# Math 2 Spring Final Review

Name: Key Per: ___

## Unit 4: Quadratics

**1.** Multiply:

**a.** $(x-4)(x-9)$

$x^2 - 9x - 4x + 36$

$x^2 - 13x + 36$

**b.** $(2x+3)(3x+1)$

$6x^2 + 2x + 9x + 3$

$6x^2 + 11x + 3$

**2.** Factor completely:

**a.** $x^2 - 7x - 18$

$(x-9)(x+2)$

**b.** $2x^2 + 16x$

$2x(x+8)$

**c.** $x^2 - 49$

$(x-7)(x+7)$

**3.** Find the x-intercepts by factoring:

$x^2 - 11x + 30 = 0$

$(x-6)(x-5) = 0$

$x-6=0$ $\quad$ $x-5=0$

$+6\ +6$ $\quad$ $+5\ +5$

$x = 6$ $\quad$ $x = 5$

$(6,0)\ (5,0)$

**4.** Find the x-intercepts by using the Quadratic Formula:

$0 = 2x^2 - 17x + 35$

$a=2$, $b=-17$, $c=35$

$x = \frac{-(-17) \pm \sqrt{(-17)^2 - 4 \cdot 2 \cdot 35}}{2 \cdot 2}$

$= \frac{17 \pm \sqrt{289 - 280}}{4}$

$= \frac{17 \pm \sqrt{9}}{4}$

$\frac{17+3}{4} = \frac{20}{4} = 5$

$\frac{17-3}{4} = \frac{14}{4} = 3.5$

$(5,0)$

$(3.5,0)$

**5.** Find the vertex for each of the following:

**a.** $y = x^2 - 8x + 7$

$0 = (x-7)(x-1)$

$x-7=0$ $\quad$ $x-1=0$

$x=7$ $\quad$ $x=1$

axis of sym: $x = \frac{7+1}{2} = \frac{8}{2} = 4$

$y = 4^2 - 8(4) + 7$

$= 16 - 32 + 7$

$= -16 + 7$

$= -9$

$(4,-9)$

**b.** $y = (x-11)(x+3)$

$x-11=0$ $\quad$ $x+3=0$

$x=11$ $\quad$ $x=-3$

axis of sym: $\frac{11+-3}{2} = \frac{8}{2} = 4$

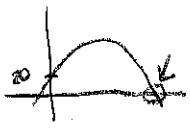
$(4-11)(4+3)$

$(-7)(7)$

$-49$

$(4,-49)$

**6.** A cannonball is shot through the air and can be modeled by the equation $h = -16t^2 + 125t + 20$, where $h$ is the height of the cannonball after $t$ seconds. When will the cannonball hit the ground? Round to the nearest hundredth of a second.



$a=-16$, $b=125$, $c=20$

$x = \frac{-125 \pm \sqrt{125^2 - 4 \cdot -16 \cdot 20}}{2 \cdot -16}$

$= \frac{-125 \pm \sqrt{15625 + 1280}}{2 \cdot -16}$

$\frac{-125 + 130.02}{-32} = \frac{5.02}{-32} \approx -0.16$

$\frac{-125 - 130.02}{-32} = \frac{-255.02}{-32} \approx 7.97$

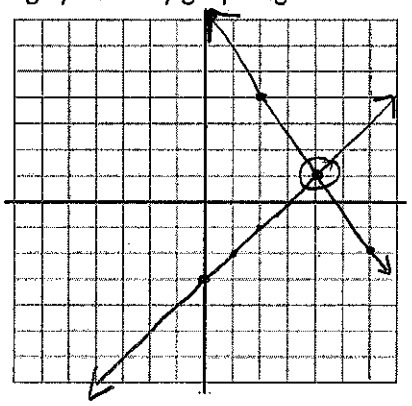
7.97 sec

## Unit 5: Systems of Equations

**7.** Solve each of the following systems by graphing.

**a.** $\begin{cases} y = x - 3 \\ y = -\frac{3}{2}x + 7 \end{cases}$

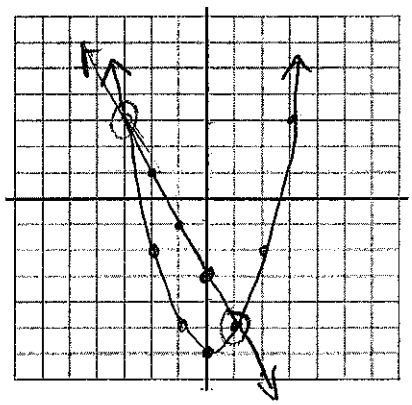
$(4,1)$



**b.** $\begin{cases} y = x^2 - 6 \\ y = -2x - 3 \end{cases}$

$(-3,3)$

$(1,-5)$



**8.** Solve each of the following systems of equations using the method of your choice:

**a.** $\begin{cases} 3x+5y=-23 \\ 6x-y=31 \end{cases}$ → $3x+5y=-23$, $30x-5y=155$

$6(4)-y=31$

$24-y=31$

$-24 \quad -24$

$+y=7$

$\frac{33x}{33}=\frac{132}{33}$

$x=4$

$(4,-7)$

**b.** $\begin{cases} y=4x+11 \\ y=4x-8 \end{cases}$

$4x+11=4x-8$

$-4x \quad -4x$

$11=-8$

not possible

no solution

**c.** $\begin{cases} y=3x+5 \\ 4x-5y=8 \end{cases}$ → $3x-y=-5$, $4x-5y=8$

$-15x+5y=25$

$4x-5y=8$

$-11y=33$

$\frac{-11y}{-11}=\frac{33}{-11}$

$y=-3$

$-3=3x+5$

$-5 \quad -5$

$\frac{-8}{3}=\frac{3x}{3}$

$-2\frac{2}{3}=x$

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

**d.** $\begin{cases} y=x^2+7x-5 \\ y=2x+9 \end{cases}$

$x^2+7x-5=2x+9$

$-2x \quad -9 \quad -2x \quad -9$

$x^2+5x-14=0$

$(x+7)(x-2)$

$x+7=0 \quad x-2=0$

$x=-7 \quad x=2$

$y=2(-7)+9$

$=-14+9$

$=-5$

$y=2(2)+9$

$=4+9$

$=13$

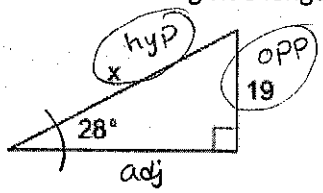
$(-7,-5)$

$(2,13)$

## Unit 6: Trigonometry

**9.** Find the missing side lengths for each of the following triangles:

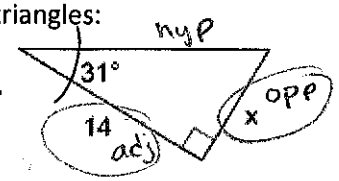
**a.**




$\frac{\sin(22)}{\sin(28)}=\frac{19}{x}$ $\cdot x$ $\cdot \sin(28)$

$x=40.471$

**b.**

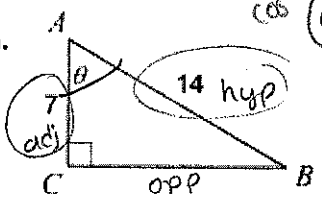



$14\cdot\tan(31)=\frac{x}{14}\cdot 14$

$x=8.412$

**10.** Find the missing angle measures (θ) for each of the following triangles:

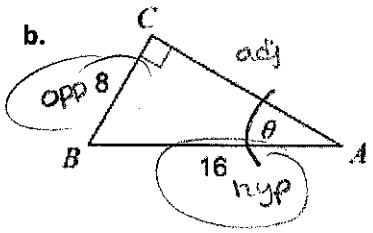
**a.**




$\cos^{-1}(\cos\theta)=\cos^{-1}(\frac{7}{14})$

$\theta=60°$

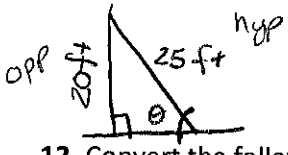
**b.**




$\sin^{-1}(\sin\theta)=\sin^{-1}(\frac{8}{16})$

$\theta=30°$

**11.** A 25-foot ladder is leaning against a 20ft wall. Find the angle of elevation from the base of the ladder to the top of the wall.




$\sin^{-1}(\sin\theta)=\sin^{-1}(\frac{20}{25})$

$\theta=53.13°$

**12.** Convert the following radians to degrees:

**a.** $\frac{2\pi}{3}\cdot\frac{180}{\pi}$ 60

$120°$

**b.** $\frac{3\pi}{5}\cdot\frac{180}{\pi}$ 36

$100°$

**13.** Convert the following degrees to radians:

**a.** $540°\cdot\frac{\pi}{180}$

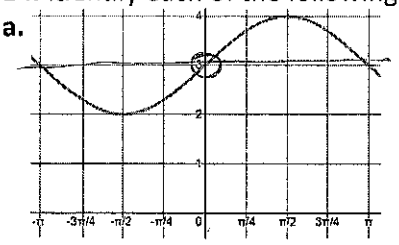
$3\pi$

**b.** $30°\cdot\frac{\pi}{180}$

$\frac{\pi}{6}$

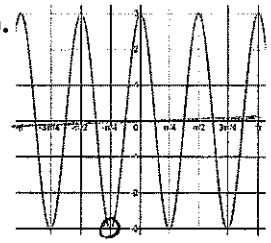
**14.** Identify each of the following functions as either sine or cosine.

**a.**



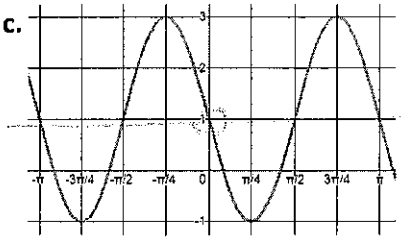
**Sine** or **Cosine**

**b.**



**Sine** or **Cosine**

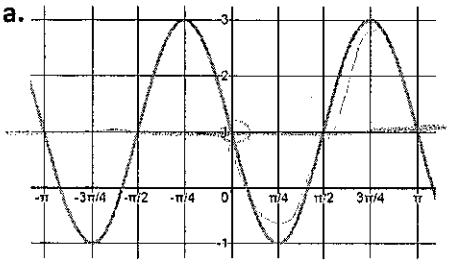
**c.**



**Sine** or **Cosine**

**15.** Identify the amplitude and vertical shift of each of the following functions:

**a.**



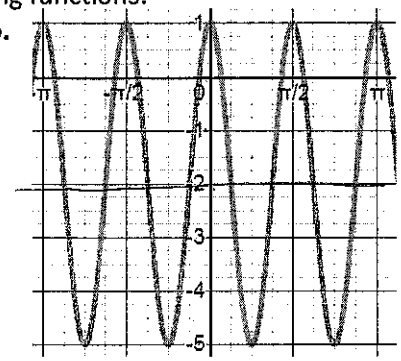
Amplitude: 2

Period: $\pi$

Vertical Shift: $+1$

$f(x) = 2\sin(2x) + 1$

**b.**



Amplitude: 3

Period: $\pi/2$

Vertical Shift: $-2$

$f(x) = 3\cos(4x) - 2$

## Unit 7: Probability

**16.** A survey of 25 juniors asked whether or not they had been or Mexico and Canada. The results are in the table below.

| | Have Been to Canada | Have Not Been to Canada | Total |
|---|---|---|---|
| **Have Been to Mexico** | 6 | 3 | 9 |
| **Have Not Been to Mexico** | 5 | 11 | 16 |
| **Total** | 11 | 14 | 25 |

**a.** P(has been to Mexico) $\frac{9}{25}$

**b.** P(has been to Mexico and Canada) $\frac{6}{25}$

**c.** P(has been to Mexico or Canada) $\frac{9}{25} + \frac{11}{25} - \frac{6}{25} = \frac{14}{25}$

**d.** P(has been to Mexico | has not been to Canada) $\frac{3}{14}$

**e.** P(has been to Canada | has not been to Mexico) $\frac{5}{16}$

**f.** Is going to Mexico and going to Canada independent? Use math to explain your answer.

$P(M) \stackrel{?}{=} P(M|C)$ OR $P(C) \stackrel{?}{=} P(C|M)$

$\frac{9}{25} \stackrel{?}{=} \frac{6}{11}$ not equal not independent $\frac{11}{25} \stackrel{?}{=} \frac{6}{9}$ not equal not independent

**17.** Determine whether each of the following scenarios are independent or dependent:

**a.** One tossed coin landing heads and the next landing tails. ***Independent*** or ***Dependent***

**b.** Rolling two sixes in a row on a number cube. ***Independent*** or ***Dependent***

**c.** Drawing a red tile from a bag and then drawing a green tile after replacing the first tile. ***Independent*** or ***Dependent***

**d.** Drawing a blue tile from a bag and then drawing a red tile without replacing the first. ***Independent*** or ***Dependent***

**18.** Determine whether the following outcomes are mutually exclusive:

**a.** Rolling a 6-sided die and getting both a 4 and an even number ***Mutually Exclusive*** or ***Not Mutually Exclusive***

**b.** Flipping two coins and landing on one heads and one tails ***Mutually Exclusive*** or ***Not Mutually Exclusive***

**c.** Drawing both a jack and a 7 from a deck of cards not at the same time ***Mutually Exclusive*** or ***Not Mutually Exclusive***

**d.** Being born in the months of April and July 2 diff months ***Mutually Exclusive*** or ***Not Mutually Exclusive***