

Final Review #9 - Mixed Review

1) Solve for x: $7^{3x-7} = 7^2$

$$3x - 7 = 2$$

$$\begin{array}{r} +7 \\ +7 \end{array}$$

$$3x = 9$$

$$\boxed{x = 3}$$

2) Rationalize the fraction $\frac{4}{\sqrt{2}}$

$$\frac{4\sqrt{2}}{\sqrt{2}\sqrt{2}}$$

$$\frac{4\sqrt{2}}{2} = \boxed{2\sqrt{2}}$$

3) Factor completely: $2x^3 + 10x^2 - 28x$

$$\boxed{2x(x^2 + 10x - 14)}$$

$$\begin{array}{r} 14x^2 \\ 7 \cdot 2 \\ 1 \cdot 14 \end{array}$$

4) Use the quadratic formula to find the roots of the equation: $3x^2 - 4x - 9 = 0$

$a = 3$
 $b = -4$
 $c = -9$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(3)(-9)}}{2(3)}$$

$$\boxed{\frac{2 \pm \sqrt{31}}{3}} = 2 \frac{4 \pm 2\sqrt{31}}{6} = \frac{2 \pm \sqrt{24} \sqrt{31}}{6}$$

5) Simplify $(x - 3)^2$

$$(x-3)(x-3)$$

$$x^2 - 3x - 3x + 9$$

$$\boxed{x^2 - 6x + 9}$$

6) Given $f(x) = x^2$ and $h(x) = 3x - 1$, find $f(g(x))$.

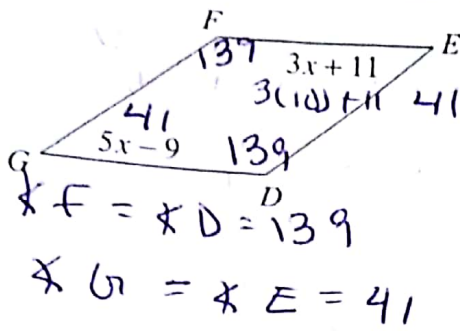
$$(3x-1)^2$$

$$(3x-1)(3x-1)$$

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

$$\boxed{9x^2 - 6x + 1}$$

7) In the diagram below is rhombus DEFG. Using the diagram solve for all angles in the diagram.



$$3x + 11 = 5x - 9$$

$$-3x \quad -3x$$

$$11 = 2x - 9$$

$$+9 \quad +9$$

$$\frac{20}{2} = \frac{2x}{2}$$

$$10 = x$$

$$\angle F = \angle D = 139$$

$$\angle G = \angle E = 41$$

8) Simplify the following with positive exponents: $\frac{75a^{-4}b^{-5}c}{15a^2b^{-1}c}$

$$5a^{-6}b^{-4} \rightarrow \frac{5}{a^6b^4}$$

9) Simplify: $7\sqrt{3} - 4\sqrt{27} + \sqrt{12}$

$$\sqrt{9}\sqrt{3} - 4\sqrt{9}\sqrt{3} + \sqrt{4}\sqrt{3}$$

$$3\sqrt{3} - 12\sqrt{3} + 2\sqrt{3}$$

$$7\sqrt{3} - 12\sqrt{3} + 2\sqrt{3} = -3\sqrt{3}$$

10) Solve for x by completing the square: $x^2 + 6x - 59 = 0$

$$x^2 + 6x = 59$$

$$(x+3)^2 = 59 + 9$$

$$\sqrt{(x+3)^2} = \sqrt{68} < \sqrt{4} \sqrt{17}$$

$$x+3 = \pm 2\sqrt{17}$$

$$x = -3 \pm 2\sqrt{17}$$

11) Find the product of $10a^{-1}$ and $3a^{-8}$.

$$30a^{-9} = \frac{30}{a^9}$$

12) Find the inverse function, $f^{-1}(x)$ of $f(x) = 5x - 11$

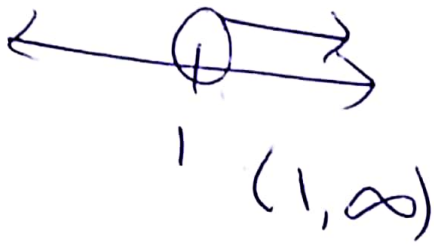
$$x = 5y - 11$$

$$+11 \quad +11$$

$$\frac{x+11}{5} = \frac{5y}{5}$$

$$\boxed{\frac{x+11}{5} = f^{-1}(x)}$$

13) Solve, graph and state the interval notation of $3(6b - 1) > 18 - 3b$



$$18b - 3 > 18 - 3b$$

$$+3b \quad +3 \quad +3 \quad +3b$$

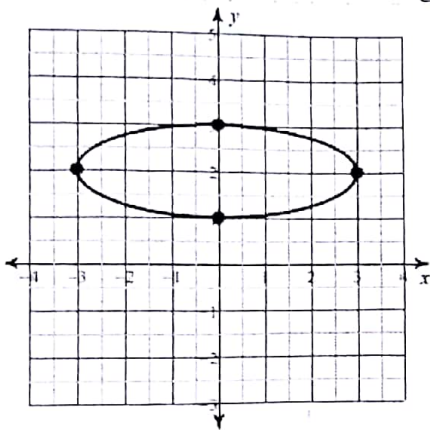
$$21b > 21$$

$$b > 1$$

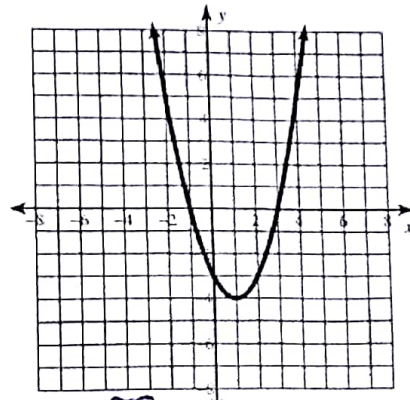
14) State the radius and the center of the circle $(x + 3)^2 + (y - 1)^2 = 4$

Center $(-3, 1)$
 radius $\sqrt{4} = 2$

15) Determine if each of the following are functions:

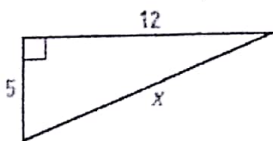


NOT



function

16) Solve for x on the triangle.



$$a^2 + b^2 = c^2$$

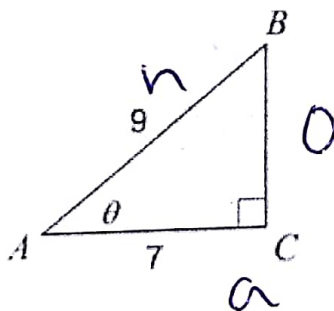
$$12^2 + 5^2 = x^2$$

$$144 + 25 = x^2$$

$$169 = x^2$$

$$x = 13$$

17) Solve for the missing angle. Round your answer to the nearest degree.



$$\cos^{-1}(7/9) = 39^\circ$$

18) Line segment DC has endpoints (2, 6) and (-1, -8), find the slope, midpoint and distance of this line.

a) Slope $\frac{y_2 - y_1}{x_2 - x_1} = \frac{-8 - 6}{-1 - 2} = \frac{-14}{-3} = \frac{14}{3}$

b) Midpoint $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$
 $(\frac{2 + (-1)}{2}, \frac{6 + (-8)}{2}) \rightarrow (\frac{1}{2}, -1)$

c) Distance $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(-3)^2 + (-14)^2}$
 $\sqrt{(-1 - 2)^2 + (-8 - 6)^2} = \sqrt{9 + 196} = \sqrt{205}$

19) State the domain of the following function: $\{(3, 2) (-4, 3) (0, 2) (9, -10) (-1, 1) (2, 2)\}$

D: $\{3, -4, 0, 9, -1, 2\}$

20) Solve for x: $6^{2(x-4)} = 6^{x-6}$

$$2(x-4) = x-6$$

$$2x - 8 = x - 6$$

$$x - 8 = -6$$

$$x - 8 = -6$$

$$+8 \quad +8$$

$$\boxed{x = 2}$$

21) Solve for all values of x: $|7x - 2| = 44$

$$7x - 2 = 44$$

$$+2 \quad +2$$

$$\frac{7x}{7} = \frac{46}{7}$$

$$x = \frac{46}{7}$$

$$-(7x - 2) = 44$$

$$-7x + 2 = 44$$

$$-2 \quad -2$$

$$\frac{-7x}{-7} = \frac{42}{-7}$$

$$x = -6$$