

① a)  $8 \log_9 m + \frac{1}{7} \log_9 (n-6) - 2 \log_9 (r-s) - \log_9 (pru)$   
 $\log_9 m^8 + \log_9 (n-6)^{1/7} - (\log_9 (r-s)^2 + \log_9 (pru))$   
 $\log_9 m^8 (n-6)^{1/7} - \log_9 (r-s)^2 (pru)$

$\log_9 \frac{m^8 (n-6)^{1/7}}{(r-s)^2 (pru)}$

1)  $\log_2 \frac{a^4 \sqrt{b-3}}{c^3}$

$\log_2 a^4 + \log_2 \sqrt{b-3} - \log_2 c^3$

$4 \log_2 a + \frac{1}{2} \log_2 (b-3) - 3 \log_2 c$

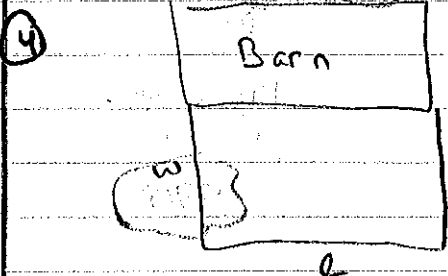
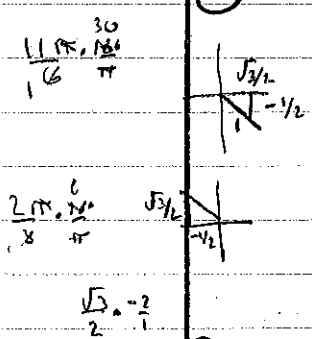
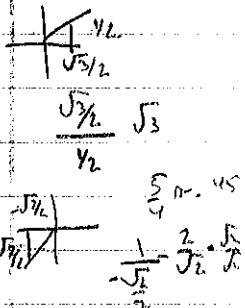
- ② a) shifted 8 units right, 12 units up, and is vertically stretched  
 b) reflected over x-axis, shifted 6 units left, 21 units down, and is vertically compressed.

③ a)  $\sin \frac{11\pi}{6} + \tan \frac{2\pi}{3}$   
 $-\frac{1}{2} + -\sqrt{3}$

$\frac{-1 - \sqrt{3}}{2}$

b)  $\sec \frac{5\pi}{4} \cdot \cot \frac{\pi}{6}$

$-\sqrt{2} \cdot \sqrt{3}$   
 $-\sqrt{6}$



$P = 2780$   
 $P = l + 2w \rightarrow l = P - 2w$   
 $A = lw$

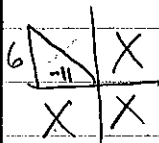
$A = (2780 - 2w)w$   
 $A = 2780w - 2w^2$

$w = -b/2a = -(2780)/(-2)$

$1390 \text{ ft} \times 695 \text{ ft}$   
 $966,050 \text{ ft}^2$

$w = 695 \text{ ft}$   
 $l = 2780 - 2(695)$   
 $l = 1390 \text{ ft}$   
 $A = 2780(695) - 2(695)^2$   
 $A = 966,050 \text{ ft}^2$

5)  $\tan \theta = \frac{-6}{11}$ ,  $\csc \theta > 0$ ,  $\cos \theta = ?$



$$\cos \theta = \frac{y}{h}$$

$$(11)^2 + (6)^2 = c^2$$

$$121 + 36 = c^2$$

$$c^2 = 157$$

$$c = \sqrt{157}$$

$$\cos \theta = \frac{-11}{\sqrt{157}}$$

$$\cos \theta = \frac{-11\sqrt{157}}{157}$$

6)  $f^{-1}(x) = ?$

$$y = (x-13)^3 + 16$$

$$x = (y-13)^3 + 16$$

$$x-16 = (y-13)^3$$

$$\sqrt[3]{x-16} = y-13$$

$$\sqrt[3]{x-16} + 13 = y$$

$$f^{-1}(x) = \sqrt[3]{x-16} + 13$$

7) c)  $\sin \theta = -0.9402$

$$\theta = -70.1^\circ$$

2nd sin

d)  $\tan \theta = 2.903$

$$\theta = 71.5^\circ$$

2nd tan

9)  $\log_{12} 56$   
(\*change of base\*)

$$\frac{\log 56}{\log 12}$$

$$1.6199$$

10)  $\frac{19\pi}{6} = \text{degrees?}$

$$\frac{19\pi}{6} \cdot \frac{180}{\pi}$$

$$570^\circ$$

(11)  $r = 7.5\%$  continuously

$t = 5$

$A = 1650$

$P = ?$

$1650 = P e^{.075(5)}$

$1650 = P \frac{e^{.375}}{e^{.375}}$

$P = \$1134.03$

(12)  $f(x) = 3x^2 + 7x - 10, g(x) = x - 9$   $(f \circ g)(x)$

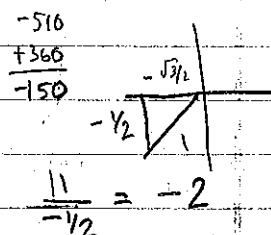
$f(g) = 3(x-9)^2 + 7(x-9) + 10$

$= 3(x^2 - 18x + 81) + 7x - 63 + 10$

$= 3x^2 - 54x + 243 + 7x - 63 + 10$

$(f \circ g)(x) = 3x^2 - 47x + 170$

(13)  $\csc(-510^\circ)$



$\frac{1}{-1/2} = -2$

$\csc(-510) = -2$

(14)  $y = \sqrt{x+21}$

$x+21 \geq 0$

$x \geq -21$

Domain  $[-21, \infty)$

(15) a)  $\log_{18}(x-435) = 3$

$18^3 = x - 435$

$5832 = x - 435$

$x = 6267$

$\{6267\}$

b)  $\log_6(3x-15) = \log_6(x+43)$

$3x-15 = x+43$

$2x = 58$

$x = 29$

$\{29\}$

c)  $\log_5(5x+62) - \log_5 x = \log_5(35)$

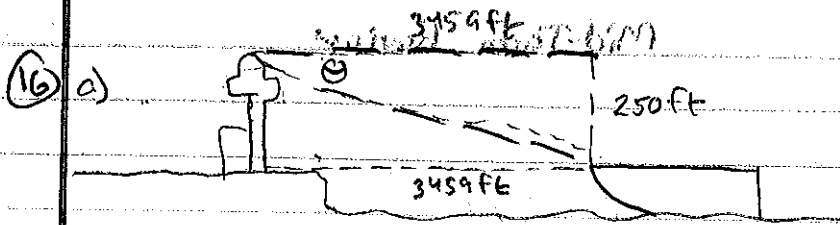
$\frac{5x+62}{x} = 35$

$5x+62 = 35x$

$62 = 30x$

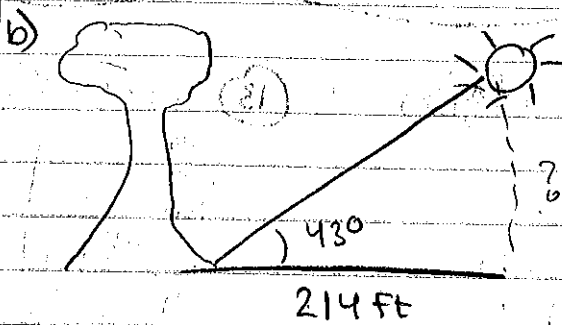
$x = 31/15$

$\{31/15\}$



$$\tan \theta = \frac{250}{3459}$$

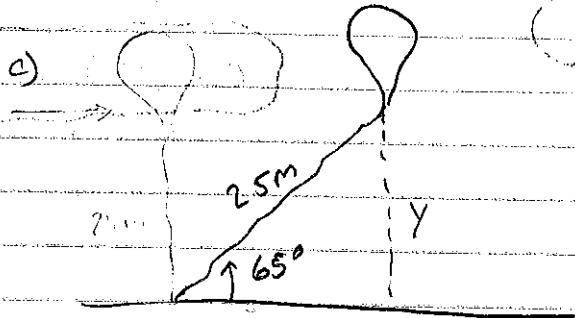
$$\tan^{-1}\left(\frac{250}{3459}\right) = \theta = 4.1^\circ$$



$$\tan 43^\circ = \frac{y}{214}$$

$$214 \tan 43 = 199.56 \text{ ft}$$

$$199.56 \text{ ft tall}$$

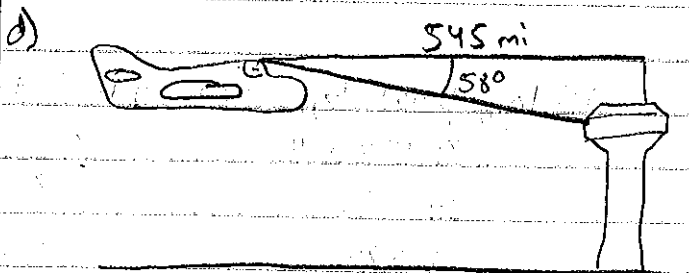


$$\sin 65^\circ = \frac{y}{25}$$

$$25 \sin 65 = y$$

$$y = 22.66 \text{ m}$$

$$22.66 \text{ m high}$$



$$\cos 58^\circ = \frac{545}{h}$$

$$h = \frac{545}{\cos 58}$$

$$h = 1028.46 \text{ m}$$

$$1028.46 \text{ m}$$

(17)  $f(x) = 8 - 24x + 3x^2$   
 $= 3x^2 - 24x + 8$

$y - 8 = 3x^2 - 24x$

$y - 8 = 3(x^2 - 8x + \underline{\quad})$

$y - 8 + (3 \cdot 16) = 3(x^2 - 8x + 16)$       $\frac{-8}{2} = -4 \rightarrow (-4)^2 = 16$

$y - 8 + 48 = 3(x - 4)^2$

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

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

(18) a) quarterly

$A = P(1 + \frac{r}{n})^{nt}$

$26000 = 6500(1 + \frac{.08}{4})^{4t}$

$4 = 1.02^{4t}$

$\log 4 = \log 1.02^{4t}$

$\log 4 = 4t \log 1.02$

$\frac{\log 4}{\log 1.02} = 4t$

$\log 1.02$

$\frac{70.0056}{4} = t$

17.5 yrs

b) monthly

$26000 = 6500(1 + \frac{.08}{12})^{12t}$

$4 = 1.0067^{12t}$

$\log 4 = \log 1.0067^{12t}$

$\log 4 = 12t \log 1.0067$

$\frac{\log 4}{\log 1.0067} = 12t$

$\log 1.0067$

$t = 207.6020$

17.3 yrs

(19) Omit

(20)  $r = 24 \text{ cm}$

$\theta = 140^\circ$

$140 = \frac{\pi}{180} \cdot \frac{140}{9} \pi$

Must be in radians!

$S = \theta r$      Arc Length

$S = \frac{7\pi}{9} (24)$

$S = 58.64 \text{ cm}$

using exponential notation

$$A = A_0 e^{0.0752t}$$

$$0.5 = 1 e^{-0.0752t}$$

$$\ln 0.5 = -0.0752t$$

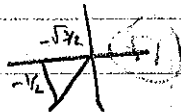
$$t = \frac{\ln 0.5}{-0.0752}$$

$$t \approx 9.2 \text{ yrs}$$

graph calculator

$$\cos\left(-\frac{5\pi}{6}\right)$$

$$\frac{-5\pi}{6} \approx \frac{30}{180} = -150$$



$$\cos\left(-\frac{5\pi}{6}\right) = -\frac{\sqrt{3}}{2}$$

23)  $f(x) = x^3 - 17x^2 + 98x - 196$   
 put in y= and find 1 in calculator!  
 $x = 7$

$$\begin{array}{r|rrrr} 7 & 1 & -17 & 98 & -196 \\ & & 7 & -70 & +196 \\ \hline & & & -10 & +28 & | & 0 \end{array}$$

$$x^2 - 10x + 28 \leftarrow \text{Not factorable}$$

$$a=1, b=-10, c=28$$

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(28)}}{2(1)}$$

$$= \frac{10 \pm \sqrt{100 - 112}}{2}$$

$$= \frac{10 \pm 2i\sqrt{3}}{2}$$

$$= 5 \pm i\sqrt{3}$$

$$\{7, 5 \pm i\sqrt{3}\}$$

24)  $V = \frac{S}{t}$        $s = 0^\circ$   
 $S = 36(5.2\pi)$

$$V = \frac{36(5.2\pi)}{2}$$

$$V = 180\pi \text{ cm/sec}$$

$$\approx 565.49 \text{ cm/sec}$$

25)  $f(x) = \frac{5x^3 + 3x^2 - 4x + 6}{x^2 - 2x - 24}$

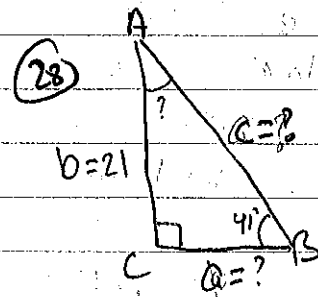
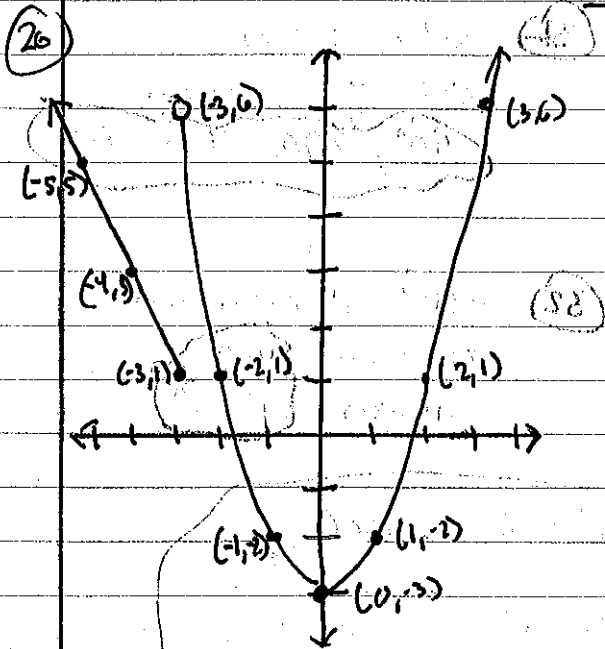
$$= \frac{5x^3 + 3x^2 - 4x + 6}{(x-6)(x+4)}$$

$$\checkmark A: \begin{array}{ll} x-6 & x+4 \\ x=6 & x=-4 \end{array}$$

$$HA: 3 \text{ ? ? } \underline{\text{None}}$$

Pre Calculus Hhrs

Mid-Term Assessment Review



$\angle A = 90 - 41$   
 $\angle A = 49^\circ$

Side C  
 $\sin 41^\circ = \frac{21}{C}$

Side a =  
 $\tan 41^\circ = \frac{21}{a}$

Side a =  
 $\frac{21}{\sin 41^\circ}$   
 $a \approx 32.01$

$a = \frac{21}{\tan 41^\circ}$

$a \approx 24.16$

(29) Pythagorean ID

$\sin^2 \theta + \cos^2 \theta = 1$

$1 + \tan^2 \theta = \sec^2 \theta$

$1 + \cot^2 \theta = \csc^2 \theta$

Quotient

$\tan \theta = \frac{\sin \theta}{\cos \theta}$

$\cot \theta = \frac{\cos \theta}{\sin \theta}$

Reciprocal

$\sin \theta = \frac{1}{\csc \theta}$      $\csc \theta = \frac{1}{\sin \theta}$

$\cos \theta = \frac{1}{\sec \theta}$      $\sec \theta = \frac{1}{\cos \theta}$

$\tan \theta = \frac{1}{\cot \theta}$      $\cot \theta = \frac{1}{\tan \theta}$

Cofunctions

$\sin(90 - \theta) = \cos \theta$

$\cos(90 - \theta) = \sin \theta$

$\tan(90 - \theta) = \cot \theta$

$\cot(90 - \theta) = \tan \theta$

$\sec \theta(90 - \theta) = \csc \theta$

$\csc \theta(90 - \theta) = \sec \theta$

Odd

$\sin(-\theta) = -\sin \theta$

$\csc(-\theta) = -\csc \theta$

$\tan(-\theta) = -\tan \theta$

$\cot(-\theta) = -\cot \theta$

Even

$\cos(-\theta) = \cos \theta$

$\sec(-\theta) = \sec \theta$

30)  $e^{-3.5x} = 6.7$   
 $\ln e^{-3.5x} = \ln 6.7$   
 $-3.5x = \ln 6.7$   
 $x = \frac{\ln 6.7}{-3.5}$

$x \approx -0.5435$

$\{ -0.5435 \}$

33)  $a^2 + b^2 = c^2$   
 $a^2 + (7)^2 = (25)^2$   
 $a^2 + 49 = 625$   
 $a^2 = 576$   
 $a = 24$

$\sin \theta = \frac{7}{25}$      $\csc \theta = \frac{25}{7}$   
 $\cos \theta = \frac{24}{25}$      $\sec \theta = \frac{25}{24}$   
 $\tan \theta = \frac{7}{24}$      $\cot \theta = \frac{24}{7}$

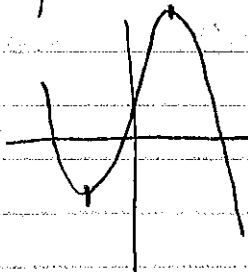
32) cotangent = 0  
 $\cot = \frac{x}{y}$   
 $90^\circ, 270^\circ, 450^\circ, 630^\circ$

32)  $-315^\circ$  of coterminal  
 $315 + 360 = 675$   
 $-315 - 360 = -675$

34)  $f(x) = 12.4692 / (1.3065)^x$   
 Rate = 26.8% monthly

Exp. Regression in calculator!

35)  $y = -5x^3 + 12x + 16$



Min:  $(-0.894, -1.16)$

Max:  $(0.894, 13.155)$

Incr:  $(-0.894, 0.894)$

Decr:  $(-\infty, -0.894)$

$(0.894, \infty)$

36)  $x = -6$      $x = 4$      $x = -3$

$(x+6)(x-4)(x+3) = 0$

$(x^2 - 4x + 6x - 24)(x+3) = 0$

$(x^2 + 2x - 24)(x+3) = 0$

$x^3 - 2x^2 - 24x + 3x^2 + 6x - 72 = 0$

$x^3 + 5x^2 - 18x - 72 = 0$

38)  $f(-3) = (-3)^3 - 6(-3)^2 + 3(-3) - 4$   
 $= -27 + 54 - 9 - 4$   
 $= -94$

No, remainder is -94



PreCalculus

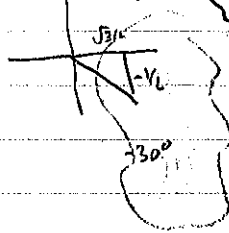
Mid-Term Assessment Review

39)  $\frac{7\pi}{8} = ?^\circ$

$\frac{2\pi}{8}, \frac{100}{\pi}$

157.5°

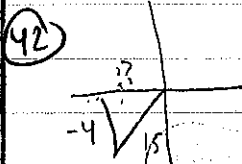
40)  $\sin\left(-\frac{\pi}{6}\right) = -\frac{1}{2}$



41)  $\cos x = .5683$

$x \approx 55.4^\circ$

\* 2nd. cos x \*



$(a^2) + (-4)^2 = (15)^2$

$a^2 + 16 = 225$

$a^2 = 209$

$a = -\sqrt{209}$

$\cot \theta = -\frac{\sqrt{209}}{4}$

$\cot \theta = \frac{\sqrt{209}}{4}$

43)  $\sec \theta = \frac{1}{\cos \theta} = \frac{1}{\sin \theta} \tan \theta$

$\frac{1}{\cos \theta} = \frac{\sin \theta}{\cos \theta}$

$\frac{1}{\cos \theta} = \frac{\sin \theta}{\cos \theta}$

$\frac{1 - \sin^2 \theta}{\cos \theta}$

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

$\frac{\cos^2 \theta}{\cos \theta} = \cos \theta$

44) 1b)  $(x+1)$

Do remainder theorem

$f(-1) = (-1)^3 - 8(-1)^2 + (-1) + 12$

$= -1 + 8 - 1 + 12$

$= 18$

45)  $y = \frac{x^2 - 16}{x^2 - 6x + 8}$

$(x+4)(x-4)$

$(x-4)(x-2)$

VA =  $x-2$

$= x-2$

HA =  $y=1$

$z=2$

Hole:  $\frac{x+4}{x-2} = \frac{8}{2} = 4$

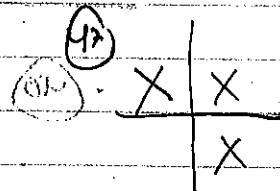
$x=4$

$(4, 4)$

Handwritten notes at the top of the page.

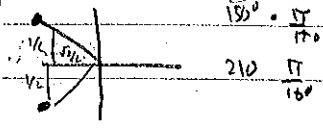
Handwritten notes at the top right of the page.

(46)  $\sec \theta = \frac{-\sqrt{3}}{3} = \frac{1}{x}$



$\cos \theta < 0 \tan > 0$

(11)  $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$   $\sqrt{x} = -\frac{\sqrt{3}}{2}$



150°  $\frac{5\pi}{6}$   
210°  $\frac{7\pi}{6}$

III

(48)  $\sec 2.56$

-1.1968

Rad mod,  $\sec(2.56)^{-1}$

(49)  $195^\circ = ? \text{ rad}$

$\frac{195 \cdot \pi}{180}$   
 $\frac{13\pi}{12}$  or 3.403 rads

(50)  $f(x) = 4x^3 + 7x^2 - 4x + 14$

PRZ =  $\frac{0}{LC} \frac{\pm 1, \pm 2, \pm 7, \pm 14}{\pm 1, \pm 2, \pm 4} = \pm 1, \pm 2, \pm 7, \pm 14, \pm \frac{1}{2}, \pm \frac{7}{2}, \pm \frac{1}{4}, \pm \frac{7}{4}$

(51)  $P = -0.0002x^2 + (140)x - 250,000$

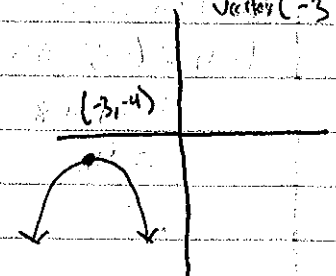
value of x

AOS =  $\frac{-b}{2a} = \frac{-(140)}{2(-.0002)}$

$x = 350,000$

(52)  $f(x) = -(x+3)^2 + 4$

vertex (-3, -4)



53)  $f(x) = -x^3 - 5x^2 - x + 10$

- $(-4.193, 0)$
- $(-2, 0)$
- $(1.193, 0)$

54)



$P = 2L + 3W$

$1700 = 2L + 3W$

$L = \frac{850 - 3W}{2}$

$A = LW$

$A = (850 - 1.5W)W$

$A = 850W - 1.5W^2$

AOS

MAX Area = 120,416.67 ft

Dim: 283.33 ft x 425.01 ft

55)

$\log_6 \frac{1}{36}$

$\log_6 6^{-2}$

$-2$

56)

- a) even
- b) neither
- c) odd
- d) even
- e) odd

57)

$g(x) = \frac{x^2 + 4x - 21}{x^2 + 5x - 36}$

$(x+9)(x-4)$

$x = -9 \quad x = 4$

All real except  $x = -9, 4$

$(-\infty, -9) \cup (-9, 4) \cup (4, \infty)$

$\{x \mid x \neq -9, 4\}$

58)

$f(x) = 3x - 5x^2 \quad g(x) = 4 - x$

$(f \circ g)(x) = 3(4-x) - 5(4-x)^2$

$= 12 - 3x - 5(16 - 8x + x^2)$

$= 12 - 3x - 80 + 40x - 5x^2$

$(f \circ g)(x) = -5x^2 + 37x - 68$

59)

$r = 6 \text{ ft}$

$S = \theta r$

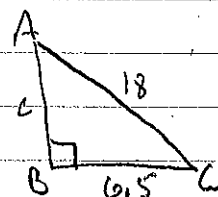
$\theta = \text{rad}$

$S = 60^\circ (6) \text{ ft}$

$S = \frac{\pi}{3} (6) \text{ ft}$

$S = \frac{\pi}{2} \text{ ft}$

60)

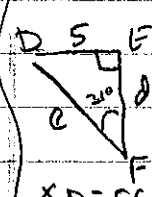


$(6.5)^2 + c^2 = (18)^2$

$c \approx 16.79$

$\sin A = \frac{6.5}{18}$

$A \approx 21.17^\circ$   
 $C \approx 68.83^\circ$



$\angle D = 59^\circ$

$\tan 31 = \frac{5}{d} = 8.32$

$\sin 31 = \frac{5}{e} = 9.71$