Liverpool Medical Statistics Courses

Pre-course quiz

You should be able to answer all 10 questions confidently without using a computer

1) Round these numbers to 3 decimal places:
    a. 3.87465
    b. 2.1412331
    c. 0.417865
    d. 101.039997

2) Round these numbers to 4 significant figures
    a. 1047866
    b. 10.476834
    c. 39.937644

3) Write down these numbers in their simplest fractional form
    a. $\frac{2}{5} \times \frac{35}{38}$
    b. $\frac{4}{9} \div \frac{28}{7}$
    c. $\frac{1}{7} + \frac{5}{21}$

4) Calculate x in these equations rounded to 4 decimal places:
    a. $1 - e^{-5x}$=0.6
    b. $\log(25x) + 2 = 3.5$
    c. $10 - 3x^{-2}$=-2

5) For the functions below, evaluate f(0), f(1) and f(-1)

   a. $f(x) = \frac{1}{(1-x)^2}$ $\quad -3 < x < 3$

   b. $f(x) = x^3 + 3x^2 - 9x - 12$ $\quad 0 \leq x < \infty$

6) If $x_i = 2i$ and $y_i = 2 + i$ determine the following sums to no more than 4 decimal places

   a. $\sum_{i=1}^{4} x_i^2$

   b. $\left(\sum_{i=1}^{3} \frac{2}{x_i}\right)^2$

   c. $\sum_{i=1}^{3} x_i y_i$

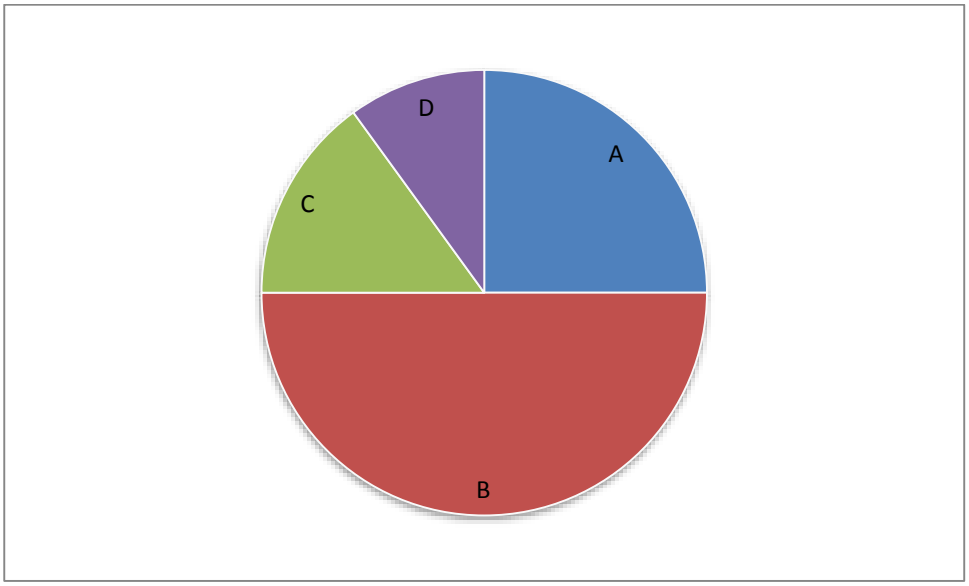
7) Calculate the mean, median and mode of x in the following samples :

   a. x={6,3,1,3,9,2,2,10,4,2}

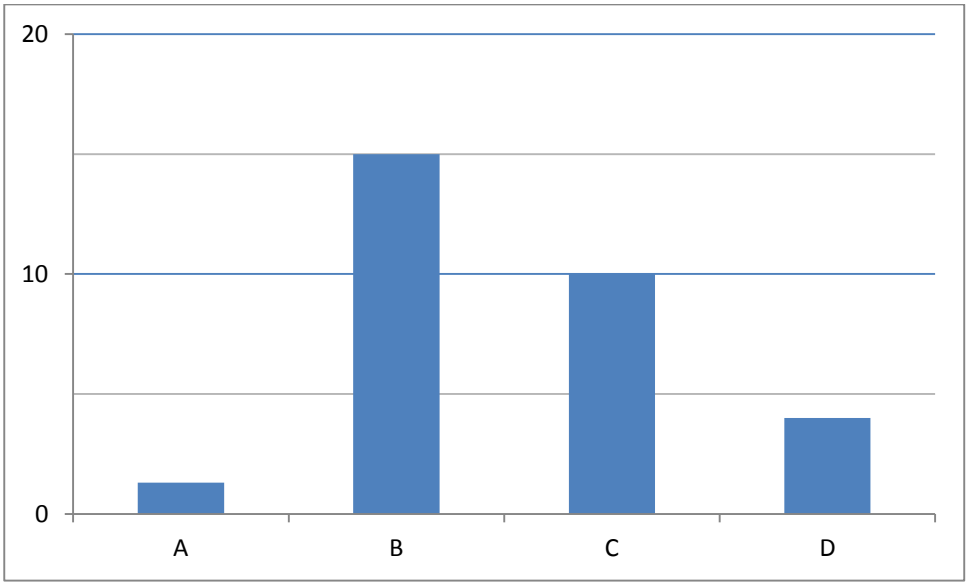
   b. x={0,2,1,3,1,3,2,1,0,2}

8) Calculate A/B to no more than 4 decimal places from the following charts:

a.

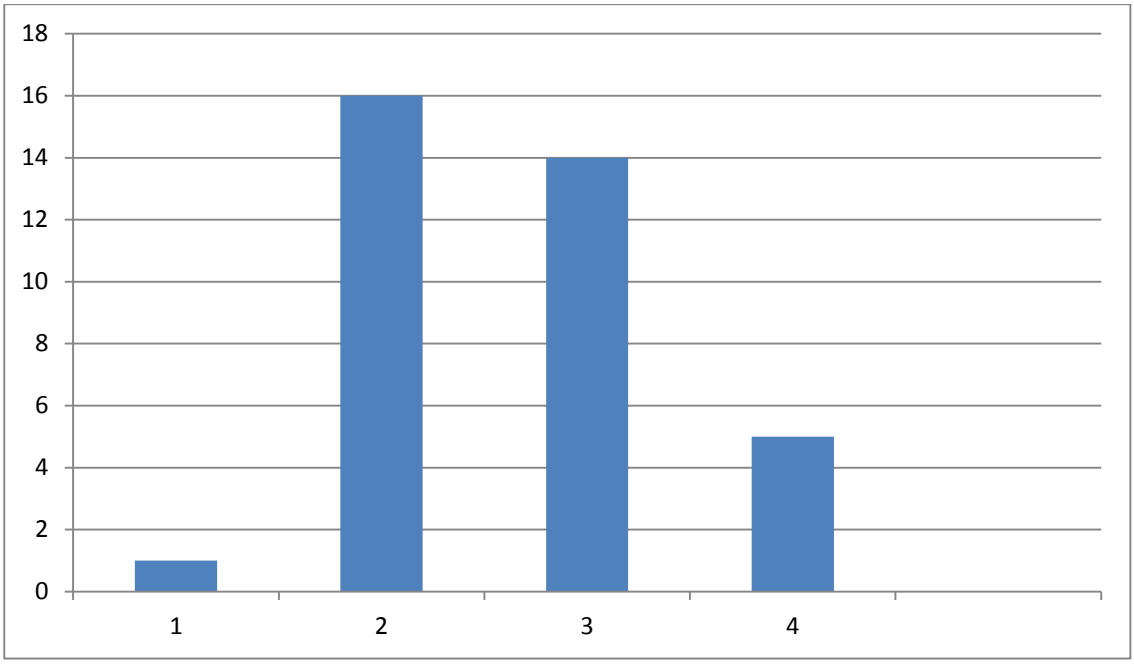


b.

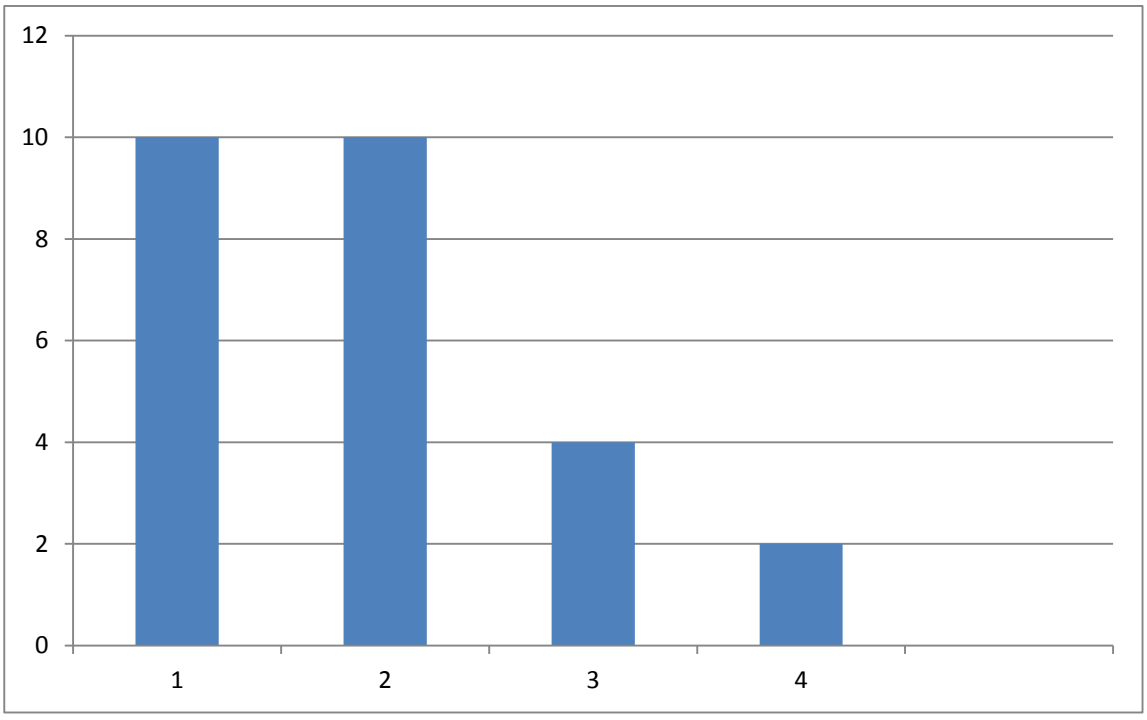


9) Calculate the probability of 1 to 3 decimal places from the following histograms

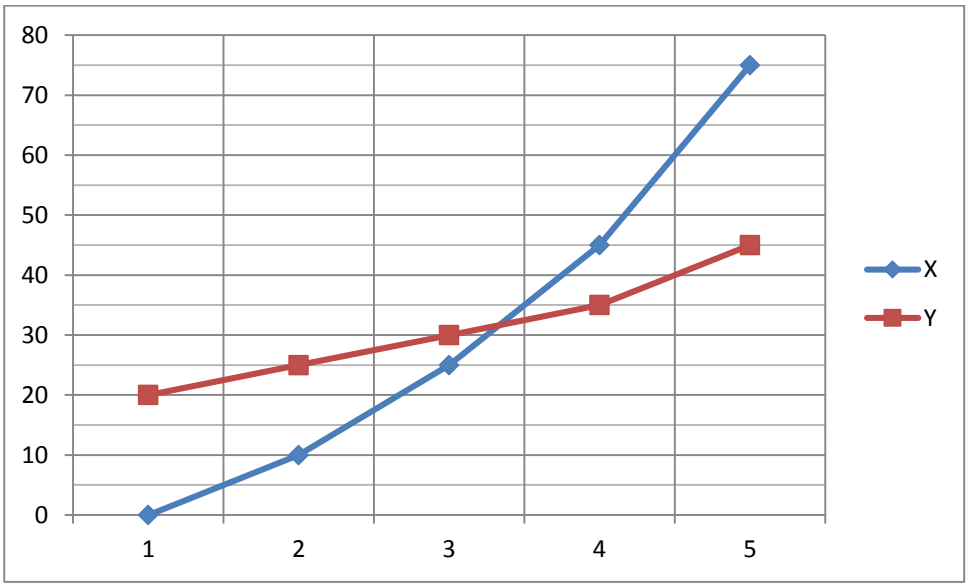
a.



b.



10) Calculate x_1/y_1, x_2/y_2, x_3/y_5 to no more than 2 decimal places from the graph below:



Liverpool Medical Statistics Courses

Pre-course quiz answers

1) Round these numbers to 3 decimal places:
   a. 3.87465 — 3.875
   b. 2.1412331 — 2.141
   c. 0.417865 — 0.418
   d. 101.039997 — 101.040

2) Round these numbers to 4 significant figures
   a. 1047866 — 1048000
   b. 10.476834 — 10.48
   c. 39.937644 — 39.94

3) Write down these numbers in their simplest fractional form
   a. $\frac{2}{5} \times \frac{35}{38}$ — $\frac{7}{19}$
   b. $\frac{4}{9} \div \frac{28}{7}$ — $\frac{1}{9}$
   c. $\frac{1}{7} + \frac{5}{21}$ — $\frac{8}{21}$

4) Calculate x in these equations rounded to 4 decimal places:
   a. $1 - e^{-5x}$=0.6

$$e^{-5x} = 0.4$$

$$e^{5x} = \frac{1}{0.4} = 2.5$$

$$5x = \log(2.5) = 0.91629$$

$$x = 0.1833$$

   b. $\log(25x) + 2 = 3.5$

$\log(25x) = 1.5$

$25x = e^{1.5} = 4.481689$

$x = \frac{4.481689}{25} = 0.1793$

c. $10 - 3x^{-2}$=-2

$\frac{3}{x^2} = 12$

$x^2 = \frac{3}{12} = \frac{1}{4}$

$x = 0.5000$

5) For the functions below, evaluate f(0), f(1) and f(-1)

a. $f(x) = \frac{1}{(1-x)^2}$ -3 < x < 3

$f(0) = 1$

$f(1) = \infty$

$f(-1) = \frac{1}{4}$

b. $f(x) = x^3 + 3x^2 - 9x - 12$ $0 \leq x < \infty$

$f(0) = -12$

$f(1) = -17$

$f(-1) = undefined$

6) If $x_i = 2i$ and $y_i = 2 + i$ determine the following sums to no more than 4 decimal places

a. $\sum_{i=1}^{4} x_i^2$

$2^2 + 4^2 + 6^2 + 8^2$ =4+16+36+64 = 120

b. $\left(\sum_{i=1}^{3} \frac{2}{x_i}\right)^2$

$$\left(\frac{2}{2}+\frac{2}{4}+\frac{2}{6}\right)^2 = \left(1+\frac{1}{2}+\frac{1}{3}\right)^2 = \left(\frac{11}{6}\right)^2 = 3.3611$$

c. $\sum_{i=1}^{3} x_i y_i$

$$(2 \times 3 + 4 \times 4 + 6 \times 5) = 52$$

7) Calculate the mean, median and mode of x in the following samples :

a. x={6,3,1,3,9,2,2,10,4,2}

mean(x) = $\frac{6+3+1+3+9+2+2+10+4+2}{10} = 4.2$

x={1,2,2,2,3,3,4,6,9,10} - ordered

median = 3

mode = 2

b. x={0,2,1,3,1,3,2,1,0,2}

mean(x) = $\frac{0+2+1+3+1+3+2+1+0+2}{10} = 1.5$

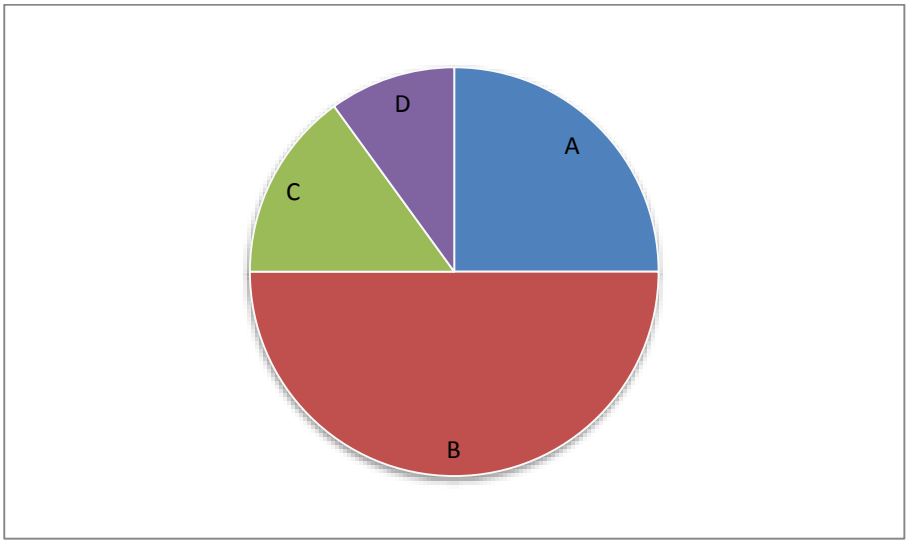
x={0,0,1,1,1,2,2,2,3,3} - ordered

median = 1.5

mode = 1 and 2 (bimodal)

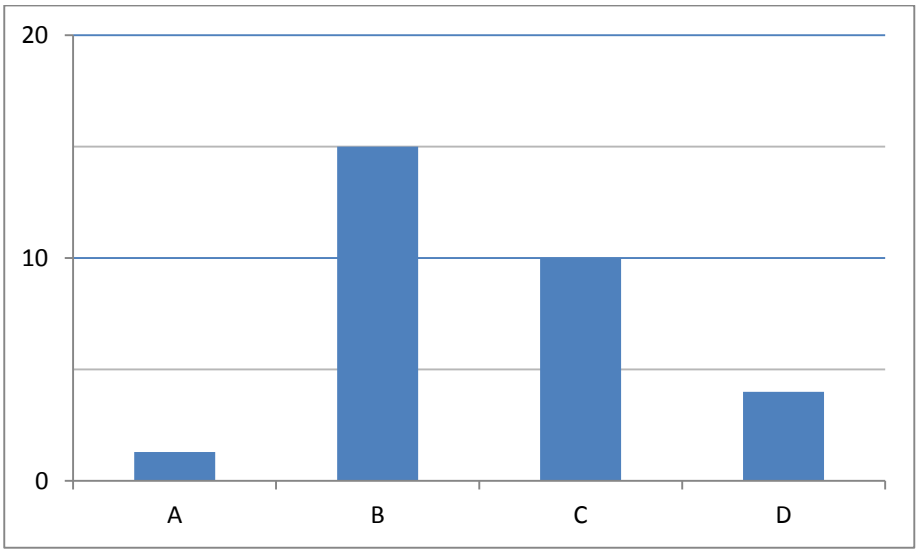
8) Calculate A/B to no more than 4 decimal places from the following charts:

a.



A/B = 0.25/0.5 = 0.5

b.

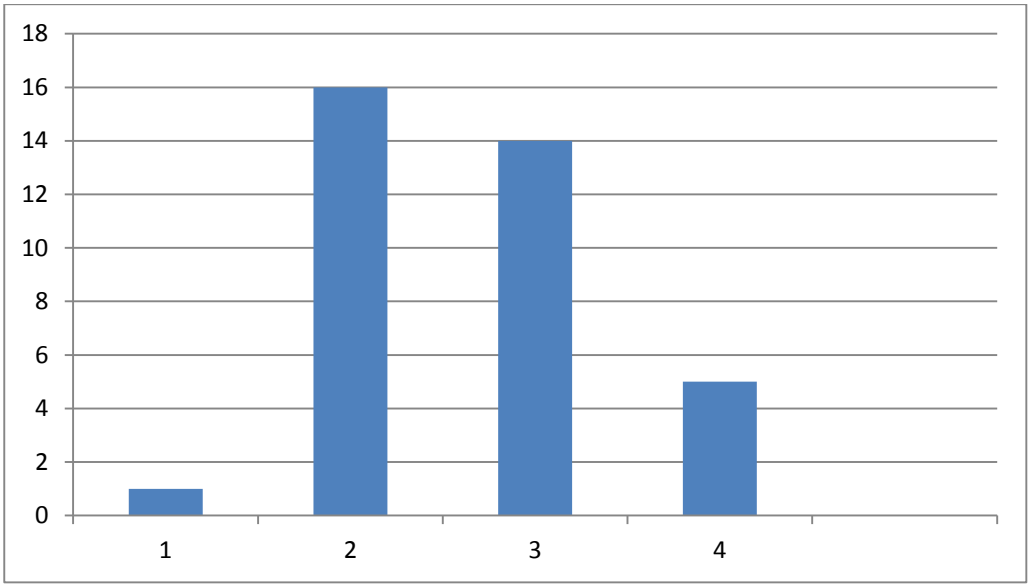


A is anything between 0 and 2.5 so:

A/B is between 0/15 and 2.5/15 or: between 0 and 0.1667

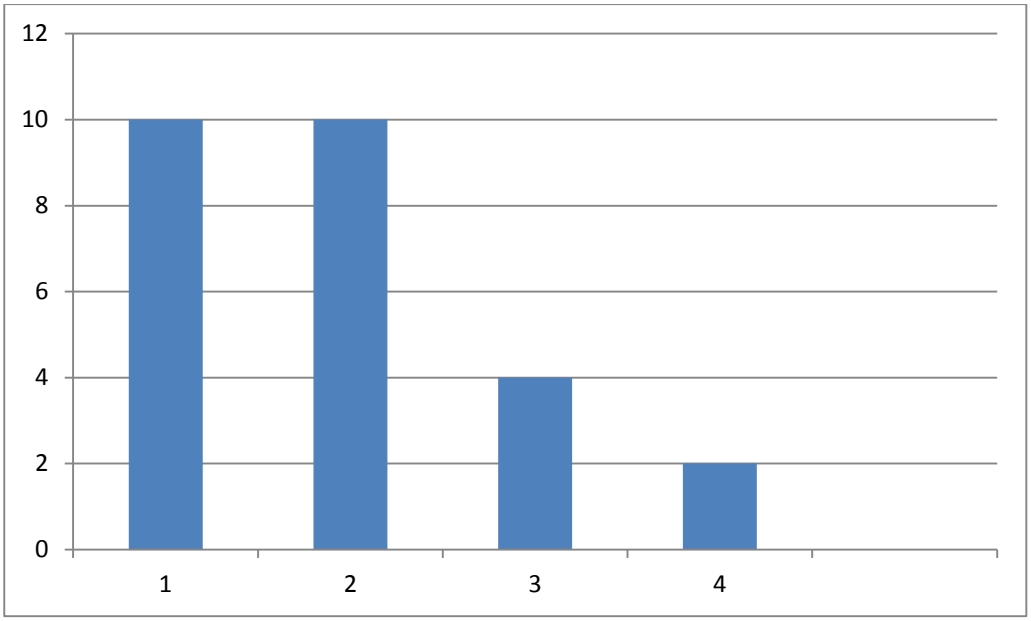
9) Calculate the probability of 1 to 3 decimal places from the following histograms

a.



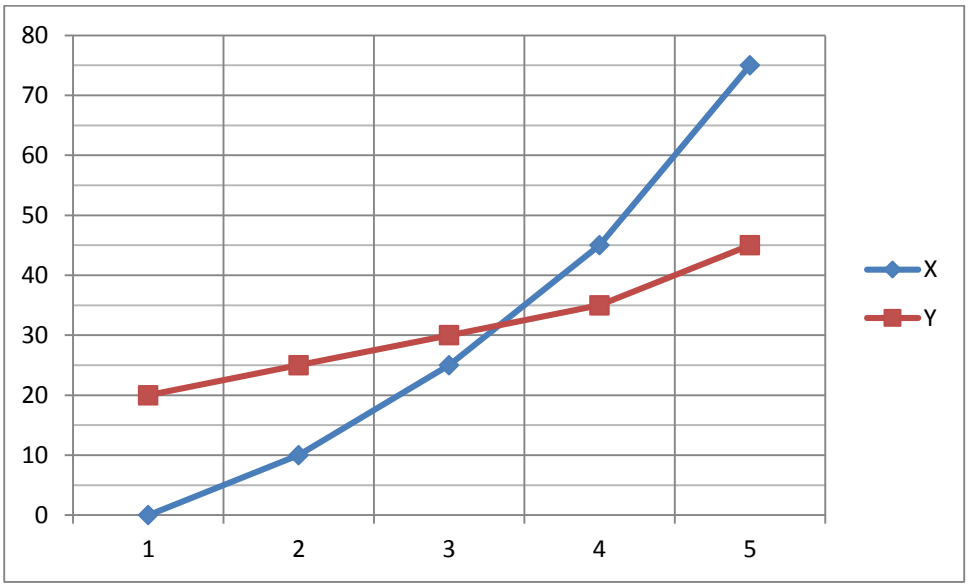
p(1) = 1/(1+16+14+5) = 1/36 = 0.028

b.



p(1) = 10/(10+10+4+2) = 10/26 = 0.385

10) Calculate x_1/y_1, x_2/y_2, x_3/y_5 to no more than 2 decimal places from the graph below:



$x_1/y_1 = 0/20 = 0$

$x_2/y_2 = 10/25 = 0.4$

$x_3/y_5 = 25/45 = 0.56$