

1) a)



b) $X \sim N(20, 4^2)$

$P(X \leq 25) = 0.84$

c) invNorm(.7, 20, 4)
22.10

2) $f(x) = x^2$ $g(x) = 3 \ln(x+1)$ $x > -1$

a) $x^2 = 3 \ln(x+1)$

$x = 1.74$ on calc
 $x = 0$

b) $\int_0^{1.74} |g(x) - f(x)| dx = 1.31$

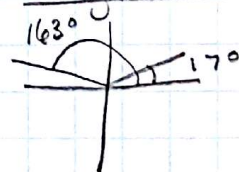
a) $\angle ABC = 135^\circ$

b) $x^2 = 5^2 + 8^2 - 2(5)(8) \cos 135$

$x = 12.1 \text{ km}$

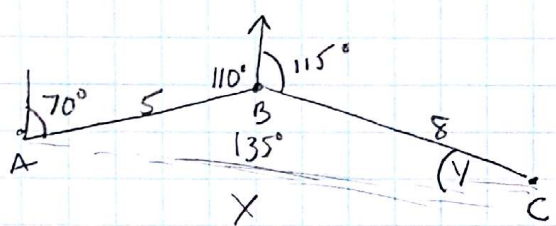
c) $\frac{5}{\sin y} = \frac{12.1}{\sin 135}$
 $3.54 = 12.1 \sin y$
 $0.292 = \sin y$
 $17.0^\circ = y$

ambiguous check



can't be 163°
because $163 + 135 > 180$

3)



4) a) $(x+2)^9$

$\binom{9}{r} x^{9-r} 2^r$ $9-r=6$
 $r=3$
 $\binom{9}{3} x^6 2^3 = 672 x^6$

b) $5x(672x^6) = 3360x^7$

5) a) strong negative

b) $\ln M = -0.12t + 4.67$

$M = e^{-0.12t + 4.67}$
 $M = e^{-0.12t} e^{4.67}$
 $M = e^{4.67} (1.887)^t$

$$c) u_4 = \frac{8u_1 = u_1 \cdot r^3}{\begin{matrix} 8=r^3 \\ 2=r \end{matrix}}$$

$$S_{10} = \frac{u_1(r^n - 1)}{r - 1} = 2557.5$$

$$\frac{u_1(2^{10} - 1)}{2 - 1} = 2557.5$$

$$u_1(1023) = 2557.5$$

$$u_1 = 2.5$$

$$u_{10} = u_1 r^9 = 2.5(2)^9 = \boxed{1280}$$

$$7) P_t = P_0 e^{kt}$$

$$a) P_t = P_0 e^{kt}$$

$$\frac{P_t}{P_0} = e^{kt} = 0.9$$

$$\ln e^{kt} = \ln 0.9$$

$$\boxed{k = -0.105}$$

the population is decreasing over time.

$$b) \ln e^{-0.105t} = \ln 0.75$$

$$-0.105t = -0.288$$

$$t > 2.74 \leftarrow \text{decades}$$

$$t > 27.4 \text{ years}$$

$$t = 28 \text{ years}$$

$$8) a) 0.55 + 0.3 + 0.1 + k = 1$$

$$k = 0.05$$

$$b) i) P(A=0) = 0.55$$

$$ii) P(\text{no breakdowns on 4 days}) \quad X \sim B(5, 0.55)$$

$$P(X=4) = 0.206$$

$$c) 0(.7) + 1(.2) + 2(.08) + 3(.02) = 0.42$$

$$\rightarrow d) i) P(2 \text{ breakdowns}) = P(A) + P(A|B) + P(B)$$

$$= 0.1 + \frac{(3)(.2)}{0.24} + 0.08 = 0.24$$

$$0.1(0.7) + (3)(.2) + (0.08)(0.55) = \boxed{0.174}$$

$$ii) \frac{0.1}{0.24} = 0.417$$

$$9) v = \cos 3t - 2 \sin t - 0.5 \quad 0 \leq t \leq 5 \quad s(0) = 4$$

$$a) s(t) = \int_0^t v(t) dt \text{ on calc}$$

$$\boxed{-3.72 \text{ m}}$$

$$b) (\text{first } x = \text{int}) \rightarrow 0.180 \text{ m}$$

$$c) 2 \text{ times}$$

$$d) \text{ on calc } \rightarrow 0.744 \text{ m/s}^2 \quad v'(3) = a(3)$$

$$e) \text{ highest or lowest point on graph } \left. \begin{matrix} \text{min} = -3.28 \\ \text{max} = 2.28 \end{matrix} \right\} \text{ since speed = velocity, highest speed is } \boxed{3.28 \text{ m/s}}$$

