Topic: Determine if a given value or point is a solution to an equation.
For each of the equations below, determine if $x=-2$ is a solution. Justify your answer.

1. $5=\sqrt{x+6}+3$
2. $x^{2}-9 x-22=0$
$(x-11)(x+2)=0$
$x=11 \quad x=-2$ yf 0
3. $6 x-10=5 x+15$
$6 x-5 x=10+15$ $x=25$ No
4. $4=\frac{x^{2}}{x+2}$ no $4=\frac{(-2)^{2}}{-2+2}$
5. $\sqrt{x-7}=-3$
no solution
6. $\begin{aligned} x^{2}+5 & =9 \\ \sqrt{x^{2}} & =\sqrt{4} \\ x & = \pm 2\end{aligned} \quad y / \int$
NO

For each of the functions below, determine if the poin (3, 4) is a solution. Justify your answer.
7. $y=(x-1)(x-5)$
$4=(3-1)(3-5)$
$4=(2)(-2)$
$4=-4$

$$
(3,4) \text { is not a solution. }
$$

8. $y=\frac{1}{2} x+\frac{5}{2}$
$4=\frac{1}{2}(3)+\frac{5}{2}$
$4=\frac{3}{2}+\frac{5}{2}$
$\begin{array}{ll}4=\frac{8}{2} & \begin{array}{c}(3,4) \text { is a } \\ \text { Solution }\end{array}\end{array}$
9. $y=\sqrt{x+5}$
$4=\sqrt{3+5}$
$4=\sqrt{8}$
$(3,4)$ is not a solution
10. 


11.

| x | $\mathrm{g}(\mathrm{x})$ |
| :---: | :---: |
| -1 | -6 |
| 0 | -5 |
| 1 | -3 |
| 2 | 0 |
| 3 | 4 |
| $(3,4)$ is a Solution |  |

12. $y=2^{x}$
$4=2^{3}$
$4 \neq 8$
$(3,4)$ is not
a solution

## SET

Topic: Solve square root and inverse variation equations.
Solve each equation. Remember to look for extraneous solutions.
13. $-x=\frac{1}{x}$
14. $\sqrt{-10+7 x}=x$
$-x^{2}=1$
$\sqrt{x^{2}}=\sqrt{-1}$
$x= \pm i$
no real solutions

$$
\begin{aligned}
-10+7 x & =x^{2} \\
0= & x^{2}-7 x+10 \\
0= & (x-5)(x-2) \\
& x=5 x x=2 \\
& \{2,5\}
\end{aligned}
$$

15. $(\sqrt{2 x-7})^{2}=(x-3)^{2}$

$$
\begin{gathered}
2 x-7=x^{2}-6 x+9 \\
0=x^{2}-8 x+16 \\
0=(x-4)^{2} \\
x=4 \\
\{4\}
\end{gathered}
$$

16. $\underset{\sim}{2}=x+1$
$2=x^{2}+x$
$0=x^{2}+x-2$
$0=(x+2)(x-1)$
$\begin{array}{rl}x+2=0 & x-1=0 \\ x=-2 & x=1\end{array}$
17. $(\sqrt{9 x-5})=(x+1)^{2}$
$\begin{aligned} 9 x-5 & =x^{2}+2 x+1 \\ 0 & =x^{2}-7 x+6\end{aligned}$
18. $(\sqrt{x-1})=(3)^{2}$
$x-1=9$
$x=10$

GO!
Topic: Solve problems involving direct and inverse variation relationships.
19. If y varies inversely as x , and $\mathrm{y}=32$ when $\mathrm{x}=3$, find x when $\mathrm{y}=15$.
20. If y varies directly as x , and $\mathrm{y}=8$ when $\mathrm{x}=2$, find y when $\mathrm{x}=5$.

$$
\begin{aligned}
& y=R x \\
& 8=K(2) \\
& 4=K
\end{aligned}
$$

$$
\begin{aligned}
& y=4 x \\
& y=4(5)
\end{aligned}
$$

$$
y=20
$$

$$
\begin{aligned}
& y=\frac{t}{x} \\
& 32=\frac{k}{3} \quad y=\frac{96}{x} \\
& 96=k \quad 15=\frac{96}{x} \\
& \begin{array}{l}
\frac{15 x}{15}=\frac{96}{15}
\end{array}
\end{aligned}
$$

21. The frequency of vibration of a guitar string varies inversely with the length of the guitar string. Suppose a guitar string is 0.65 meters long, and vibrates 4.3 times per second. At what frequency would a string that is 0.5 meters long vibrate?

$$
\begin{array}{lll}
f=\frac{k}{l} & 4.3=\frac{l k}{.65} & f=\frac{2.795}{J} \\
2.795=k & f=\frac{2.795}{.5} \\
& & f=5.59 \text { times } \\
\text { per sec }
\end{array}
$$

22. The amount of calories a person burns varies directly with the amount of miles that they run. Sonya ran 2 miles on a treadmill. The display reported that she burned 220 calories. She wants to treat herself with a hot fudge sundae after her workout. A hot fudge sundae has 380 calories. How far does Sonya have to run to burn off that many calories?

$$
\begin{array}{rlrl}
C & =k d & C & =110 d \\
220 & =k(2) & \frac{380}{110} & =\frac{110 d}{110^{\circ}} \\
110 & =k & d & \approx 3.45 \text { miles }
\end{array}
$$

23. The current in a simple electrical circuit is inversely proportional to the resistance. If the current is 80 amps when the resistance is 50 ohms, find the current when the resistance is 22 ohms.

$$
\begin{array}{lll}
C=\frac{R}{R} & 80=\frac{R}{50} & C=\frac{4000}{R} \\
& 4000=R & C=\frac{4000}{22} \\
& & C \approx 181.8 \mathrm{amps}
\end{array}
$$

24. The amount of money you earn varies directly with amount of time that you work. If you work 6.5 hours, you will make $\$ 66.95$. If you made $\$ 97.85$, how many hours did you work?

$$
\begin{array}{rlrl}
m & =k t & m & =10.30 t \\
66.95 & =k(6.5) & 97.85 & =10.30 t \\
10.3 & =k & 9.5 & =t \\
& 9.5 \text { hours }
\end{array}
$$

