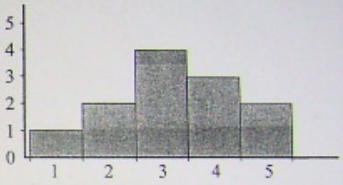
Statistics Exam Review

1. What are the three measures of central tendency? _____ , _____ , _____
2. Which measure of central tendency is
   a. affected by extreme values? _____
   b. can have more than one value? _____
   c. is always part of the data? _____
   d. requires using all values of the data? _____
   e. least likely to be an actual score of the data?_____
   f. is the center or middle value of the data?_____
3. Using the following histogram, determine the following:
   a. Mean
   b. Median
   c. Mode
   d. Standard Deviation



4. Draw and label the Normal Curve.
5. The attendance for a week at the local theatre is normally distributed, with a mean of 4000 and a standard deviation of 500.
   a. Draw and label the normal curve.
   b. What percent of attendance fall between:
      i. 3500 and 4000 ? _____
      ii. 4000 and 5000 ? _____
      iii. 2500 and 4500 ? _____
   d) What range of attendance occurs:
      i. 68% of the time ? _____
      ii. 95% of the time ? _____
   e) What percent of attendance fall between: **(Z-Scores might help.)** ☺
      i) 3600 and 4600 ? _____
      ii) less than 3300? _____
      iii) more than 4200? _____

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i. 68% of the time ? _____
ii. 95% of the time ? _____

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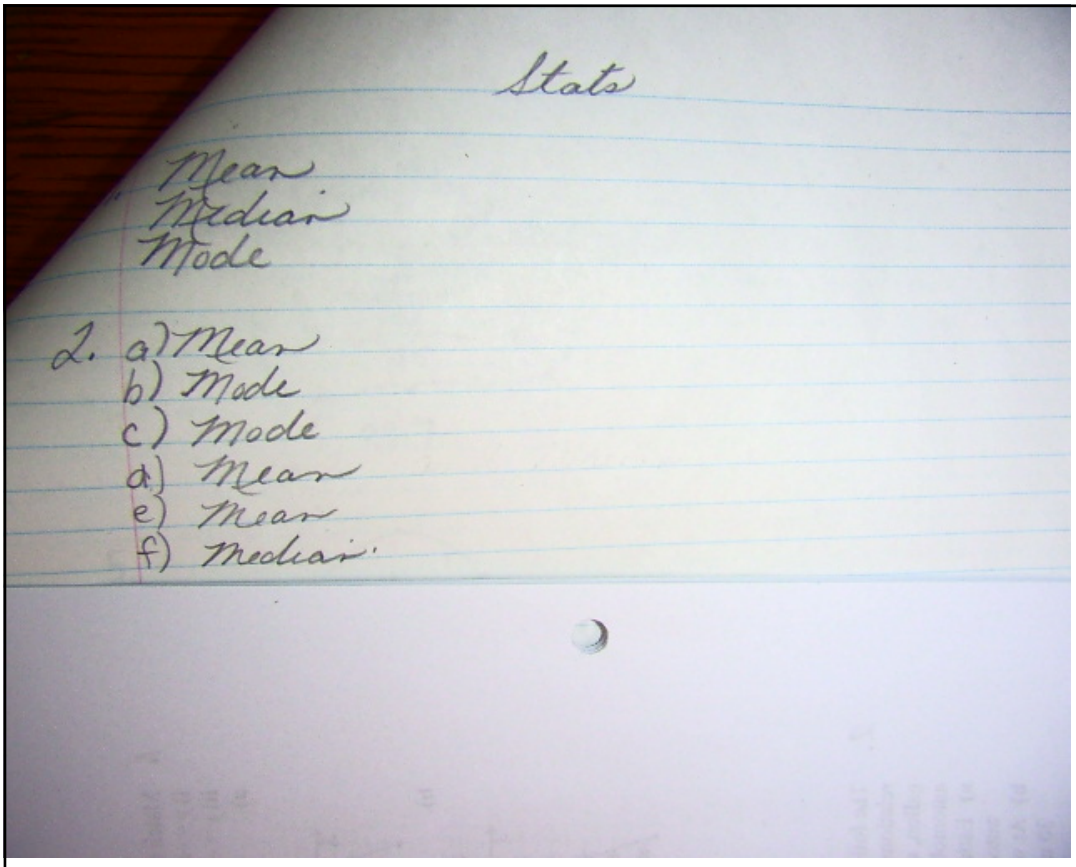
i) 3600 and 4600 ? _____
ii) less than 3300? _____
iii) more than 4200?_____

6. A provincial math exam has a mean of 68 and a standard deviation of 13.2. If 30 000 students take the exam, and a score of 49 or less fails, how many students fail the exam?
7. Determine the 95% confidence interval for μ if $\sigma = 6$, mean = 72, and n=49.
8. Determine the 90% confidence interval for μ if $\sigma = 6$, mean = 72, and n=49.
9. Forest companies bid on a large tract of land in the Prince George forest district. A random sample of 150 trees yields a mean diameter of 48 cm with a standard deviation of 5.6 cm. Find a 99% confidence interval for the mean diameter of all the trees.
10. State the margin of error in questions 7, 8 and 9?



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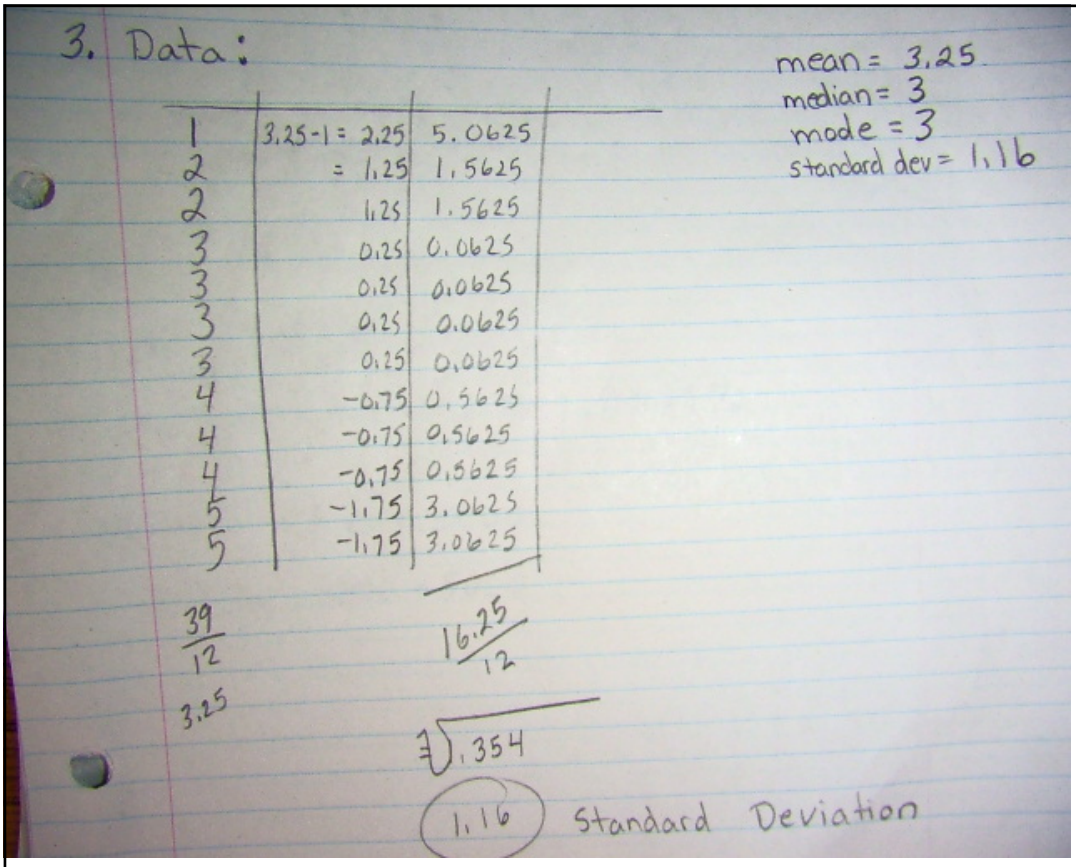
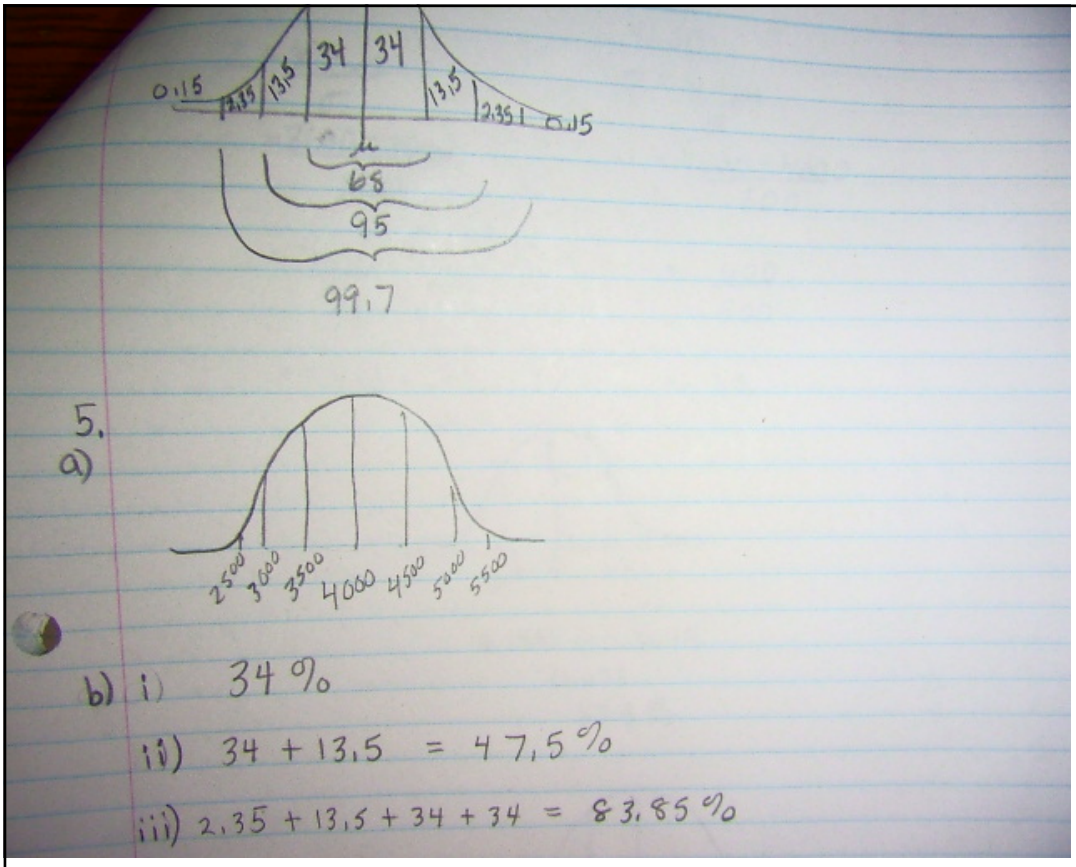

3. Data:
mean = 3.25
median = 3
mode = 3
standard dev = 1.16
1 | 3.25-1 = 2.25 | 5.0625
2 | = 1.25 | 1.5625
2 | 1.25 | 1.5625
3 | 0.25 | 0.0625
3 | 0.25 | 0.0625
3 | 0.25 | 0.0625
3 | 0.25 | 0.0625
4 | -0.75 | 0.5625
4 | -0.75 | 0.5625
4 | -0.75 | 0.5625
5 | -1.75 | 3.0625
5 | -1.75 | 3.0625
39/12
3.25
16.25/12
1.354
1.16
Standard Deviation



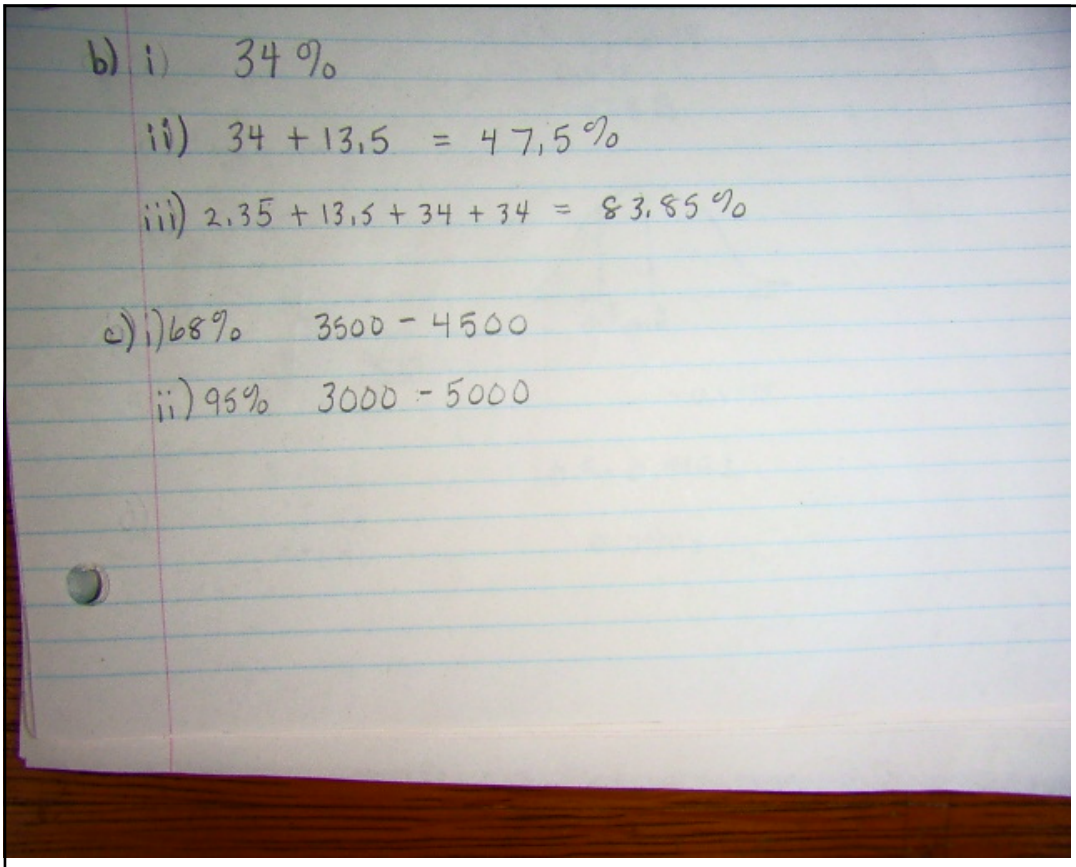
5.

a)

b) i) 34 %

ii) 34 + 13,5 = 47,5 %

iii) 2,35 + 13,5 + 34 + 34 = 83,85 %



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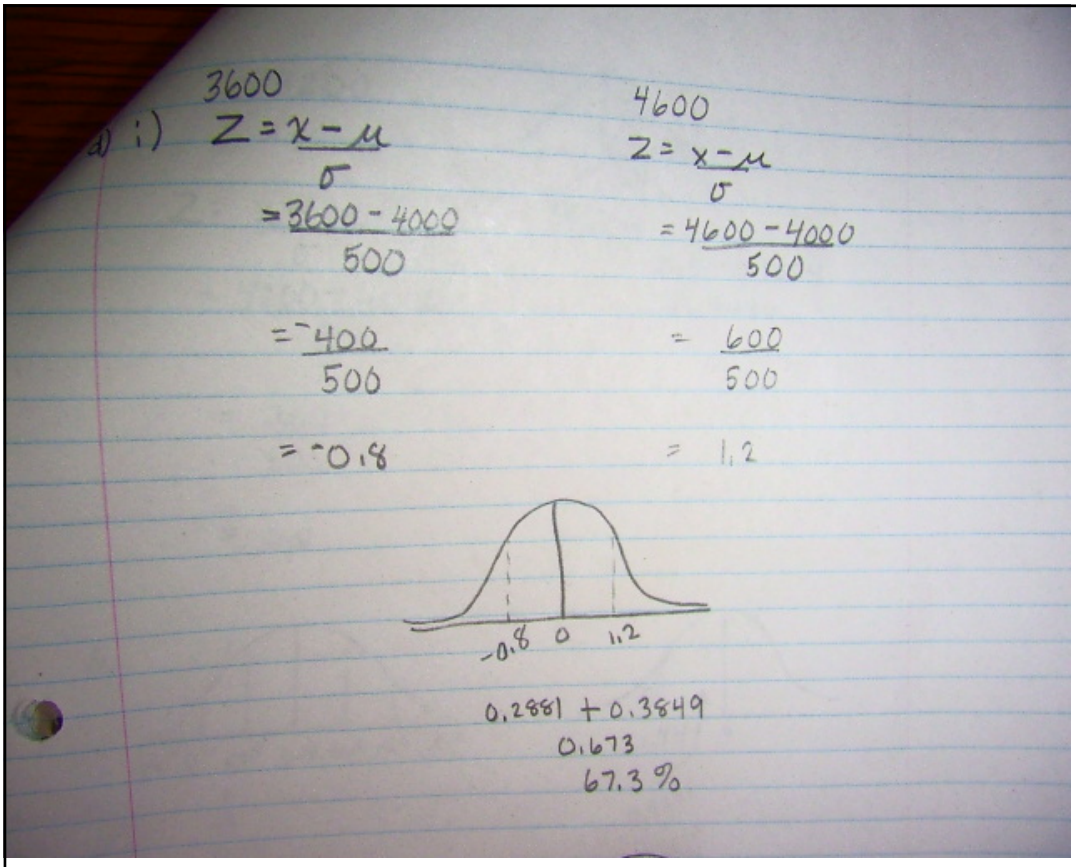

3600
d) i) $Z = \frac{x - \mu}{\sigma}$
$= \frac{3600 - 4000}{500}$
$= \frac{-400}{500}$
$= -0.8$
4600
$Z = \frac{x - \mu}{\sigma}$
$= \frac{4600 - 4000}{500}$
$= \frac{600}{500}$
$= 1.2$
-0.8 0 1.2
0.2881 + 0.3849
0.673
67.3 %

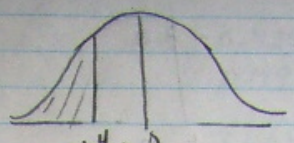
e) < 3300

$$Z = \frac{x - \mu}{\sigma}$$

$$= \frac{3300 - 4000}{500}$$

$$= \frac{-700}{500}$$

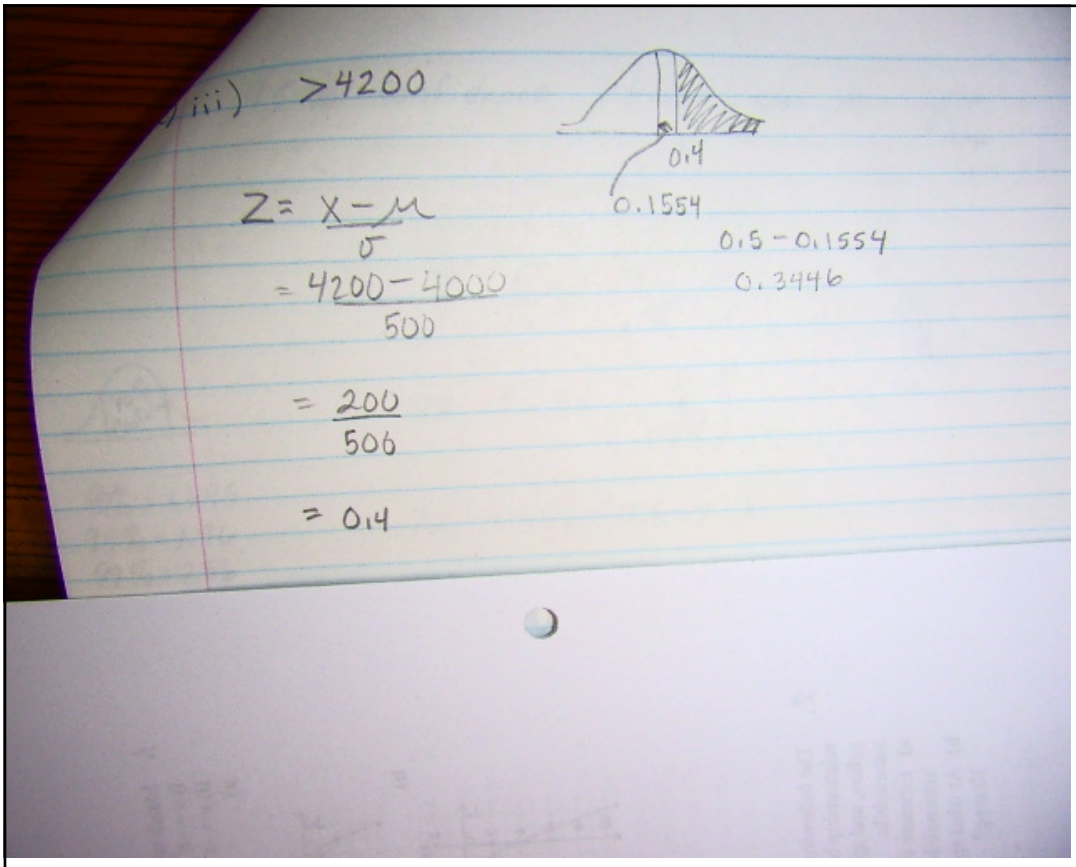
$$= -1.4$$

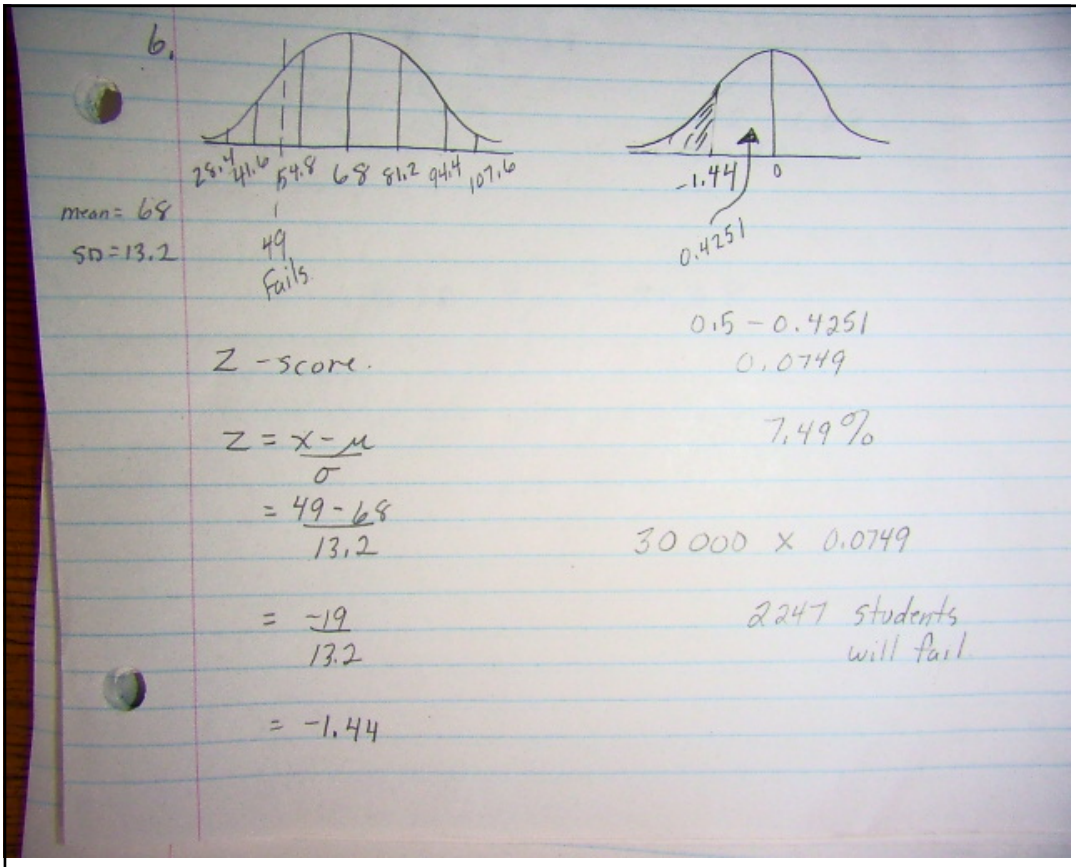


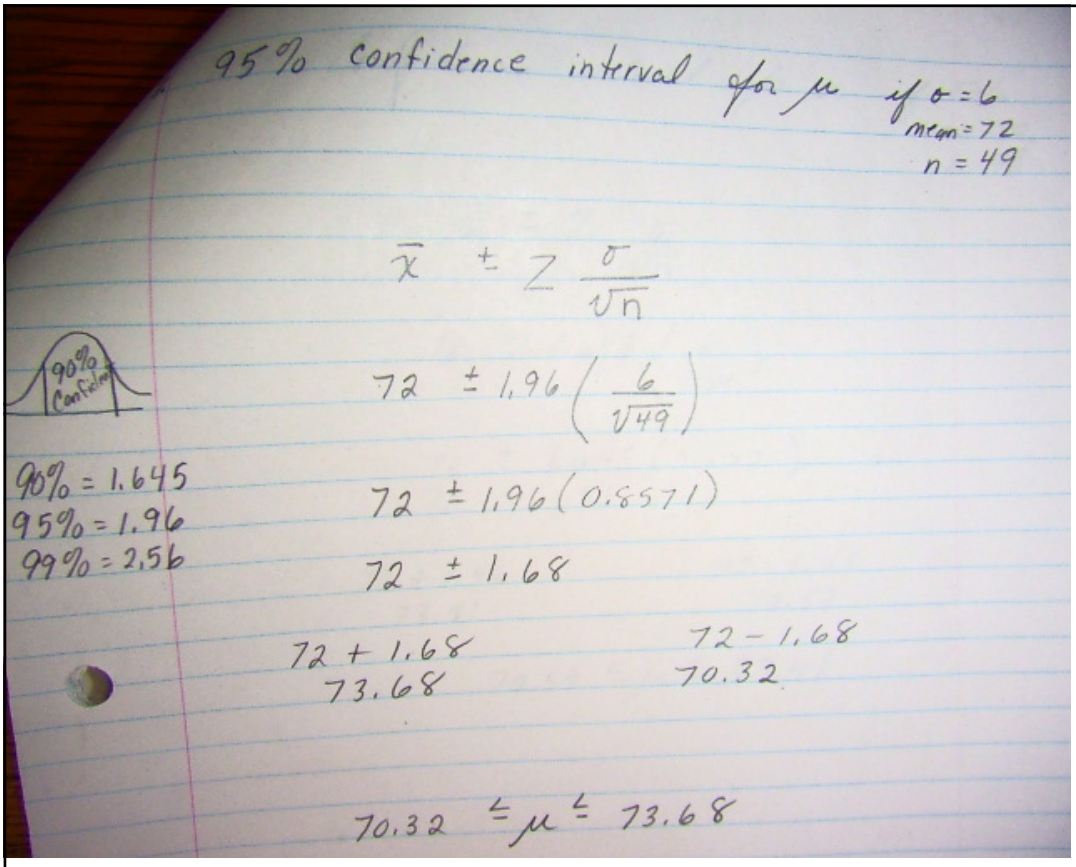
0.4192

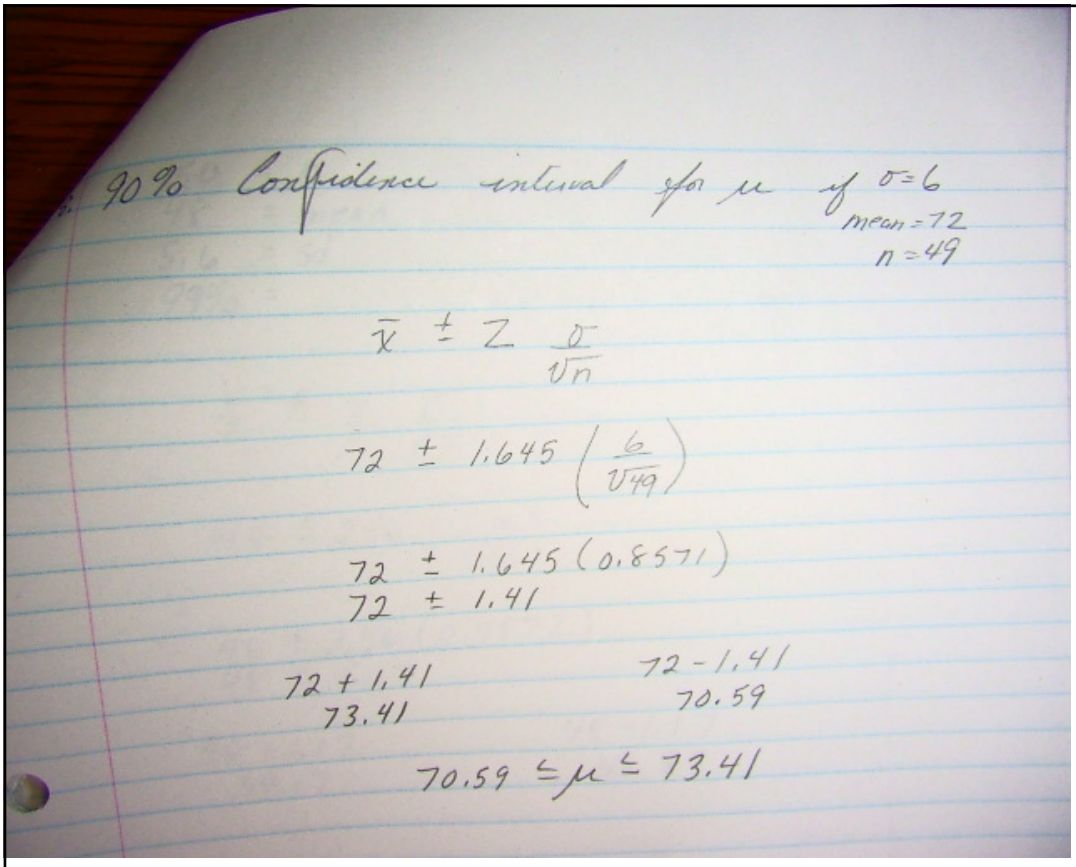
$0.5 - 0.4192$

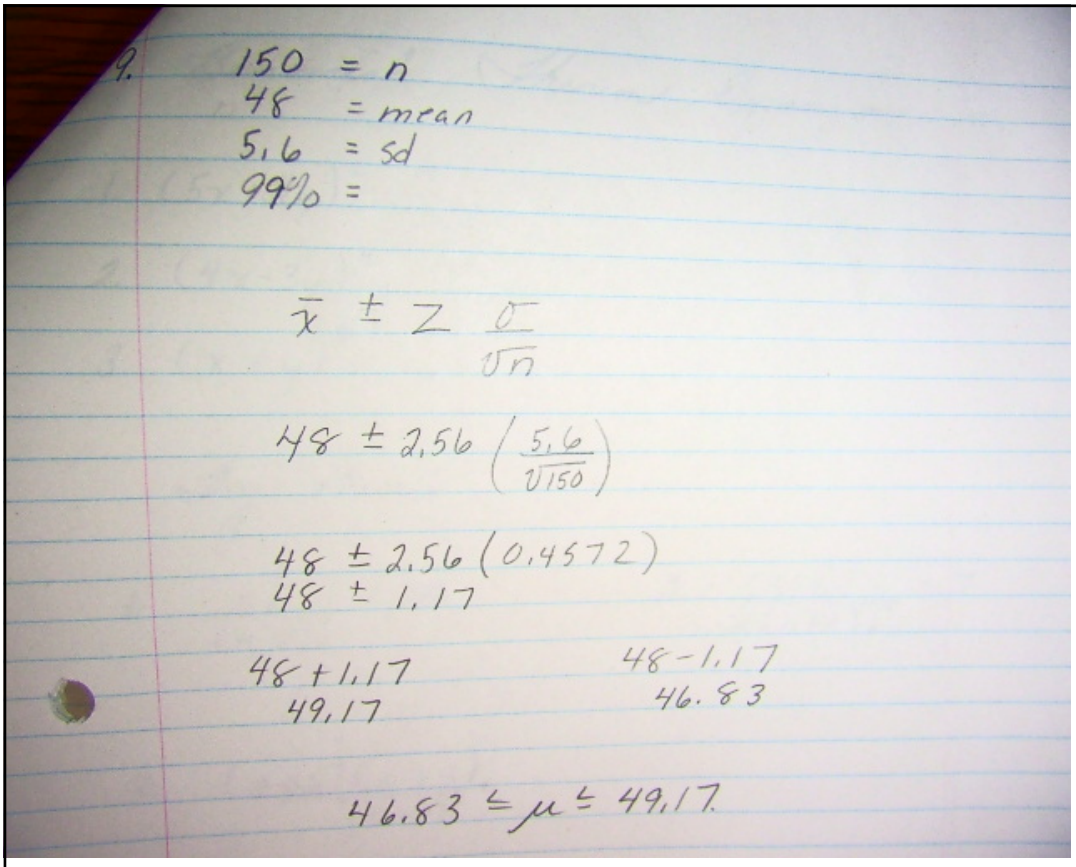
0.0808

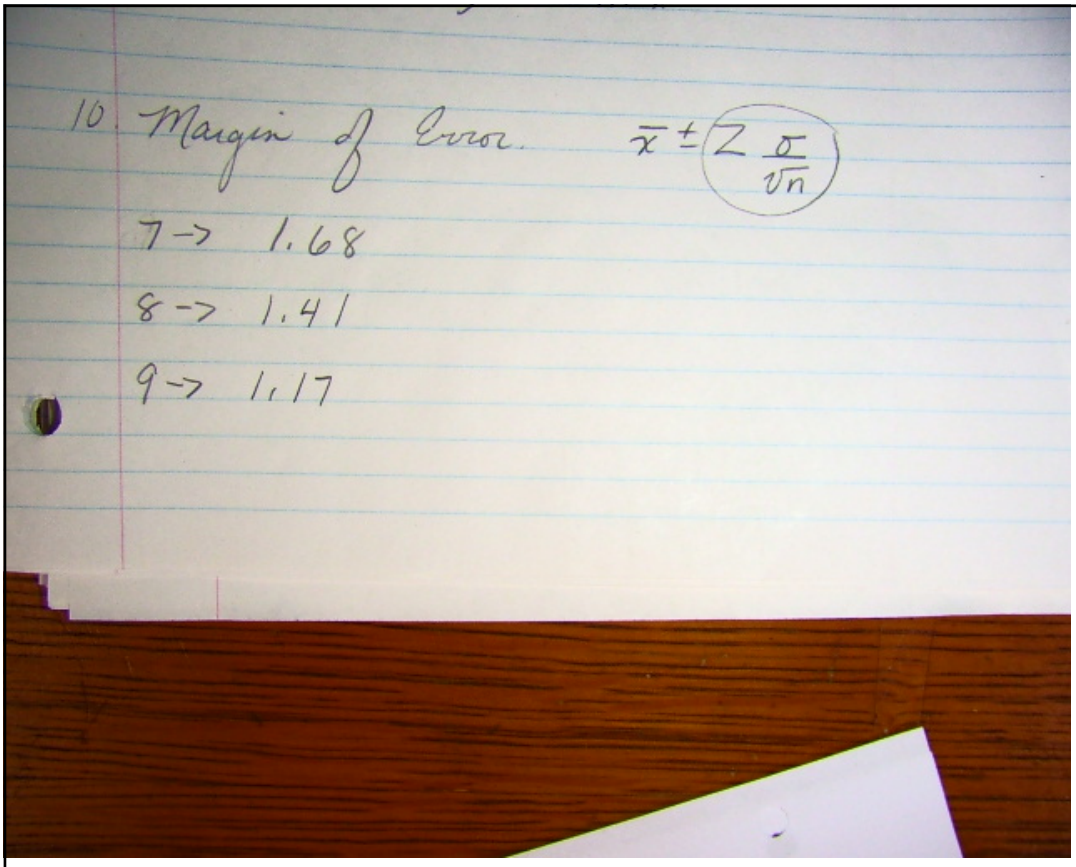

iii) >4200
Z = X − μ / σ
= 4200 − 4000 / 500
= 200 / 506
= 0.4
0.4
0.1554
0.5 − 0.1554
0.3446


6.
28.4 41.6 54.8 68 81.2 94.4 107.6
mean = 68
SD = 13.2
49
Fails
Z - score.
$Z = \frac{x - \mu}{\sigma}$
$= \frac{49 - 68}{13.2}$
$= \frac{-19}{13.2}$
$= -1.44$
-1.44 0
0.4251
0.5 - 0.4251
0.0749
7.49%
30 000 x 0.0749
2247 students will fail


95% confidence interval for μ if σ = 6
mean = 72
n = 49
$\bar{x} \pm Z \frac{\sigma}{\sqrt{n}}$
90% Confidence
$72 \pm 1.96\left(\frac{6}{\sqrt{49}}\right)$
90% = 1.645
95% = 1.96
99% = 2.56
$72 \pm 1.96(0.8571)$
72 ± 1.68
72 + 1.68
73.68
72 − 1.68
70.32
$70.32 \leq \mu \leq 73.68$


90% Confidence interval for μ if σ=6
mean=72
n=49
$\bar{x} \pm Z \frac{\sigma}{\sqrt{n}}$
$72 \pm 1.645 \left(\frac{6}{\sqrt{49}}\right)$
$72 \pm 1.645 (0.8571)$
72 ± 1.41
72+1.41
73.41
72-1.41
70.59
$70.59 \leq \mu \leq 73.41$


9.
150 = n
48 = mean
5.6 = sd
99% =
$\bar{x} \pm Z \frac{\sigma}{\sqrt{n}}$
$48 \pm 2.56 \left(\frac{5.6}{\sqrt{150}}\right)$
$48 \pm 2.56 (0.4572)$
48 ± 1.17
48+1.17
49.17
48-1.17
46.83
$46.83 \leq \mu \leq 49.17$



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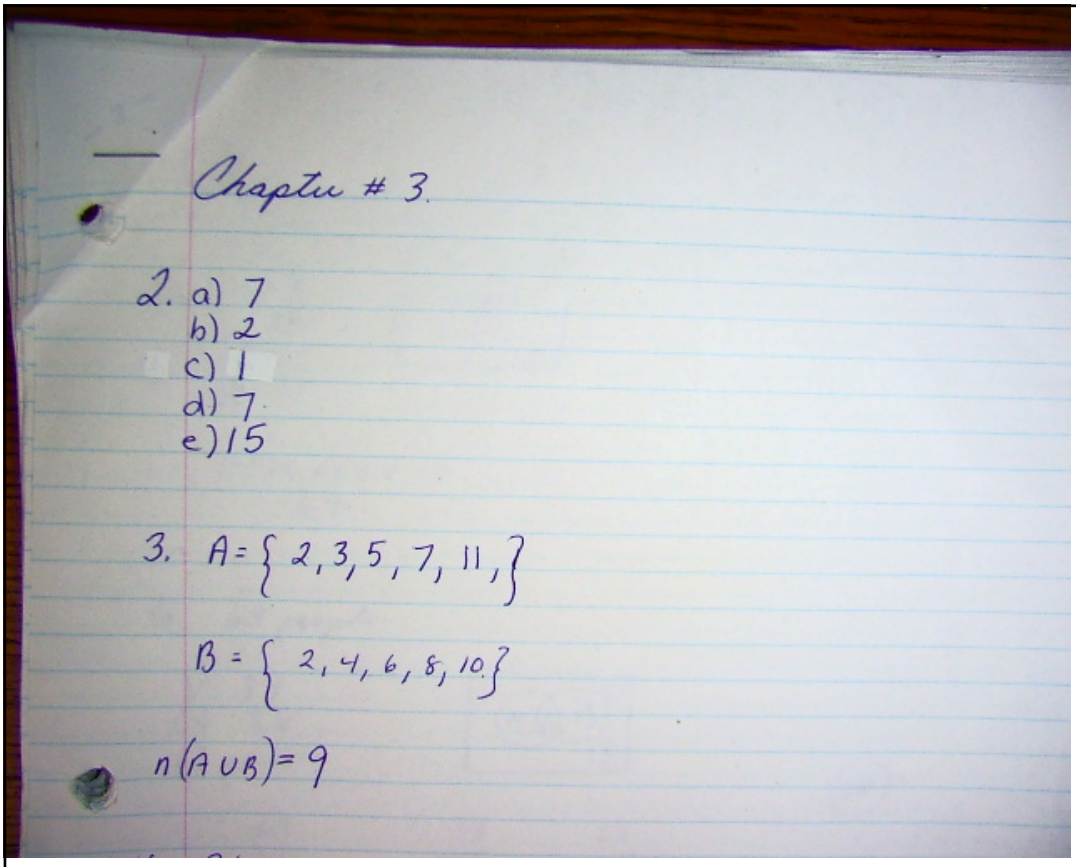


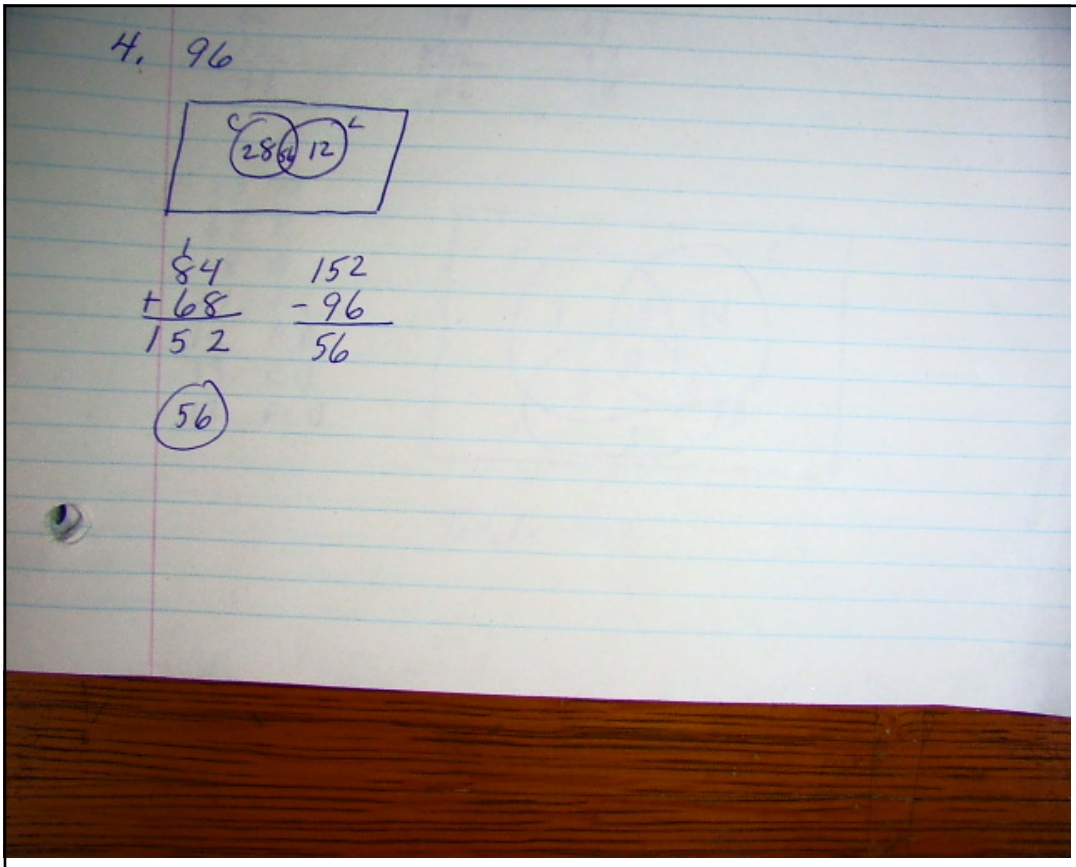
Chapter # 3.

2. a) 7
b) 2
c) 1
d) 7
e) 15

3. $A = \{2, 3, 5, 7, 11, \}$

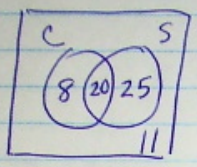
$B = \{2, 4, 6, 8, 10\}$

$n(A \cup B) = 9$


4. 96
28
12
84
+68
152
152
-96
56
56

(3)

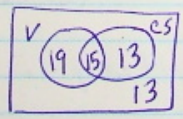
5. C 28
S 45
Both 20
Neither 11



8 + 20 + 25 + 11
64.

6. 60 people.

V 34
CS 28
13 neither

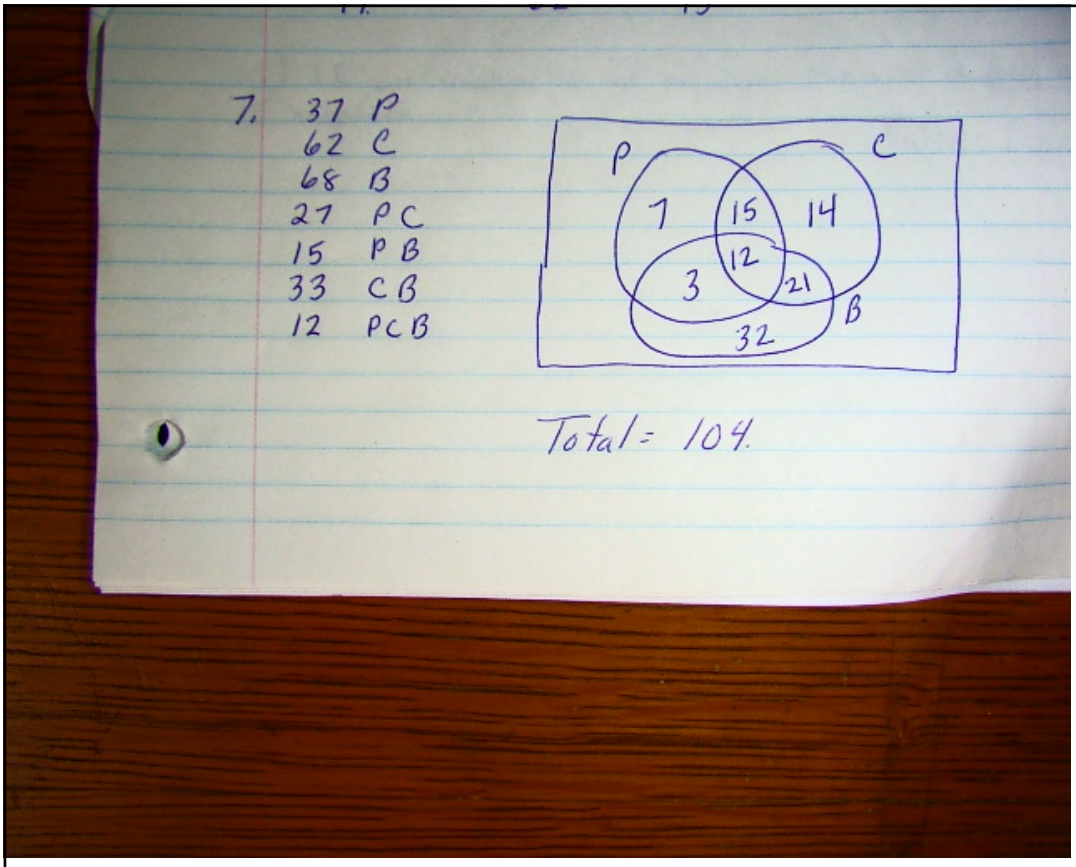


(15)

60 − 13 = 47

34 + 28 = 62

62 − 47 = 15


7. 37 P
62 C
68 B
27 PC
15 PB
33 CB
12 PCB
P
C
B
7
15
14
12
3
21
32
Total = 104.

8. a) True

b) If today is the summer solstice, then it is the longest day of the year.

c) It is the longest day of the year if and only if it is the summer solstice.

9.

a) False (zero)

b) If an integer is positive, then it is not negative

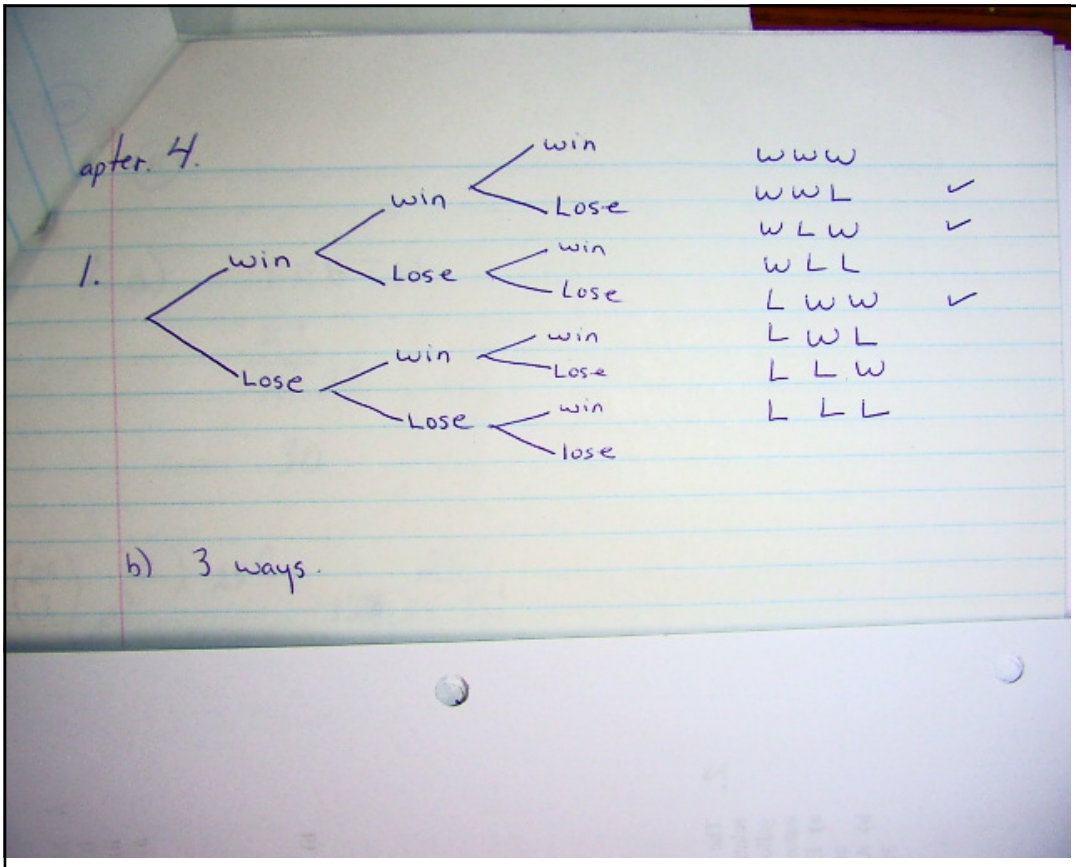
True

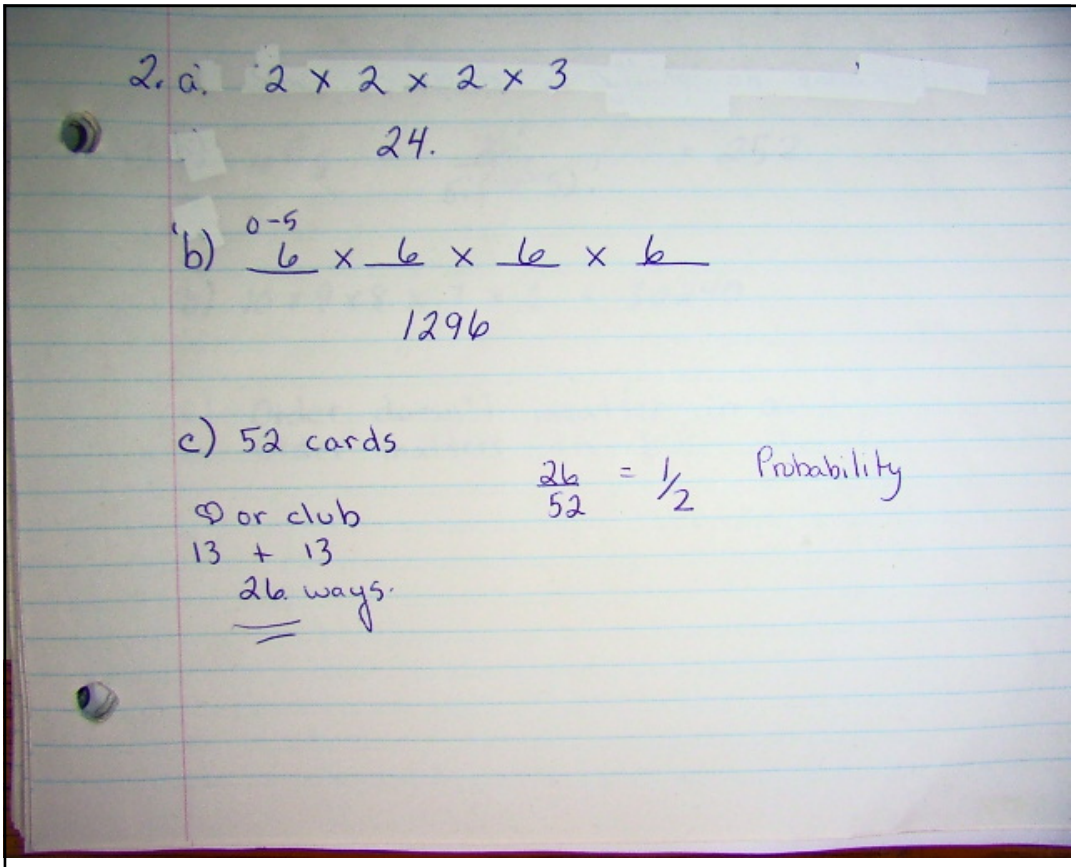
ii.) If an integer is not "not" negative, then it is not positive.

True

iii) If an integer is not positive then it is not "not" negative.

False (zero)


apter. 4.
1.
win
Lose
win
Lose
win
Lose
win
Lose
win
Lose
win
Lose
win
lose
WWW
WWL ✓
WLW ✓
WLL
LWW ✓
LWL
LLW
LLL
b) 3 ways.



2. a. $2 \times 2 \times 2 \times 3$

24.

b) $\underset{0-5}{6} \times 6 \times 6 \times 6$

1296

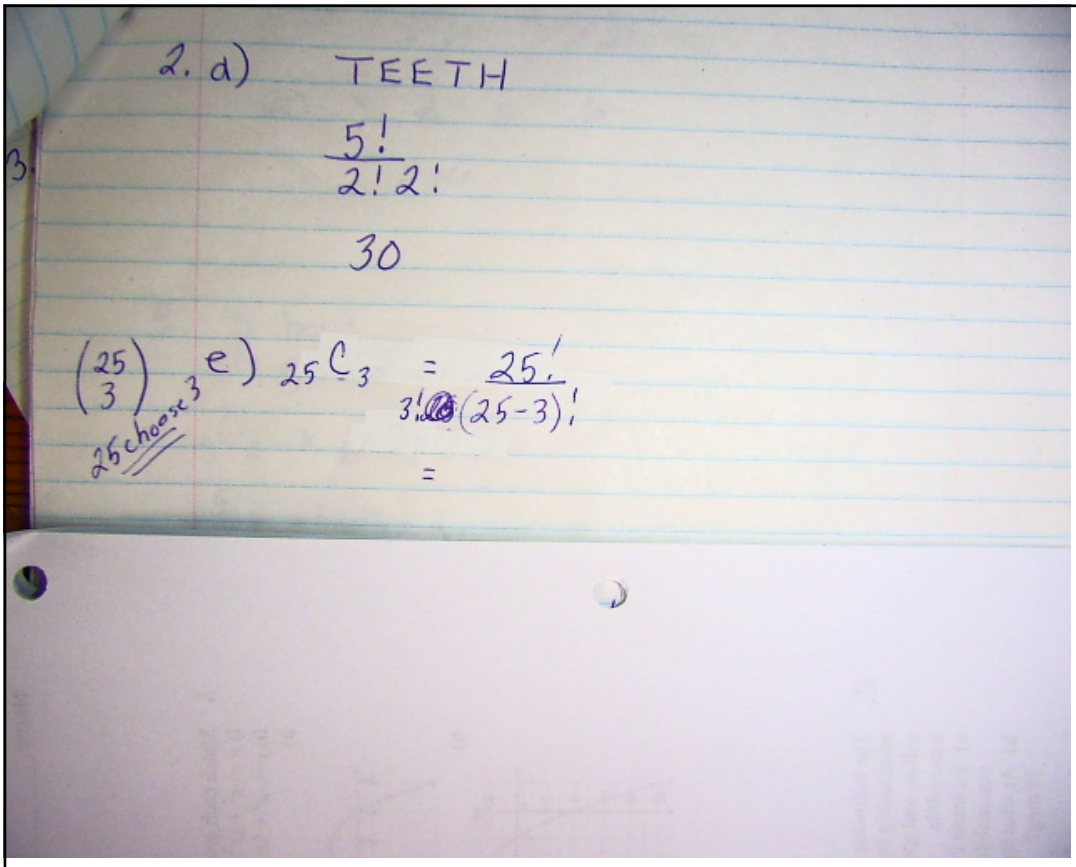
c) 52 cards

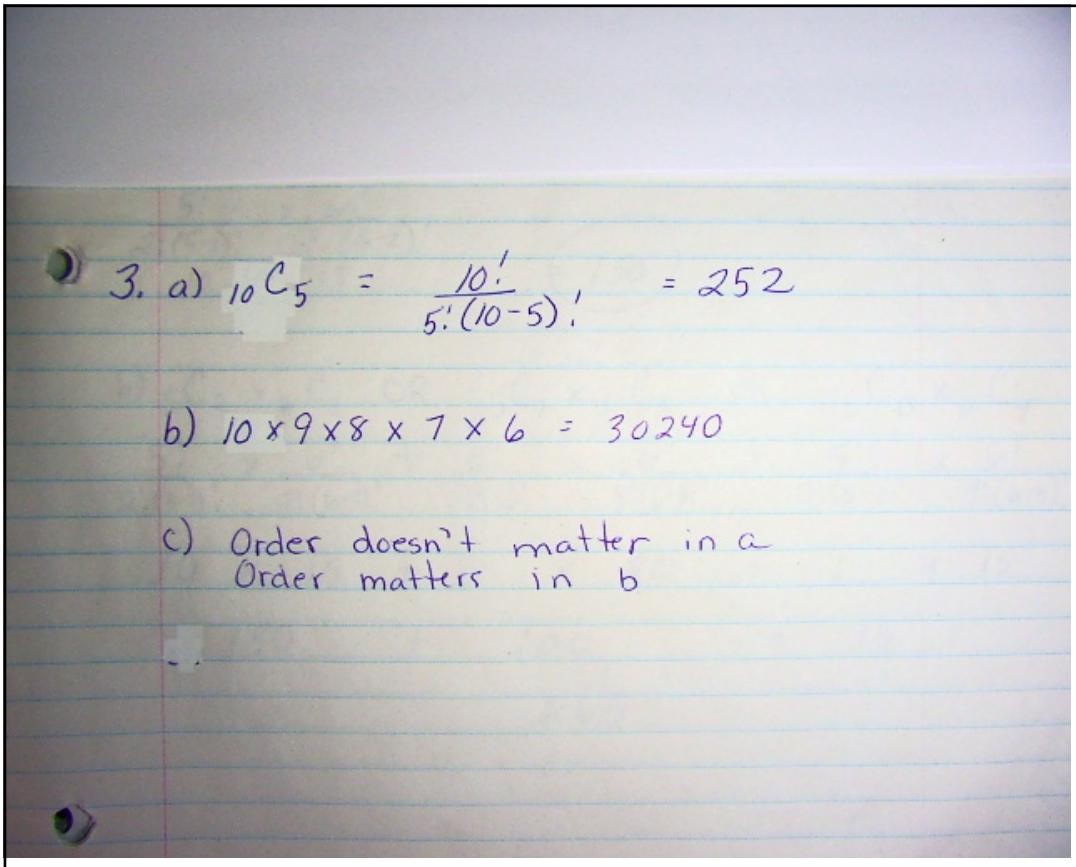
♥ or club

13 + 13

26 ways.

$\frac{26}{52} = \frac{1}{2}$ Probability


2. a) TEETH
5!
2!2!
30
3.
$\binom{25}{3}$
e) $_{25}C_3 = \frac{25!}{3!(25-3)!}$
25 choose 3
=



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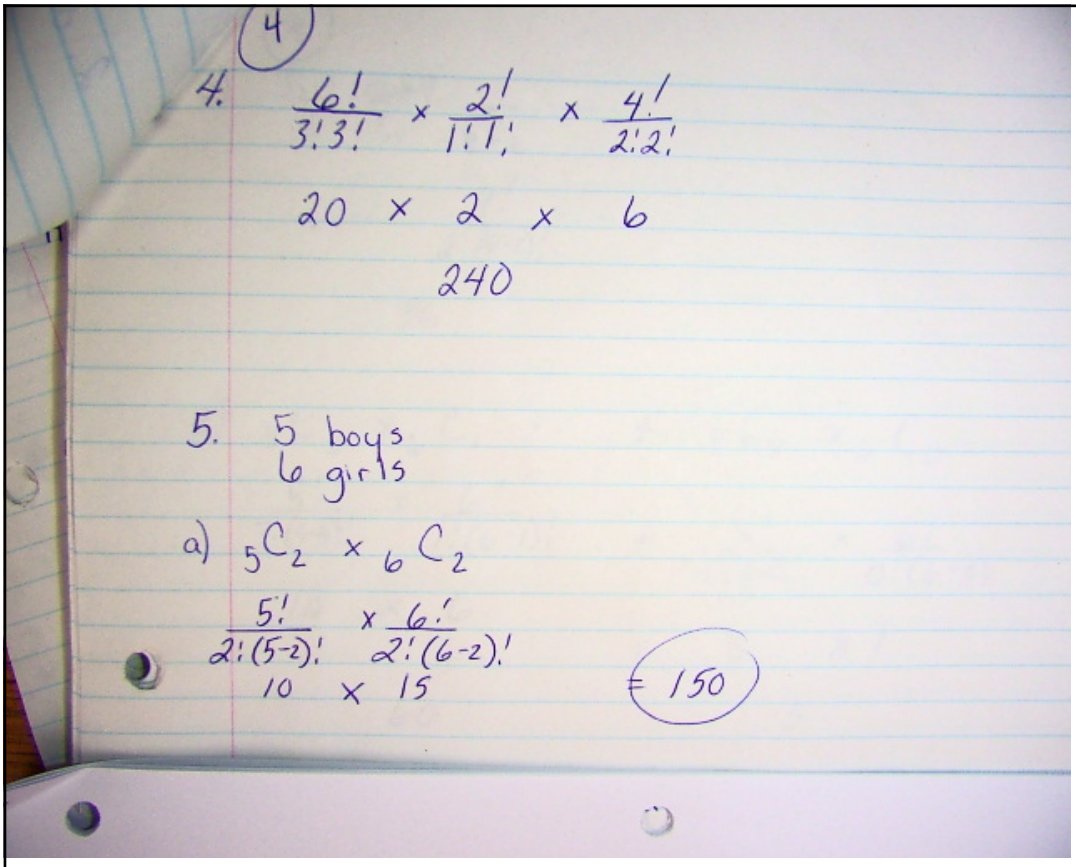
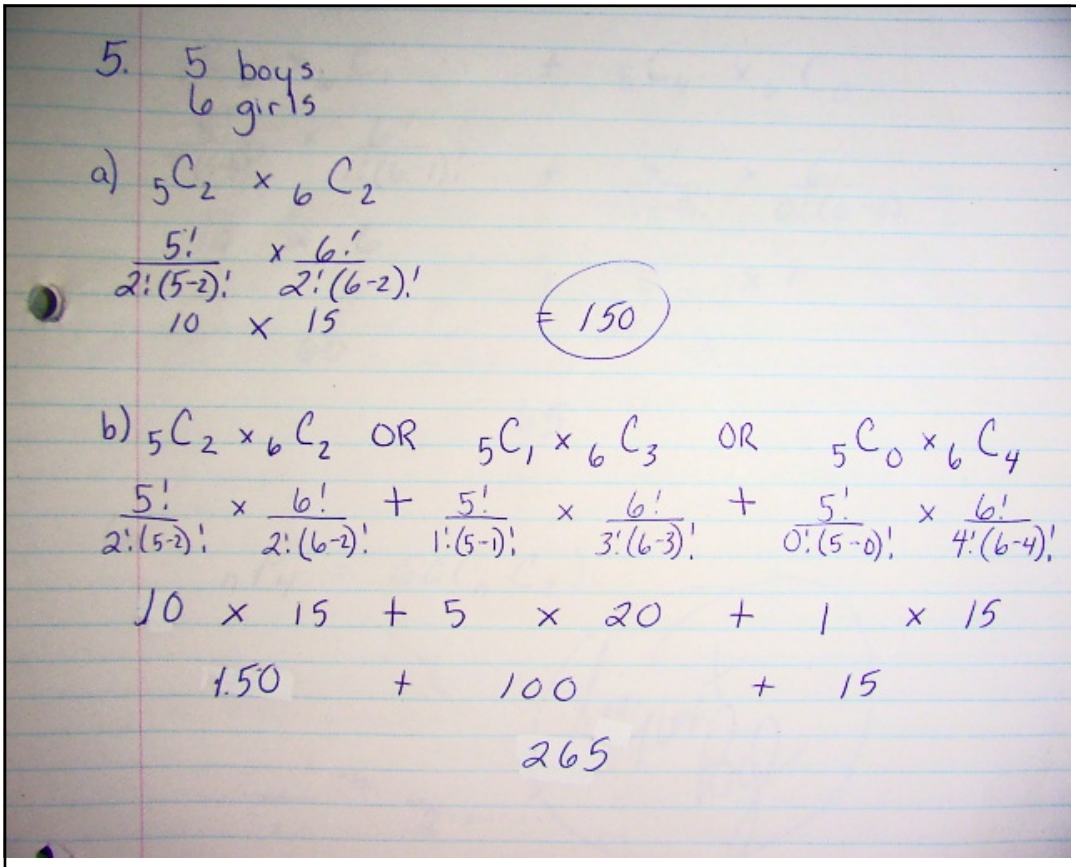

4
4. $\frac{6!}{3!3!} \times \frac{2!}{1!1!} \times \frac{4!}{2!2!}$
20 x 2 x 6
240
5. 5 boys
6 girls
a) ${}_5C_2 \times {}_6C_2$
$\frac{5!}{2!(5-2)!} \times \frac{6!}{2!(6-2)!}$
10 x 15
= 150



5. 5 boys
6 girls

a) ${}_5C_2 \times {}_6C_2$

$\frac{5!}{2!(5-2)!} \times \frac{6!}{2!(6-2)!}$

$10 \times 15 = 150$

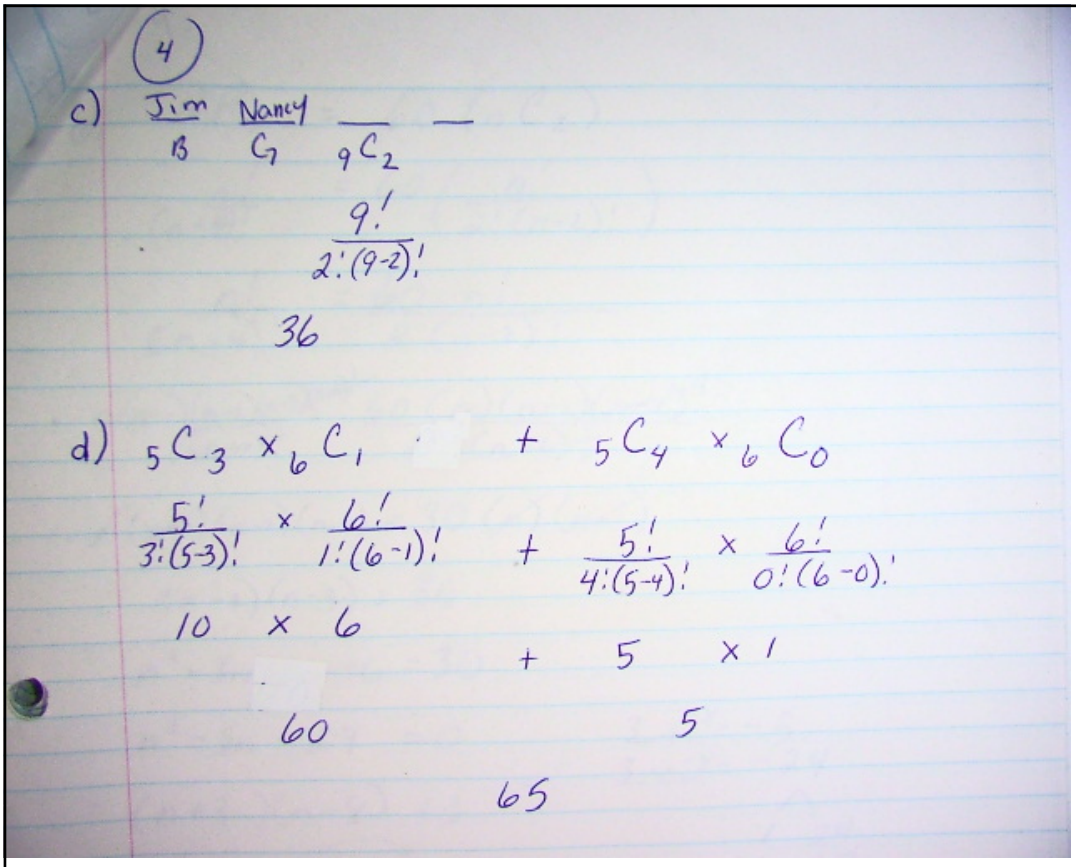
b) ${}_5C_2 \times {}_6C_2$ OR ${}_5C_1 \times {}_6C_3$ OR ${}_5C_0 \times {}_6C_4$

$\frac{5!}{2!(5-2)!} \times \frac{6!}{2!(6-2)!} + \frac{5!}{1!(5-1)!} \times \frac{6!}{3!(6-3)!} + \frac{5!}{0!(5-0)!} \times \frac{6!}{4!(6-4)!}$

$10 \times 15 + 5 \times 20 + 1 \times 15$

$150 + 100 + 15$

265



4

c) Jim (B) Nancy (G) $\_\_$ $\_\_$ $_9C_2$

$\frac{9!}{2!(9-2)!}$

36

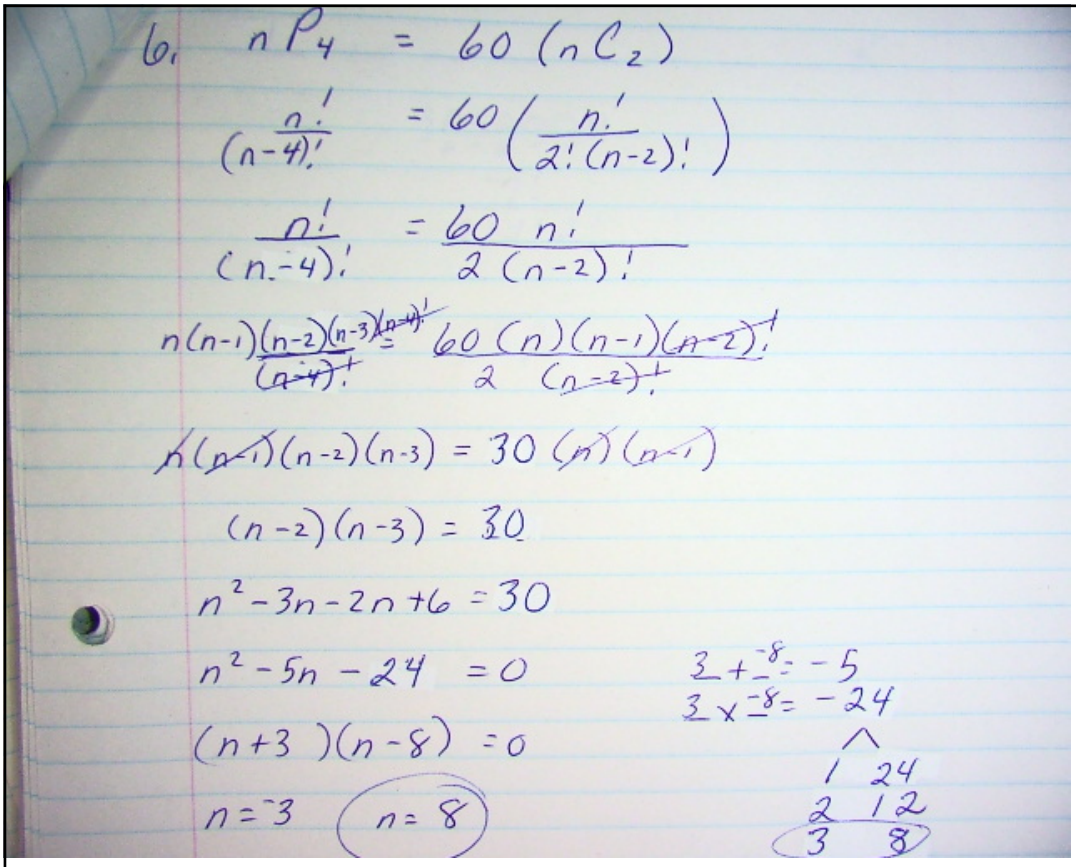
d) $_5C_3 \times {}_6C_1 + {}_5C_4 \times {}_6C_0$

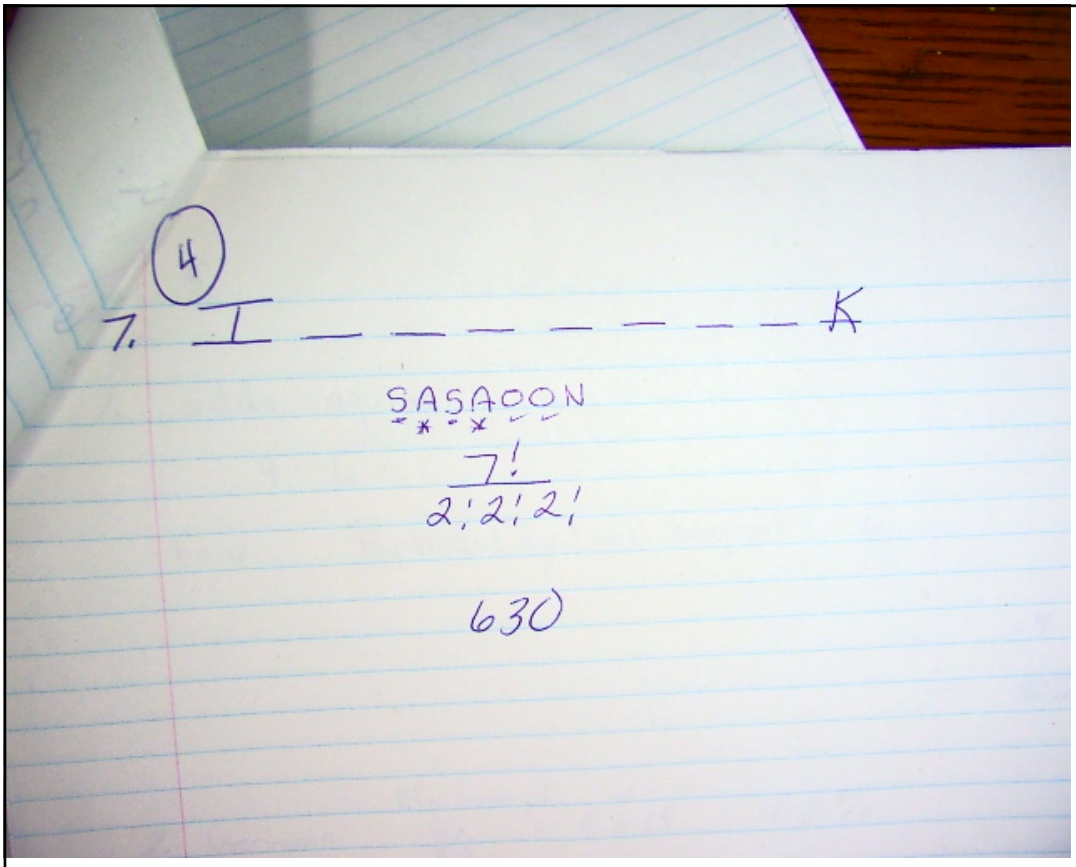
$\frac{5!}{3!(5-3)!} \times \frac{6!}{1!(6-1)!} + \frac{5!}{4!(5-4)!} \times \frac{6!}{0!(6-0)!}$

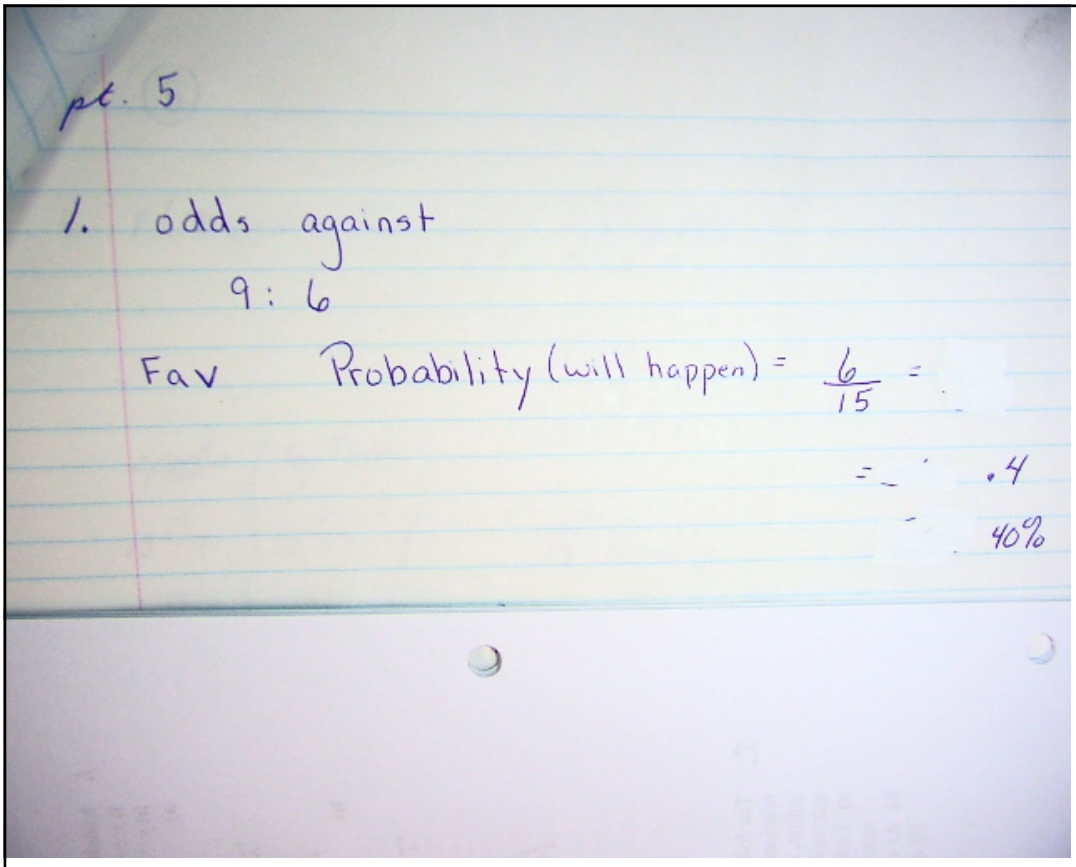
$10 \times 6 + 5 \times 1$

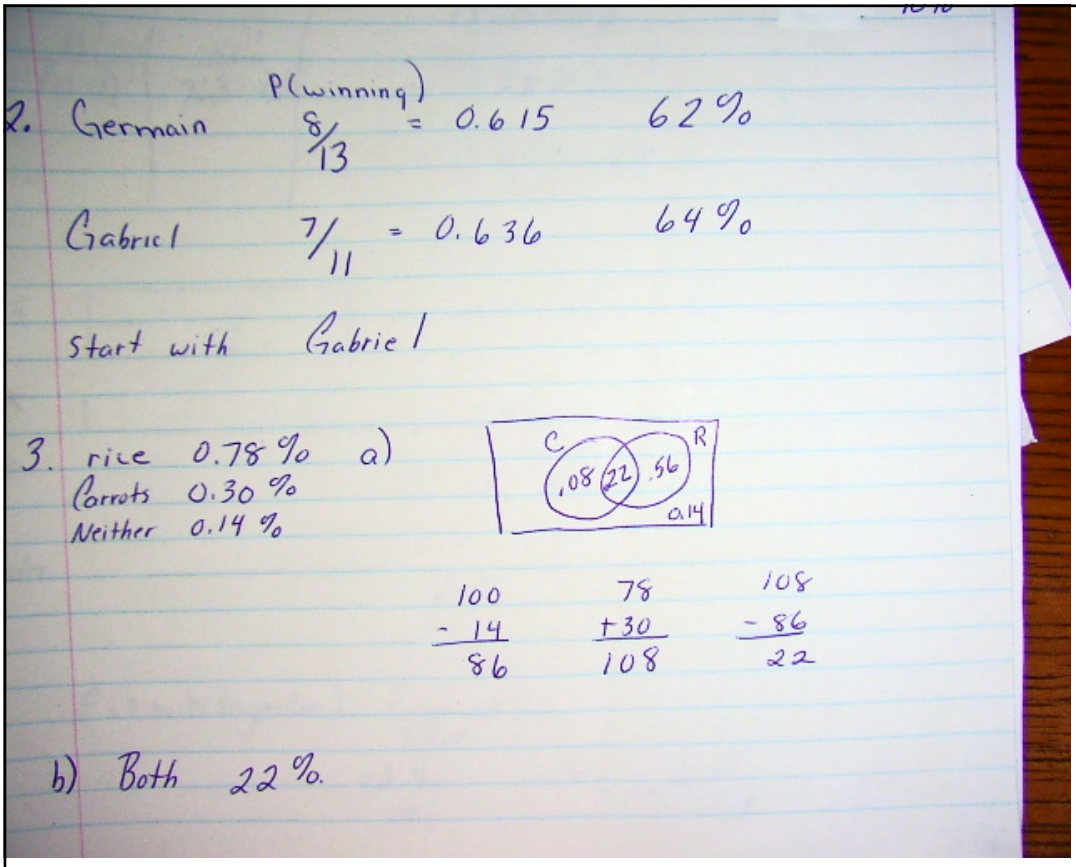
$60 + 5$

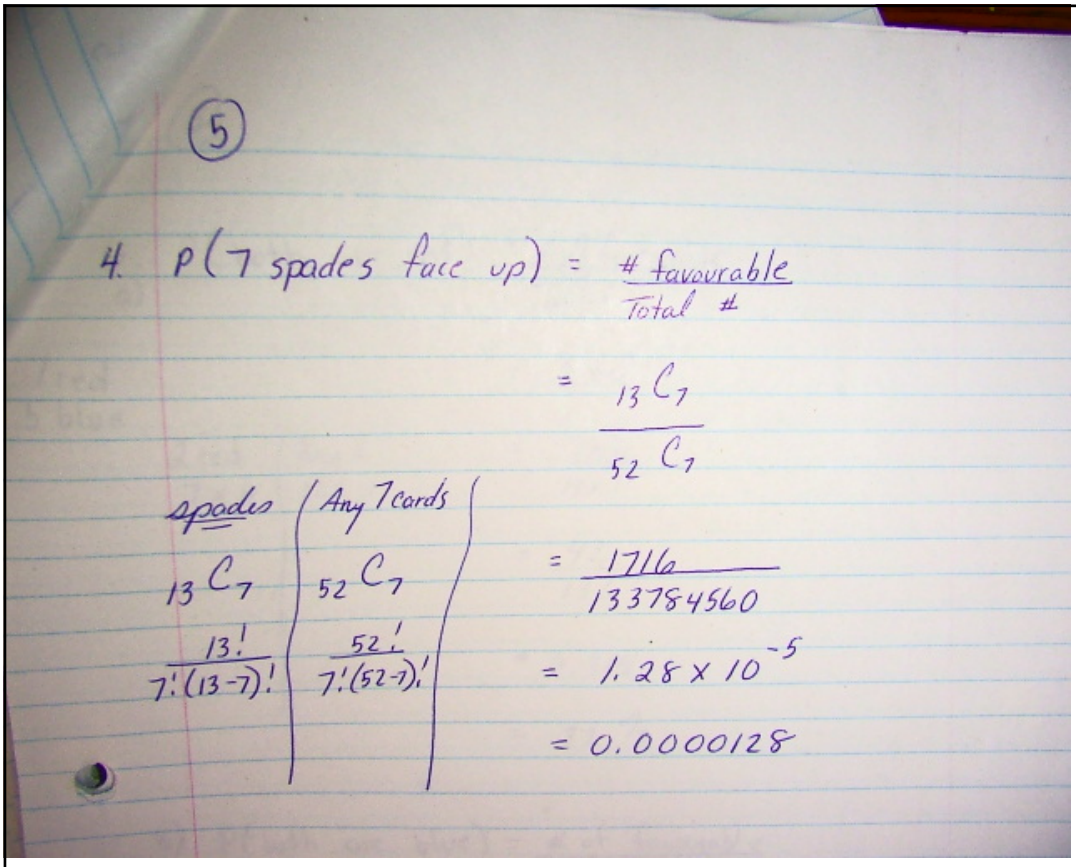
65


6. $_nP_4 = 60\,(_nC_2)$
$\frac{n!}{(n-4)!} = 60\left(\frac{n!}{2!(n-2)!}\right)$
$\frac{n!}{(n-4)!} = \frac{60\,n!}{2\,(n-2)!}$
$n(n-1)(n-2)(n-3) = 60\,(n)(n-1)$
$(n-2)(n-3) = 30$
$n^2 - 3n - 2n + 6 = 30$
$n^2 - 5n - 24 = 0$
$(n+3)(n-8) = 0$
$n = -3$ $n = 8$
$3 + -8 = -5$
$3 \times -8 = -24$
1 24
2 12
3 8


4
7. I K
SASKOON
7!
2!2!2!
630


pt. 5
1. odds against
9 : 6
Fav Probability (will happen) = 6/15 =
= .4
40%


2. Germain P(winning) 8/13 = 0.615 62%
Gabriel 7/11 = 0.636 64%
Start with Gabriel
3. rice 0.78%
Carrots 0.30%
Neither 0.14%
a)
C
R
.08
.22
.56
.14
100 - 14 = 86
78 + 30 = 108
108 - 86 = 22
b) Both 22%.



(5)

4. P(7 spades face up) = $\frac{\#\text{ favourable}}{\text{Total }\#}$

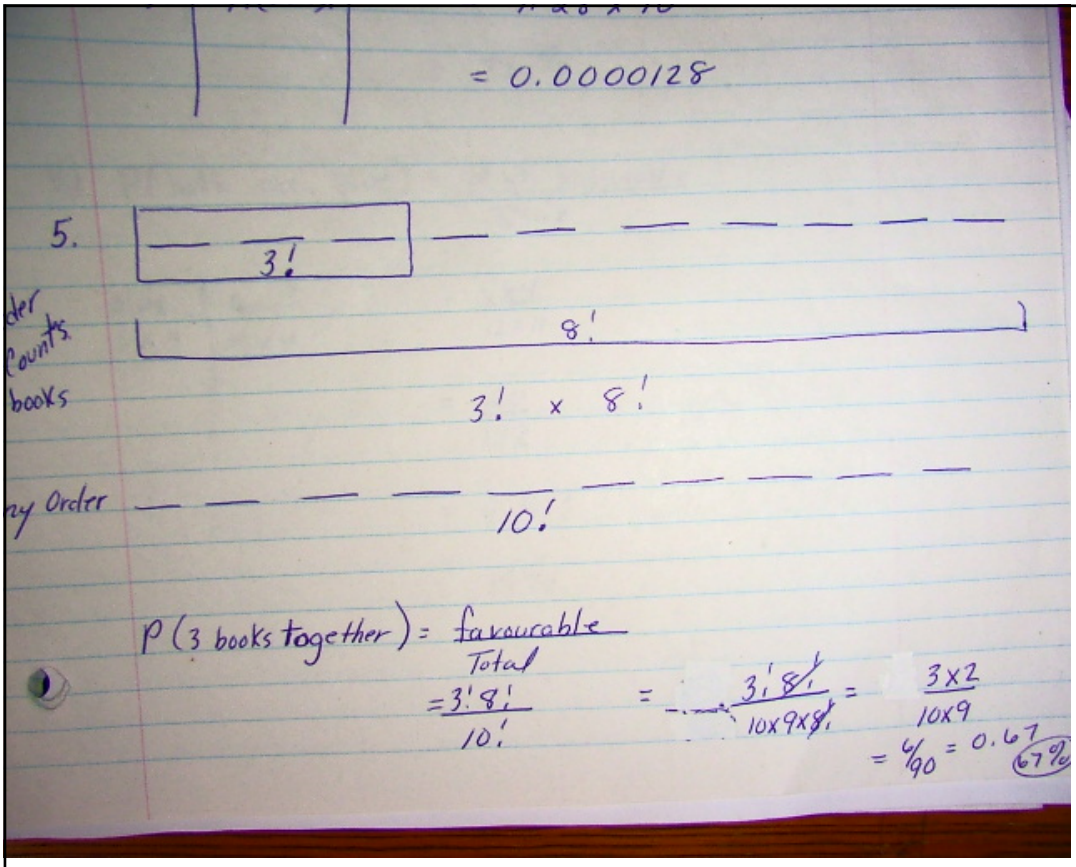
$= \frac{{}_{13}C_7}{{}_{52}C_7}$

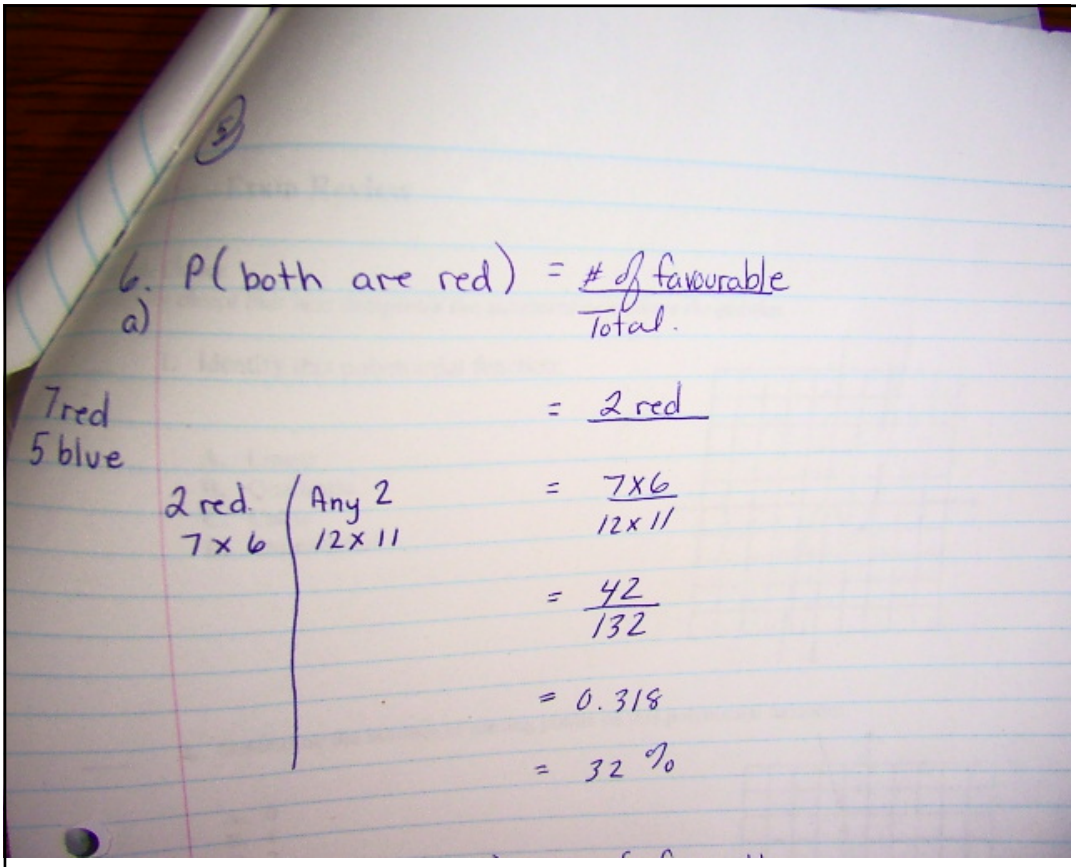
spades	Any 7 cards
${}_{13}C_7$	${}_{52}C_7$
$\frac{13!}{7!(13-7)!}$	$\frac{52!}{7!(52-7)!}$

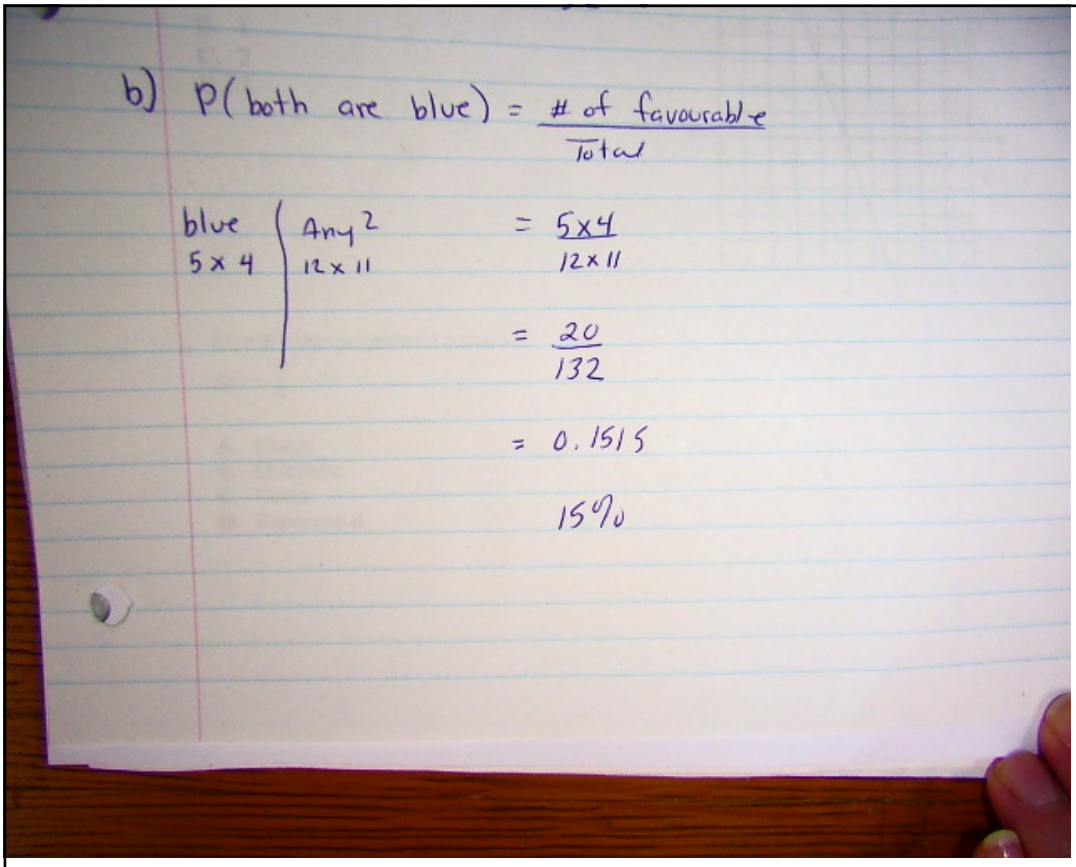
$= \frac{1716}{133784560}$

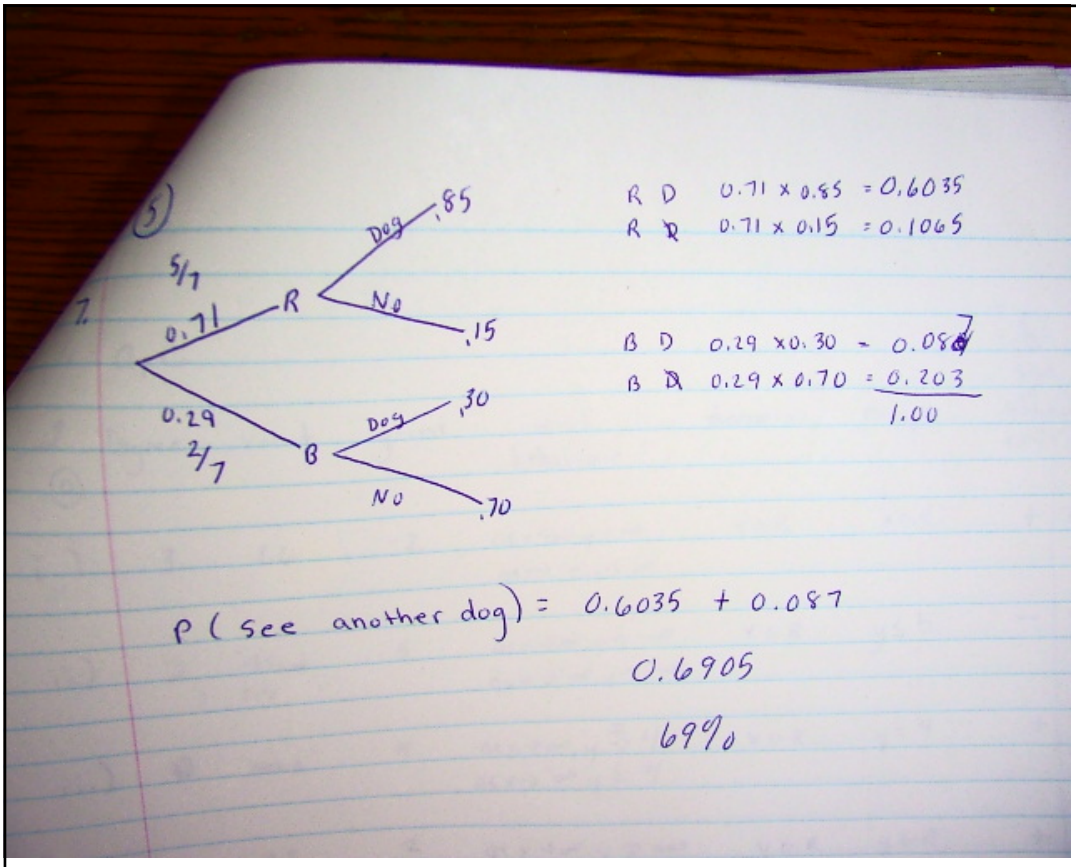
$= 1.28 \times 10^{-5}$

$= 0.0000128$


= 0.0000128
5.
3!
8!
3! x 8!
10!
P(3 books together) = favourable / Total
= 3!8! / 10!
= 3!8! / 10x9x8!
= 3x2 / 10x9
= 6/90 = 0.67
67%

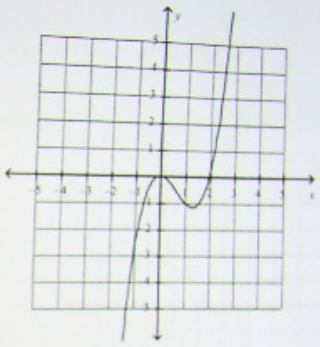

6. P(both are red) = # of favourable / Total.
a)
7 red
5 blue
2 red
7 x 6
Any 2
12 x 11
= 2 red
= 7x6 / 12x11
= 42 / 132
= 0.318
= 32 %


b) P(both are blue) = # of favourable / Total
blue 5 x 4
Any 2 12 x 11
= 5x4 / 12x11
= 20 / 132
= 0.1515
15%


5
5/7
0.71
R
Dog
.85
No
.15
0.29
2/7
B
Dog
.30
No
.70
R D 0.71 x 0.85 = 0.6035
R D 0.71 x 0.15 = 0.1065
B D 0.29 x 0.30 = 0.087
B D 0.29 x 0.70 = 0.203
1.00
P(see another dog) = 0.6035 + 0.087
0.6905
69%

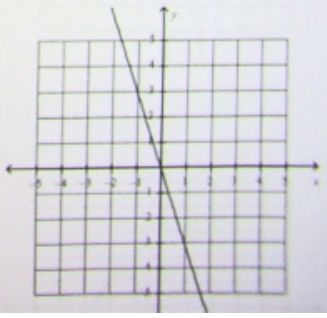
Multiple Choice
Identify the choice that best completes the statement or answers the question.

___ **1.** Identify this polynomial function:

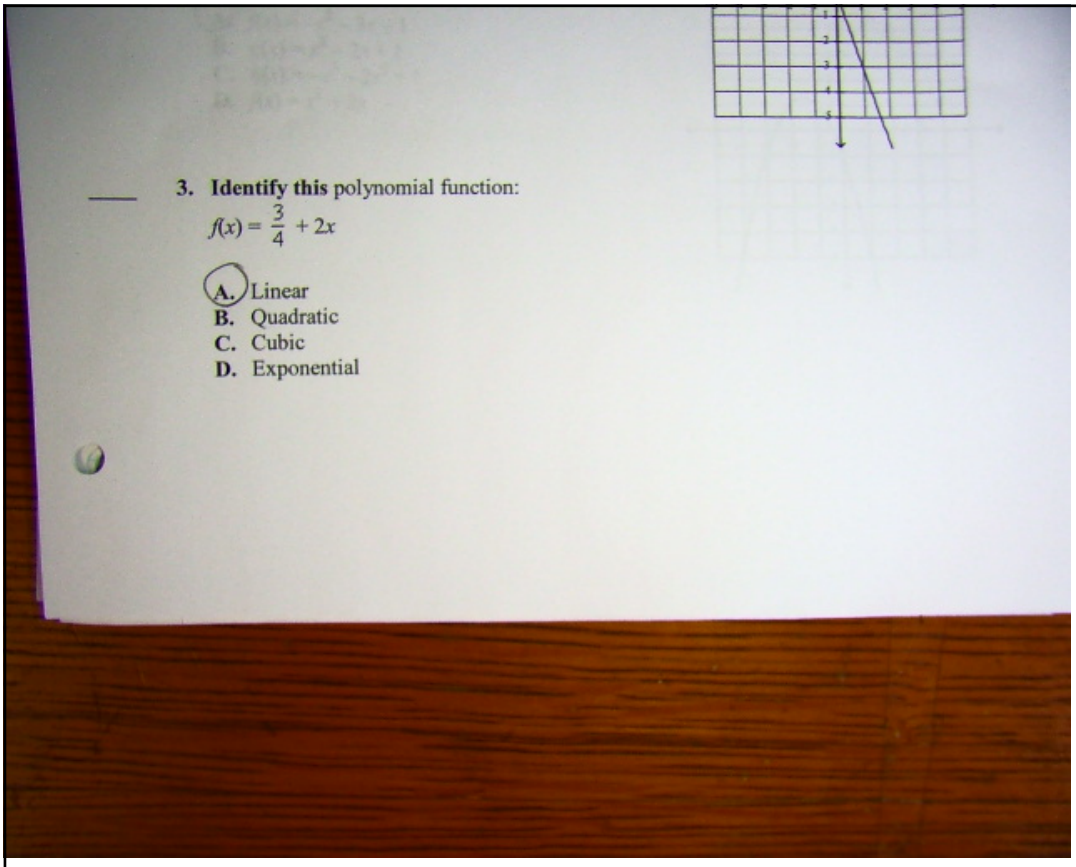


A. Linear
B. Quadratic
C. Cubic
D. Exponential

___ **2.** Determine the number of turning points on this polynomial function:



A. 0
B. 1
C. 2
D. 3



___ 3. **Identify this** polynomial function:

$f(x) = \frac{3}{4} + 2x$

A. Linear
B. Quadratic
C. Cubic
D. Exponential

Jan 13-2:19 PM

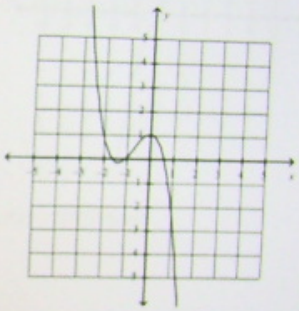
4. Identify this polynomial function:
$f(x) = 4x - 2^3 + x$

$= 4x - 8 + x$

$= 3x - 8$

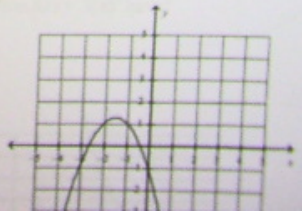
(A) Linear
B. Quadratic
C. Cubic
D. Exponential

___ 5. Determine the equation of this polynomial function:



A. $f(x) = -x^2 - 3x - 1$
B. $g(x) = x^2 - 2x + 1$
(C.) $h(x) = -x^3 - 2x^2 + 1$
D. $j(x) = x^3 + 2x$

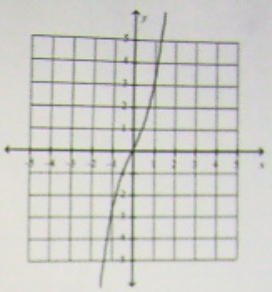
___ 6. Determine the equation of this polynomial function:



(A.) $f(x) = -x^2 - 3x - 1$
B. $g(x) = x^2 - 2x + 1$
C. $h(x) = -x^3 - 2x^2 + 1$
D. $j(x) = x^3 + 2x$

7. Fill in the blanks to describe the end behaviour of this polynomial function:
As x approaches positive infinity, y approaches _____.

A. 0
B. Infinity
C. -1
D. Negative Infinity



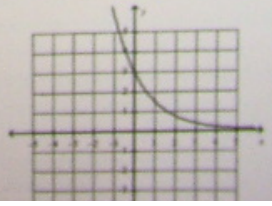
___ 8. How many x-intercepts does the exponential function $f(x) = 2(10)^x$ have?

A. 0
B. 1
C. 2
D. 3

___ 9. How many turning points does the exponential function $f(x) = 2(\pi)^x$ have?

A. 0
B. 1
C. 2
D. 3

___ 10. Match the following graph with its function.



A. $y = 3(0.5)^x$
B. $y = 2(1.25)^x$
C. $y = 0.5(3)^x$
D. $y = 2(0.75)^x$