

$$1.) \begin{aligned} x &= 3 \cos 315^\circ \\ y &= 3 \sin 315^\circ \end{aligned}$$

$$\left(\frac{3\sqrt{2}}{2}, -\frac{3\sqrt{2}}{2} \right)$$

$$2.) \begin{aligned} x &= 2 \cos \pi/3 \\ y &= 2 \sin \pi/3 \end{aligned}$$

$$\left(2 \left(\frac{1}{2} \right), 2 \left(\frac{\sqrt{3}}{2} \right) \right) = (1, \sqrt{3})$$

$$3.) r = \sqrt{\left(-\frac{1}{2}\right)^2 + \left(-\frac{\sqrt{3}}{2}\right)^2} = \sqrt{\frac{1}{4} + \frac{3}{4}} = 1$$

$$= (1, 4\pi/3)$$

$$\theta = \tan^{-1}\left(\frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}}\right) = \theta = \tan^{-1}(\sqrt{3}) = 4\pi/3$$

$$4.) r = \sqrt{(\sqrt{2})^2 + (-\sqrt{2})^2} = 2$$

$$(2, 7\pi/4)$$

$$\theta = \tan^{-1}\left(\frac{-\sqrt{2}}{\sqrt{2}}\right) = \tan^{-1}(-1) = 7\pi/4$$

$$5.) (x+3)^2 + (y-1)^2 = 10$$

$$x^2 + 6x + 9 + y^2 - 2y + 1 = 10$$

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

$$r^2 + 6r \cos \theta - 2r \sin \theta = 0$$

$$r(r + 6 \cos \theta - 2 \sin \theta) = 0$$

$$r = 0 \quad \boxed{r = 2 \sin \theta - 6 \cos \theta}$$

$$6.) x^2 - 4x + 4 + y^2 + 2y + 1 = 8$$

$$x^2 + y^2 - 4x + 2y = 0$$

$$r^2 - 4r \cos \theta + 2r \sin \theta = 0$$

$$r(r - 4 \cos \theta + 2 \sin \theta) = 0$$

$$\underline{r = 4 \cos \theta - 2 \sin \theta}$$

$$7.) x^2 + y^2 - 4y + 4 = 4$$

$$r^2 - 4r \sin \theta = 0$$

$$r(r - 4 \sin \theta) = 0$$

$$r = 0 \quad \boxed{r = 4 \sin \theta}$$

$$8.) x^2 + 4x + 4 + y^2 - 2y + 1 = 5$$

$$r^2 + 4r \cos \theta - 2r \sin \theta = 0$$

$$r(r + 4 \cos \theta - 2 \sin \theta) = 0$$

$$\underline{r = 2 \sin \theta - 4 \cos \theta}$$

$$9.) r = -2 \sin \theta$$

$$x^2 + y^2 = -2y$$

$$x^2 + y^2 + 2y = 0 \quad \text{Circle}$$

$$10.) 3r + 2r \cos \theta = 2$$

$$3r + 2x = 2$$

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

$$9r^2 = 4 - 8x + 4x^2$$

$$9(x^2 + y^2) = 4 - 8x + 4x^2$$

$$9x^2 + 9y^2 = 4 - 8x + 4x^2$$

$$5x^2 + 9y^2 + 8x - 8 = 0$$

Ellipse

11.) $2r - r \sin \theta = 6$
 $2r - y = 6$
 $(2r - y)^2 = 6^2$
 $4r^2 = y^2 + 12y + 36$
 $4x^2 + 4y^2 = y^2 + 12y + 36$
 $4x^2 + 3y^2 - 12y - 36 = 0$
 Ellipse

12.) $r = 2 \cos \theta + 6 \sin \theta$
 $r^2 = 2r \cos \theta + 6r \sin \theta$
 $x^2 + y^2 = 2x + 6y$
 $x^2 - 2x + y^2 - 6y = 0$
 Circle

13.) $x = 5 \cos t$ $y = 2 \sin t$
 $\frac{x}{5} = \cos t$ $\frac{y}{2} = \sin t$
 $\left(\frac{x}{5}\right)^2 + \left(\frac{y}{2}\right)^2 = \cos^2 t + \sin^2 t$
 $\frac{x^2}{25} + \frac{y^2}{4} = 1$ Ellipse

14.) $\frac{x-1}{5} = \cos t$ $\frac{y+1}{4} = \sin t$
 $\left(\frac{x-1}{5}\right)^2 + \left(\frac{y+1}{4}\right)^2 = 1$
 $\frac{(x-1)^2}{25} + \frac{(y+1)^2}{16} = 1$ Ellipse

15.) $x = -2t - 2$ $y = t^2 - 4$
 $\frac{x+2}{-2} = t$
 $y = \left(\frac{x+2}{-2}\right)^2 - 4$
 $y = \frac{(x+2)^2}{4} - 4$ parabola

16.) $x = 2t - 3$ $y = 2\left(\frac{x+3}{2}\right)^2 - 2\left(\frac{x+3}{2}\right)$
 $\frac{x+3}{2} = t$
 $y = \frac{2}{3} \frac{(x+3)^2}{4} - (x+3) + \frac{3}{2}$
 $y = \frac{(x+3)^2}{6} - (x+3) + \frac{3}{2}$
 $y = \frac{(x+3)^2}{6} - x - 3 + \frac{3}{2}$
 $y = \frac{x^2 + 6x + 9}{6} - x - 3 + \frac{3}{2}$
 $y = \frac{x^2}{6}$ parabola

17.) $x^2 + y^2 - 4y + 4 = 60 + 4$
 $x^2 + (y-2)^2 = 64$
 $C(0, 2) r = 8$

18.) $9x^2 + 16y^2 + 72x - 320y + 448 = 0$
 $9(x^2 + 8x + 16) + 16(y^2 - 20y + 100) = -448 + 144 + 1600$
 $9(x+4)^2 + 16(y-10)^2 = 1296$
 $\frac{(x+4)^2}{144} + \frac{(y-10)^2}{81} = 1$ Ellipse $C(-4, 10)$
 $V(8, 10) (-16, 10)$
 Focus $C = \sqrt{144 - 81}$
 $\sqrt{63} = 3\sqrt{7}$
 $f(-4 \pm 3\sqrt{7}, 10)$

19) $x^2 + 8x + 16 + y^2 - 18y + \underline{\quad} = 114 + 16 + 81$

$(x+4)^2 - 1(y^2 + 18y + 81)$
 $(x+4)^2 - (y+9)^2 = 49$

$\frac{(x+4)^2}{49} - \frac{(y+9)^2}{49} = 1$

hyperbola $C(-4, -9)$
 $V(3, -9)(-11, -9)$

focus: $c^2 = 49 + 49$ $f(-4 \pm 7\sqrt{2}, -9)$
 $c = \sqrt{98} = 7\sqrt{2}$

Asym: $y = -x - 13$
 $y = x - 5$

20) $-3x^2 - 60x + 7y - 307 = 0$

Parabola

$7y - 307 + 300 = 3x^2 + 60x$
 $3(x^2 + 20x + 100)$

$7y - 7 = 3(x+10)^2$

$y = \frac{3}{7}(x+10)^2 + \frac{7}{7} = y = \frac{3}{7}(x+10)^2 + 1$

$c = \frac{1}{4(\frac{3}{7})} = \frac{7}{12}$

$f(-10, 19\frac{1}{12})$

$V(-10, 1)$

Axis of Sym $x = -10$

Directrix $y = \frac{5}{12}$

ASS! Careful

21) $\cos \theta = \frac{5}{10}$

$\theta = 71.8^\circ$

22) $\tan \theta = \frac{7}{6}$

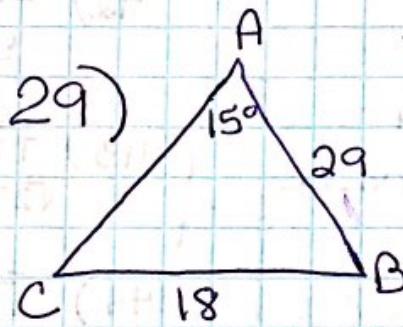
$\theta = 49.4^\circ$

23) $\sin 33 = \frac{3}{x}$

$x = \frac{3}{\sin 33} = 5.5$

24) $\tan 71 = \frac{7}{x}$

$x = \frac{7}{\tan 71} = 2.4$



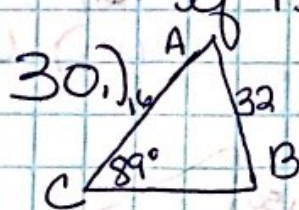
$\frac{\sin 15^\circ}{18} = \frac{\sin C}{29}$ $\angle C = 25^\circ$

25-28) in class
 law of sin law of cos

take the \angle you found

$180 - 25 = 155^\circ$

$155^\circ + 15^\circ$ is < 180 2Δ



$\frac{\sin 89}{32} = \frac{\sin B}{16}$ $\angle B \approx 30^\circ$

$180 - 30 = 150$

$150 + 89 > 180$ 1Δ

31) $2\sin\theta = \sqrt{3}$

$\sin\theta = \frac{\sqrt{3}}{2}$

$\{ \frac{\pi}{3}, \frac{2\pi}{3} \}$

32) $3\cot\theta = -3$

$\cot\theta = -1$

$\tan\theta = -1$

$\{ \frac{3\pi}{4}, \frac{7\pi}{4} \}$

(4)

33) in class

34) $\tan\theta + \sqrt{2}\tan\theta\sin\theta = 0$

GCFCF $\tan\theta(1 + \sqrt{2}\sin\theta) = 0$

$\tan\theta = 0$ $1 + \sqrt{2}\sin\theta = 0$

$\{ 0, \pi \}$

$\sin\theta = -\frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$

$\{ \frac{5\pi}{4}, \frac{7\pi}{4} \}$

35) $-2\cos^2\theta + \cos\theta + 2 = 1$

$-2\cos^2\theta + \cos\theta + 1 = 0$

$2\cos^2\theta - \cos\theta - 1 = 0$

$(2\cos\theta + 1)(\cos\theta - 1) = 0$

$\cos\theta = -\frac{1}{2}$ $\cos\theta = 1$

$\{ \frac{2\pi}{3}, \frac{4\pi}{3} \}$ and $\{ 0 \}$

36.) $4 = -\tan^2\theta + 7$

$-3 = -\tan^2\theta$

$3 = \tan^2\theta$

$\pm\sqrt{3} = \tan\theta$

$\{ \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3} \}$

37) $\cos^{-1}(-\frac{\sqrt{2}}{2})$ (only QI+QII Cos) Inverse (only QI+QIV Sin+tan)

think $\cos\theta = -\frac{\sqrt{2}}{2} = \frac{3\pi}{4}$

38) $\csc\theta = -\sqrt{2}$

$\sin\theta = -\frac{\sqrt{2}}{2} = -\frac{\pi}{4}$

because inverse name by neg

39) $\sec^{-1}(\tan\frac{\pi}{4})$

$\sec^{-1}(1) = \theta$

$\cos\theta = 1$

$0 \rightarrow \theta$

40) $\tan^{-1}(\csc(-\frac{\pi}{2}))$

$\tan^{-1}(-1)$

$\tan\theta = -1$

$\theta = -\frac{\pi}{4}$

42.) $-5f$

$-5 \langle -12, -5 \rangle = \langle 60, 25 \rangle$

43) $\vec{TX} = \langle 2, -9 \rangle$

$\sqrt{2}\vec{TX} = \langle 2\sqrt{2}, -9\sqrt{2} \rangle$

44) $\vec{TX} = \langle -11, 15 \rangle$ $\vec{YZ} = \langle -14, 6 \rangle$

$-\vec{TX} + \vec{YZ}$

$\langle +11, -15 \rangle + \langle -14, 6 \rangle$

$= \langle -3, -9 \rangle$

45.) $-f - g$

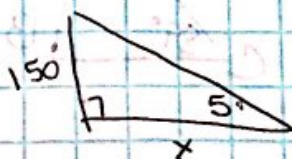
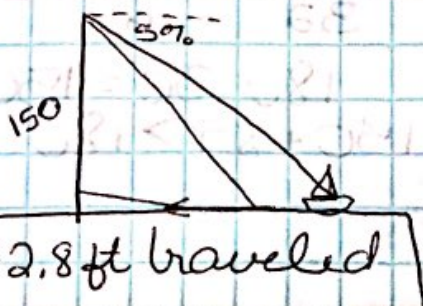
$-\langle 3, +10 \rangle + \langle -3, 6 \rangle$

$\langle 0, -4 \rangle$

46.) $3 + 24 = 27$

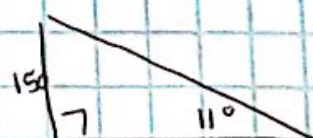
47.) $64 + 0 = 64$

41.)



$\tan 5 = \frac{150}{x}$

$x = 1714.5 \text{ ft}$



$\tan 11 = \frac{150}{x}$

$x = 771.68 \text{ ft}$

$$48.) \sqrt{(-8)^2 + 1^2} = \|a\|$$

$$\sqrt{65} = \|a\|$$

$$\left\langle \frac{-8}{\sqrt{65}}, \frac{1}{\sqrt{65}} \right\rangle = \left\langle \frac{-8\sqrt{65}}{65}, \frac{\sqrt{65}}{65} \right\rangle$$

$$49.) \sqrt{144 + 256} = 20$$

$$\left\langle \frac{-12}{20}, \frac{16}{20} \right\rangle = \left\langle \frac{-3}{5}, \frac{4}{5} \right\rangle$$

$$50.) r = \frac{18/25}{4/5} = 3/5$$

$$E: a_n = \frac{6}{5} \left(\frac{3}{5}\right)^{n-1}$$

$$R: a_n = \frac{3}{5} a_{n-1}$$

$$a_1 = 6/5$$

$$51.) d = -2 - 0 = -2$$

$$E: a_n = 0 - 2(n-1)$$

$$= -2n + 2$$

$$R: a_n = a_{n-1} - 2$$

$$a_1 = 0$$

$$52.) = 532$$

$$n=1 \quad 4(1) - 4 = 0$$

$$4(2)^2 - 4 = 12$$

$$4(3)^2 - 4 = 32$$

$$4(4)^2 - 4 = 60$$

$$4(5)^2 - 4 = 96$$

$$4(6)^2 - 4 = 140$$

$$4(7)^2 - 4 = 192$$

$$53.) 6 - 2 = 4 + 1 = 5$$

$$a_2 = 302 \quad a_6 = 306$$

$$S = \frac{5}{2} (302 + 306)$$

$$= 1520$$

$$54.) \text{Conver} \quad r = -1/5$$

$$55.) \text{Conver} \quad r = 1/3$$

$$56.) \text{Diverges} \quad r = 3$$

$$57.) \text{Conver} \quad r = 1/2$$

$$58.) a_n = a_1 + d(n-1)$$

$$a_n = 18 + 5(n-1)$$

$$= 13 + 5n$$

$$S_n = \frac{n}{2} (a_1 + a_n)$$

$$986 = \frac{n}{2} (18 + 13 + 5n)$$

$$1972 = n(31 + 5n)$$

$$0 = 5n^2 + 31n - 1972$$

$$n = 17$$

$$59.) a_n = -2(6)^{n-1}$$

$$-3110 = \frac{-2(1-6^n)}{1-6}$$

$$15,550 = -2(1-6^n)$$

$$-7775 = 1-6^n$$

$$-7776 = -6^n$$

$$7776 = 6^n$$

$$\log 7776 = n \log 6$$

$$n = 5$$

$$60.) \text{math} \quad \sum_{n=1}^5 4n$$

$$61.) a_n = 10 + 5(n-1)$$

$$= 10 + 5n - 5$$

$$= 5n + 5$$

$$\sum_{n=1}^6 (5n + 5)$$