

Review Day Practice

1. If $f(x) = 5^{x+2}$ and $g(x) = 4^{3x}$. Find the value of x such that $f(x) = \frac{1}{4}g(x)$ (rounded to the hundredths place).

$$\underbrace{5^{x+2}}_{y_1} = \frac{1}{4} \underbrace{(4^{3x})}_{y_2} \quad \boxed{x=1.81}$$

2. Find the center and radius of the following circle: $x^2 + y^2 + 2x + 4y = 11$

$$x^2 + 2x + 1 + y^2 + 4y + 4 = 11 + 1 + 4$$

$$(x+1)^2 + (y+2)^2 = 16$$

$C: (-1, -2)$
 $r: 4$

3. Find the area of a sector of a circle with arc length of 50 in and radius of 10 in.

$$S = r\theta$$

$$50 = 10\theta$$

$$\theta = 5 \text{ radians}$$

$$A = \frac{1}{2}r^2\theta$$

$$= \frac{1}{2}(10)^2(5) = \boxed{250 \text{ in}^2}$$

4. Given the table at the right,

- Describe the interval over which $f(x)$ is increasing $(-\infty, 4)$
- Describe the interval over which $f(x)$ is decreasing $(4, \infty)$
- Describe the end behavior of the function
 $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$
 $f(x) \rightarrow -\infty$ as $x \rightarrow \infty$
- Find the min or max $(4, 5)$
- Describe the transformations *right 4, up 5*
- Write an equation to model this function $y = -3|x-4| + 5$

x	f(x)
1	-4
2	-1
3	2
4	5
5	2
6	-1
7	-4



5. Given the function: $f(x) = 2x^4 + 3x^3 - 29x^2 - 18x + 72$:

- Describe the number and type of zeros *4 zeros: all real*
- Find the zeros $-4, -2, 1.5, 3$
- Find the y-intercept 72
- Find the relative min(s) $(-3.18, -55.97)$; $(2.36, -30.53)$
- Find the relative max(s) $(-0.3, 74.73)$
- Describe the interval over which the function is increasing $(-3.18, -0.3) \cup (2.36, \infty)$
- Describe the interval over which the function is decreasing $(-\infty, -3.18) \cup (-0.3, 2.36)$
- Describe the end behavior
 $f(x) \rightarrow \infty$ as $x \rightarrow -\infty$
 $f(x) \rightarrow \infty$ as $x \rightarrow \infty$

6. A swimming pool can be filled by one small hose in 15 hours, and one larger hose in 8 hours. How long does it take to fill the pool if both hose are used at the same time?

$$\left[\frac{1}{15} + \frac{1}{8} = \frac{1}{x} \right] 120x \rightarrow 8x + 15x = 120 \quad \boxed{x = 5.22 \text{ hrs}}$$

$$23x = 120$$

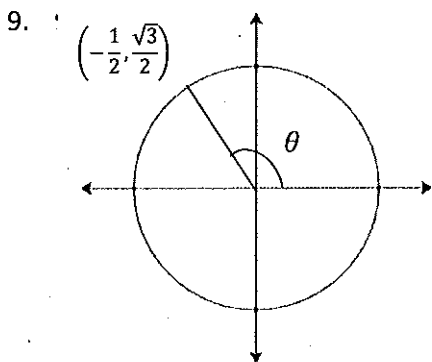
7. Simplify: $\frac{8}{x+7} + \frac{3}{x}$

$$\left(\frac{x}{x} \right) \frac{8}{x+7} + \frac{3}{x} \left(\frac{x+7}{x+7} \right) = \frac{8x + 3x + 21}{x(x+7)} = \frac{11x + 21}{x(x+7)} = \frac{11x + 21}{x^2 + 7x}$$

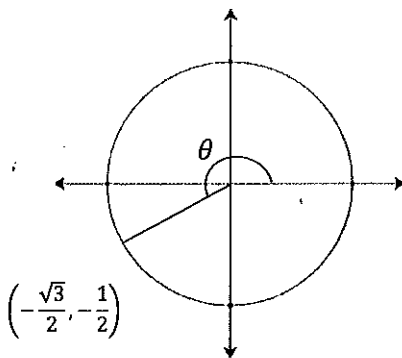
8. Solve for x: $\left[\frac{2}{x-6} + \frac{7}{x+2} = \frac{4x+2}{x^2-4x-12} \right] (x+2)(x-6)$

$$2x + 4 + 7x - 42 = 4x + 2 \quad \rightarrow \quad 5x = 40$$

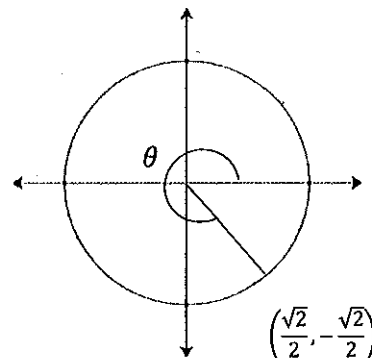
$$9x - 38 = 4x + 2 \quad \rightarrow \quad \boxed{x = 8}$$



- a. What is the sine of θ ? $\frac{\sqrt{3}}{2}$
 What is the cosine of θ ? $-\frac{1}{2}$



- b. What is the sine of θ ? $-\frac{1}{2}$
 What is the cosine of θ ? $-\frac{\sqrt{3}}{2}$



- c. What is the sine of θ ? $-\frac{\sqrt{2}}{2}$
 What is the cosine of θ ? $\frac{\sqrt{2}}{2}$

10. Solve for x: $2^{x+3} = 7$. Round to three decimal places.

$$\log_2(7) = x + 3$$

$$x = \log_2(7) - 3 \quad \boxed{x = -0.19}$$

$$(x+3)\log 2 = \log 7$$

$$x \log 2 + 3 \log 2 = \log 7$$

$$x \log 2 = \log 7 - 3 \log 2$$

$$x = \frac{\log 7 - 3 \log 2}{\log 2}$$

$$x = -0.19$$

11. $\log_3(x^2 + 8) = \log_3 x + \log_3 6$

$$\log_3(x^2 + 8) = \log_3(6x)$$

$$x^2 + 8 = 6x$$

$$x^2 - 6x + 8 = 0 \quad \rightarrow \quad (x-4)(x-2) = 0$$

$$\boxed{x = 2, 4}$$

12. $\log_3 x + \log_3(x-2) = 1$

$$\log_3 x(x-2) = 1$$

$$3^1 = x(x-2) \quad \rightarrow \quad x^2 - 2x - 3 = 0$$

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

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