Pre Calculus
Prerequisite Review

Name: _____
Block: _____

Calculator Allowed. Show all applicable work for full credit.

Use an inequality to describe:

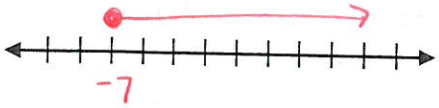
1. the interval $(-\infty, 3]$

$x \le 3$

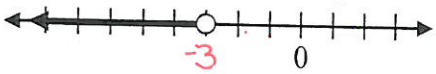
2. "Olympic gymnasts are at least 14 years old."

$x \ge 14$

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



4. Use interval notation to describe the graph below.



$(-\infty, -3)$

Simplify. Express answers with only positive exponents.

5. $\dfrac{(xy^2)^3}{y^2x^3}$

$\dfrac{x^3y^6}{y^2x^3}$

$\boxed{y^4}$

6. $(4x^3y^{-5})^{-2}$

$4^{-2}x^{-6}y^{10}$

$\dfrac{y^{10}}{4^2x^6}$

$\boxed{\dfrac{y^{10}}{16x^6}}$

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

$\dfrac{\cancel{4}x^{\cancel{5}3}y^4}{\cancel{12}_3\cancel{x^2}y^{-4}}$

$\boxed{\dfrac{x^3y^8}{3}}$

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

$m = \frac{3}{2}$

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

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

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

$m = -\frac{5}{6}$

$y - 10 = -\frac{5}{6}(x-3)$

$y = -\frac{5}{6}x + \frac{5}{2} + \frac{20}{2}$

$\frac{6y}{6} = \frac{33}{6} - \frac{5x}{6}$

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

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

$m = 2$

$\frac{2y}{2} = \frac{8}{2} + \frac{4x}{2}$

$m = 2$

$\cancel{y - 2 = 2(x+3)}$

$\cancel{y = 2x + 6 + 2}$

$\cancel{y = 2x + 8}$

$\boxed{\cancel{-2x + y - 8 = 0}}$

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

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

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

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

$-9-18x=x-17$

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

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

12. $\left(\frac{x-2}{3}+\frac{x+5}{2}=\frac{1}{3}\right)$ 6

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

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

$5x+11=2$

$5x=-9$

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

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

$x-4-4x\le 10(3-x)$

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

$\frac{7x}{7}\le\frac{34}{7}$

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

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

$-4\quad -4\quad -4$

$\frac{-6}{2}<\frac{2x}{2}<\frac{3}{2}$

$\boxed{-3<x\le\frac{3}{2}\quad(-3,3/2]}$

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

$4x+1=3 \qquad 4x+1=-3$

$4x=2 \qquad 4x=-4$

$\boxed{x=\frac{1}{2}\qquad x=-1}$

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

$-11<2-3x<11$

$-2\quad -2\quad -2$

$\frac{-13}{-3}<\frac{-3x}{-3}<\frac{9}{-3}$

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

$\boxed{-3<x<\frac{13}{3}\quad(-3,13/3)}$

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

$+7\quad +7$

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

$|3x+4|\ge 2$

$3x+4\ge 2 \qquad 3x+4\le -2$

$3x\ge -2 \qquad 3x\le -6$

$\boxed{x\ge -2/3 \qquad x\le -2}$

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

18. $\frac{x-3}{x}+\frac{3}{x^2+x}=\frac{3}{x+1}$

$\boxed{x=5 \quad \cancel{x=0}}$

Solve by factoring:

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

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

3	$9x$	-3
$2x$	$6x^2$	$-2x$
	$3x$	-1

$-18x$, $-2x$, $9x$, $-7x$

$(2x+3)=0$

$(3x-1)=0$

$\boxed{x=-3/2 \quad x=1/3}$

20. $12x^3-14x^2-6x=0$

$2x(6x^2-7x-3)=0$

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

$\boxed{x=0 \quad x=-1/3 \quad x=3/2}$

-3	$-9x$	-3
$2x$	$6x^2$	$2x$
	$3x$	1

$-18x^2$, $-9x$, $2x$, $-7x$

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

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

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

$\boxed{\frac{\sqrt{7}+1}{3}\quad 1.22}$ $\boxed{\frac{-\sqrt{7}+1}{3}\quad -.549}$

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

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

$\frac{-10\pm\sqrt{100-4(4)(5)}}{2(4)}=\boxed{\frac{-10\pm\sqrt{20}}{8}\quad \frac{-10\pm 2\sqrt{5}}{8}\quad \frac{-5\pm\sqrt{5}}{4}}$

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

$(-1.6,0.23)\cup(1.37,\infty)$

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

$$\boxed{(x+6)^2 + (y-7)^2 = 64}$$

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

$$\boxed{C = (3, -1) \qquad r = \sqrt{10}}$$

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

a) Find the midpoint.

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

b) Find the distance between the two points.

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

$$\sqrt{(-10)^2 + (-6)^2}$$

$$\sqrt{100 + 36}$$

$$\boxed{\sqrt{136} = 2\sqrt{34} = 11.66}$$

~~10 6 6~~

34 4

17 2 2 2