

**Pre Calculus  
Prerequisite Review**

Name: KEY  
Block: \_\_\_\_\_

Calculator Allowed. Show all applicable work for full credit.

Use an inequality to describe:

1. the interval  $(-\infty, 3]$

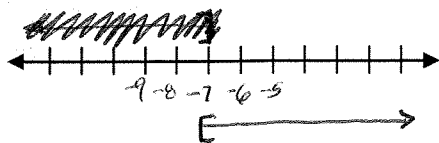
$$x \leq 3$$

2. "Olympic gymnasts are at least 14 years old."

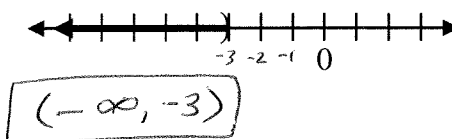
$a = \text{age of Olympic gymnasts}$

$$a \geq 14$$

3. Graph the interval  $[-7, \infty)$



4. Use interval notation to describe the graph below.



Simplify. Express answers with only positive exponents.

$$5. \frac{(xy^2)^3}{y^2x^3} = \frac{x^3y^6}{y^2x^3} = \boxed{y^4}$$

$$6. (4x^3y^{-5})^{-2} = 4^{-2}x^{-6}y^{10} = \frac{y^{10}}{4^2x^6} = \boxed{\frac{y^{10}}{16x^6}}$$

$$7. \left(\frac{x^3y^{-2}}{12x^6y^{-5}}\right)\left(\frac{4x^2y^6}{x^{-4}y}\right) = \frac{4x^5y^4}{12x^2y^{-4}} = \boxed{\frac{x^3y^8}{3}}$$

8. Write the equation of the line in point slope form through  $(-1, -4)$  and  $(3, 2)$ .

$$\text{Slope} = \frac{-4-2}{-1-3} = \frac{-6}{-4} = \frac{3}{2}$$

$$\boxed{y+4 = \frac{3}{2}(x+1)}$$

$$\text{OR } \boxed{y-2 = \frac{3}{2}(x-3)}$$

9. Write the equation of the line in slope intercept form through  $(3, 10)$  and parallel to  $5x+6y=33$ .

$$y-10 = -5/6(x-3)$$

$$y-10 = -5/6x + 5/2$$

$$y = -5/6x + 5/2 + 10$$

$$\boxed{y = -5/6x + 25/2}$$

$$\text{Slope} = -5/6$$

same slopes!

$$6y = 33 - 5x$$

$$y = 33/6 - 5/6x$$

10. Write the equation of the line in general form through  $(-3, 2)$  and perpendicular to  $-4x+2y=8$ .

$x$ 's &  $y$ 's on same side  
NO FRACTIONS!

$$y-2 = -1/2(x+3)$$

$$(y-2 = -1/2x - 3/2) \cdot 2$$

$$2y-4 = -x-3$$

$$\boxed{x+2y = 1}$$

or

$$\boxed{x+2y-1=0}$$

used to get rid of the fractions AFTER you distribute the -1/2.

Slopes are opposite signs & reciprocals

$$\text{New Slope} = -1/2$$

$$2y = 8 + 4x$$

$$y = 4 + 2x$$

Solve each equation or inequality algebraically. Show all work!! Use interval notation where appropriate.

$$11. 2(3-4x) - 5(2x+3) = x - 17$$

$$6 - 8x - 10x - 15 = x - 17$$

$$-9 - 18x = x - 17$$

$$8 = 19x$$

$$\boxed{\frac{8}{19} = x}$$

$$13. \left(\frac{x-4}{2} - 2x \leq 5(3-x)\right)$$

$$\left(\frac{x-4}{2} - 2x \leq 15 - 5x\right)$$

$$x-4 - 4x \leq 30 - 10x$$

$$-3x - 4 \leq 30 - 10x$$

$$7x \leq 34$$

$$\boxed{x \leq \frac{34}{7}}$$

$$\boxed{(-\infty, \frac{34}{7}]}$$

$$15. |4x+1| = 3$$

$$4x+1 = 3 \text{ or } 4x+1 = -3$$

$$4x = 2$$

$$4x = -4$$

$$\boxed{x = \frac{1}{2} \text{ or } x = -1}$$

$$12. \left(\frac{x-2}{3} + \frac{x+5}{2} = \frac{1}{3}\right)$$

$$2(x-2) + 3(x+5) = 2$$

$$2x - 4 + 3x + 15 = 2$$

$$5x + 11 = 2$$

$$5x = -9$$

$$\boxed{x = -\frac{9}{5}}$$

$$14. -2 < 2x+4 \leq 7$$

$$-6 < 2x < 3$$

$$\boxed{-3 < x < \frac{3}{2}}$$

$$\boxed{(-3, \frac{3}{2})}$$

$$16. |2-3x| < 11$$

$$-11 < 2-3x < 11$$

$$-13 < -3x < 9$$

$$\boxed{\frac{13}{3} > x > -3}$$

$$\boxed{(-3, \frac{13}{3})}$$

$$17. 2|3x+4| - 7 \geq -3$$

$$2|3x+4| \geq 4$$

$$|3x+4| \geq 2$$

$$3x+4 \leq -2$$

$$3x+4 \geq 2$$

$$3x \leq -6$$

$$3x \geq -2$$

$$\boxed{(-\infty, -2] \cup [-\frac{2}{3}, \infty)}$$

$$\boxed{x \leq -2 \text{ or } x \geq -\frac{2}{3}}$$

Solve by factoring:

$$19. 6x^2 + 7x = 3$$

$$6x^2 + 7x - 3 = 0$$

$$(3x-1)(2x+3) = 0$$

$$\boxed{x = \frac{1}{3} \text{ or } x = -\frac{3}{2}}$$

$$21. \text{ Solve by extracting the square roots: } 3(3x-1)^2 = 21.$$

$$(3x-1)^2 = 7$$

$$3x-1 = \pm\sqrt{7}$$

$$3x = 1 \pm\sqrt{7}$$

$$\boxed{x = \frac{1 \pm\sqrt{7}}{3}}$$

$$22. \text{ Solve by the quadratic formula: } 4x^2 = 10x - 5.$$

$$4x^2 = -10x - 5$$

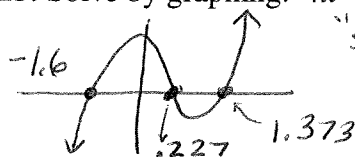
$$4x^2 + 10x + 5 = 0$$

$$x = \frac{-10 \pm \sqrt{100 - 4(4)(5)}}{2(4)} = \frac{-10 \pm \sqrt{100 - 80}}{8}$$

$$= \frac{-10 \pm \sqrt{20}}{8}$$

$$= \frac{-10 \pm 2\sqrt{5}}{8} = \boxed{\frac{-4 \pm \sqrt{5}}{4}}$$

$$23. \text{ Solve by graphing: } 4x^3 - 9x + 2 > 0.$$



"solve for zeros"

$$\boxed{(-1.6, 0.227) \cup (1.373, \infty)}$$

24. Find the equation of a circle that has a center of  $(-6, 7)$  and a radius of 8.

$$(x+6)^2 + (y-7)^2 = 64$$

Center  $(h, k)$  radius  $= r$   
 $(x-h)^2 + (y-k)^2 = r^2$

25. Given the equation of the circle  $(x-3)^2 + (y+1)^2 = 10$ , what is the center and radius?

Center  $(3, -1)$

Radius  $= \sqrt{10}$

26. Use the following 2 points:  $(8, 13)$  and  $(-2, 7)$

a) Find the midpoint.

$$\left( \frac{8+(-2)}{2}, \frac{13+7}{2} \right) \Rightarrow \boxed{(3, 10)}$$

b) Find the distance between the two points.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(8+2)^2 + (13-7)^2}$$

$$d = \sqrt{100 + 36}$$

$$d = \sqrt{136} \approx 11.662$$