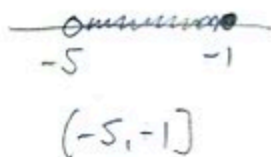
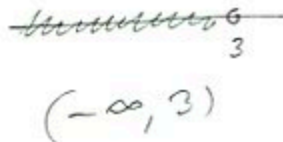


Write interval notation and sketch on the number line.

1. (3pts) $\{x | -5 < x \leq -1\}$



2. (3pts) $\{x | x < 3\}$



Solve the equations.

3. (3pts) $3x + 2 = 5x + 7 \quad | -5x$

$$\begin{aligned} -2x + 2 &= 7 & | -2 \\ -2x &= 5 & | \div (-2) \\ x &= -\frac{5}{2} \end{aligned}$$

4. (4pts) $3(a + 1) - 4 = 2a + 3(4a - 1)$

$$\begin{aligned} 3a + 3 - 4 &= 2a + 12a - 3 \\ 3a - 1 &= 14a - 3 & | -14a \\ -11a - 1 &= -3 & | +1 \\ -11a &= -2 & | \div (-11) \\ a &= \frac{-2}{-11} = \frac{2}{11} \end{aligned}$$

Simplify and write in standard form:

5. (4pts) $(2x + 1)^2 - 4x^2 + 3x = (2x + 1)(2x + 1) - 4x^2 + 3x$

$$\begin{aligned} &= \cancel{4x^2} + 2x + 2x + 1 - \cancel{4x^2} + 3x \\ &= 7x + 1 \end{aligned}$$

6. (4pts) $(5x + 3)x - (x + 2)(x + 7) = 5x^2 + 3x - (x^2 + 7x + 2x + 14)$

$$\begin{aligned} &= 5x^2 + 3x - x^2 - 9x - 14 \\ &= 4x^2 - 6x - 14 \end{aligned}$$

Simplify and write the answer so all exponents are positive:

7. (2pts) $(3a)^2 a^3 = 9a^2 \cdot a^3 = 9a^5$

8. (2pts) $\frac{x^7}{(4x)^2} = \frac{x^7}{16x^2} = \frac{x^5}{16}$ (with red annotations: $-3-3$, $2-3$, $-9+10$, $6-7$)

9. (3pts) $(a^{-3}b^2)^3 a^{10}b^{-7} = a^{-9}b^6 a^{10}b^{-7} = a^1 b^{-1} = \frac{a}{b}$

10. (5pts) $(u^4v^{-3})^{-2}(2u^{-1}v^2)^4 = u^{-8}v^6 \cdot 2^4 u^{-4}v^8 = 16u^{-12}v^{14} = \frac{16v^{14}}{u^{12}}$

11. (7pts) $\frac{(3x^{-3}y^2)^4}{(6x^{-2}y^3)^2} = \frac{3^4 x^{-12} y^8}{6^2 x^{-4} y^6} = \frac{\cancel{81} x^{-12-(-4)} y^{8-6}}{\cancel{36}} = \frac{9x^{-8}y^2}{4} = \frac{9y^2}{4x^8}$ (with red annotations: 9 , $\cancel{81}$, 36 , 4)

Factor the following.

12. (4pts) $x^2 - 2x - 15 = (x-5)(x+3)$

prod = -15 -5, 3
sum = -2

13. (4pts) $x^2 - 12x + 27 = (x-3)(x-9)$

prod = 27 -3, -9
sum = -12

Solve the equations.

14. (6pts) $x^2 - 4x = x + 24 \quad | -x - 24$

prod = -24 $x^2 - 5x - 24 = 0$
sum = -5 $(x-8)(x+3) = 0$
-8, 3 $x-8=0$ or $x+3=0$
 $x=8, -3$

15. (6pts) $2x^2 + 2x + 28 = x^2 - 9x \quad | -x^2 + 9x$

prod = 28 $x^2 + 11x + 28 = 0$
sum = 11 $(x+4)(x+7) = 0$
4, 7 $x+4=0$ or $x+7=0$
 $x=-4, -7$