

# Unit 8 Study Guide

1. Center:  $(5, 0)$

Radius:  $11$

2.  $(x-h)^2 + (y-k)^2 = r^2$

$(x+8)^2 + (y-5)^2 = 9$

3.  $(x-h)^2 + (y-k)^2 = r^2$

$(x-4)^2 + (y-2)^2 = r^2$

$(-3-4)^2 + (-5-2)^2 = r^2$

$(-7)^2 + (-7)^2 = r^2$

$49 + 49 = r^2$

$98 = r^2$

$(x-4)^2 + (y-2)^2 = 98$

4.  $x^2 + y^2 - 6x + 8y - 12 = 3$

$x^2 - 6x + y^2 + 8y = 15$

$x^2 - 6x + \quad + y^2 + 8y + \quad = 15 + \quad + \quad$

$x^2 - 6x + 9 + y^2 + 8y + 16 = 15 + 9 + 16$

$(x-3)^2 + (y+4)^2 = 40$

5.  $x+2=0$      $3x^4 + 0x^3 - 8x^2 + 6x - 9$

$x = -2 \mid 3 \quad 0 \quad -8 \quad +6 \quad -9$

$\downarrow -6 \quad 12 \quad -8 \quad 4$

$3 \quad -6 \quad 4 \quad -2 \quad \boxed{-5}$

$3x^3 - 6x^2 + 4x - 2 + -5$

$x+2$

$$6. \quad x+2=0 \quad |x^3 - 2x^2 - 5x + 6$$

$$x = -2 \quad | \quad \begin{array}{r|rrrr} 1 & -2 & -5 & 6 \\ \downarrow & -2 & 8 & -6 \\ \hline 1 & -4 & 3 & 0 \end{array}$$

$$x^2 - 4x + 3$$

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

$$x-3=0 \quad x-1=0$$

$$x=3 \quad x=1$$

Factors:  $(x+2)(x-3)(x-1)$

Solutions:  $x=-2 \quad x=3 \quad x=1$

$$7. \quad x+2=0 \quad |x^4 + 7x^3 - 2x^2 + 6x + k$$

$$x = -2 \quad | \quad \begin{array}{r|rrrrr} 1 & 7 & -2 & 6 & k \\ \downarrow & -2 & -10 & 24 & -60 \\ \hline 1 & 5 & -12 & 30 & (-6) \end{array}$$

$$k - 60 = -60$$

$$k = 54$$

$$x-2=0$$

$$x = 2 \quad | \quad \begin{array}{r|rrrrr} 1 & 7 & -2 & 6 & 54 \\ \downarrow & 2 & 18 & 32 & 76 \\ \hline 1 & 9 & 16 & 38 & 130 \end{array}$$

Remainder = 130

$$8. \quad x=3i \quad x=-9$$

$$(x^2+9)(x+9) = 0$$

$$x^2 = (3i)^2 \quad x+9=0$$

$$x^3 + 9x^2 + 9x + 81 = 0$$

$$x^2 = -9$$

$$x^2 + 9 = 0$$

$$9. \quad x = \sqrt{3} \quad x = 2$$

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

$$x^2 = (\sqrt{3})^2 \quad x-2=0$$

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

$$x^2 = 3$$

$$x^2 - 3 = 0$$

10.  $X = 2 + 5i$      $X = -1$

$X - 2 = 5i$      $X + 1 = 0$

$(X - 2)^2 = (5i)^2$

$(X - 2)(X - 2) = -25$

$X^2 - 4X + 4 = -25$

$X^2 - 4X + 29 = 0$

	$X^2$	$-4X$	$+29$
$\times$	$X^3$	$-4X^2$	$+29X$
$+1$	$1X^2$	$-4X$	$+29$

$X^3 - 3X^2 + 25X + 29 = 0$

11.  $V = \frac{Bh}{3}$      $B = (x-3)(x-3)$      $V = \frac{9x(x^2 - 6x + 9)}{3}$

$B = x^2 - 6x + 9$

B = area of base

B = LW ← because the base is a square!

$V = \frac{9x^3 - 54x^2 + 81x}{3}$

$V = 3x^3 - 18x^2 + 27x$

12a.  $V = Bh$      $B = 8(17+5)$      $V = (88)(8)$

B = area of trapezoid

$B = \frac{h(b_1 + b_2)}{2}$

$B = 88$

$V = 704 \text{ in}^3$

b.  $V = \text{cone} + \text{cylinder}$

$V = \frac{\pi r^2 h}{3} + \pi r^2 h$

$r^2 + 6^2 = 10^2$

$r^2 + 36 = 100$

$r^2 = 64$

$r = 8$

$V_{\text{cone}} = \frac{(3.14)(8)^2(6)}{3} = 401.92$

$V_{\text{cyl}} = \pi(8)^2(10) = 2009.6$

Volume =  $401.92 + 2009.6 = 2411.52 \text{ in}^3$

$$13. V_{\text{cyl}} = \pi r^2 h \quad V_{\text{cone}} = \frac{\pi r^2 h}{3}$$

$$V_{\text{cone}} = V_{\text{cyl}}$$

$$\frac{\pi r^2 h}{3} = \pi r^2 (15)$$

3

Cone's height = 45 in tall

$$\frac{\pi r^2 h}{\pi r^2} = \frac{45 \pi r^2}{\pi r^2}$$

$$h = 45$$

$$14. \text{Area} = \text{rect} + \text{tri} \quad \text{b) Area} = \text{rect} - \frac{1}{2} \text{circle}$$

$$A_r = (4)(3) = 12$$

$$A_r = (11)(11) = 121$$

$$A_t = \frac{(4)(3)}{2} = 6$$

$$A_c = \frac{\pi(5.5)^2}{2} = 47.5$$

$$\text{Total area} = 18 \text{ in}^2$$

$$\text{Total} = 121 - 47.5 \\ = 73.5 \text{ in}^2$$