8}{8x+11}$  OR  $\frac{2(x+4)}{8x+11}$

4. Simplify:  $\frac{x^3 + 3x^2 - 4x - 12}{x-2} = (x+2)(x+3)$  (hint: factor the numerator)

5. Solve for  $x$ :  $\frac{3}{2x} - \frac{5}{2x^2} = \frac{1}{x^3} \Rightarrow x = -\frac{1}{3}; 2$

6. Write the following statement in interval notation: "x is less than -3, or x is greater than 1 but less than or equal to 7".  $(-\infty, -3) \cup (1, 7]$ 

7. Sketch the above statement on the number line:

**Bonus** (after attempting the problems above, do these for extra credit):

1. Complete the rules:

(a)  $a^x \cdot a^y = a^{x+y}$  (b)  $\frac{x^a}{x^b} = x^{a-b}$  (c)  $x^{a/b} = \sqrt[b]{x^a}$  (d)  $x^{-m} = \frac{1}{x^m}$

2. Factor completely:  $3x^{3/2} + 3x^{1/2} - 6x^{-1/2} = 3x^{-1/2}(x-1)(x+2)$

3. Simplify:  $\frac{\sqrt{a+h} - \sqrt{a}}{h} = \frac{1}{\sqrt{a+h} + \sqrt{a}}$