INFORMATION FOR
THE MATH ASSESSMENT EXAM FOR MANAGEMENT

- Successful completion of this exam is required before registering for *MGT 140 Quantitative Decision Making*, unless a student has already taken and passed IQL101 or a qualified mathematics course.

- *YOU MAY ONLY TAKE THIS EXAM ONCE.*

- The exam is a six part assessment exam testing your knowledge and skills in the following areas:
  1) Fractions and Ratios
  2) Decimals
  3) Percents
  4) Order of Operations
  5) Solving Equations, Formulas, and Proportions
  6) Linear Functions

  Visit www.keene.edu/mathctr for additional information on these topics.

- Each part contains 10 multiple-choice questions, for a total of 60 questions.

- You will not be allowed to use a calculator while taking this exam.

- If you answer **at least 7 out of 10 questions correctly** (at least 70%) on **each of the six topics** listed above, **you have passed** the Math Assessment Exam and have completed the requirement.

- If you **score less than 70% on 3 or less of the topics**, you will need to **complete review work on these topics and then take a quiz on each topic**. Each quiz contains 10 questions and you must answer at least 7 questions correctly to pass. Once you pass all the quizzes you need to, you will have completed the requirement.

- If you **score less than 70% on 4 or more of the topics**, you will be **required to take and pass the one-credit mathematics course**, *Math 102 Math for Management*. Once you pass the one-credit course, you will have completed the requirement.

- Although there is no time limit, the exam usually takes about one hour.

- You will be notified of your results within two weeks of taking the exam via your ksc.mailcruiser.com email address.

- To schedule an appointment to take the exam or if you have any questions, please contact Allysha (Lisha) Hunter, Math Center Testing Coordinator, at Allysha.Hunter@keene.edu.

The following pages include **sample questions and solutions** to problems similar to those you will find on the assessment exam. It is in your best interest to do these problems before you take the exam. If you have questions, please see a peer tutor at the Math Center before you take the exam.

Sample Questions for the Math Assessment Exam for Management

1) Insert <, >, or = to form a true statement .

a) $\frac{3}{4}$ _____ $\frac{4}{5}$

b) 27.025 _____27.25

2) Add: $\frac{3}{8}+\frac{9}{32}$

3) Divide: $\frac{5}{12}\div\frac{7}{20}$

4) You earn $500 per month. Your rent is $\frac{1}{4}$ of your monthly income. How much is your rent?

5) A stock opened at $5\frac{3}{4}$ and went down $\frac{7}{8}$. What was the closing price?

6) Which is a better buy? A 12 ounce box of cereal for $2.89 or a 16 ounce box of cereal for $3.29?

7) In 2005, the ABC company made a profit of $5000. In 2010, the same company made a profit of $7000. What was the percent change from 2005 to 2010.

8) Simplify: 14.059 + 8.2 - 0.0263

9) Multiply: (33.4)(5.06)

10) Divide: $2.7\div 6.03$ (Round the answer to the nearest thousandth.)

11) Convert $\frac{5}{7}$ to a decimal rounded to the nearest thousandths.

12) Add: $0.48+\frac{2}{5}$

13) Simplify: $(0.8)^2$

14) Write $\frac{7}{20}$ as a percent.

15) Write 67% as a decimal.

16) Write 0.0479 as a percent.

17) Write 36% as a fraction in simplest terms.

18) Convert $4\frac{3}{4}\%$ to a decimal.

19) What is 30% of 75?

20) 40.5 is 45% of what number?

21) Simplify:

a) $9-5(1+3)^2$ b) $8(5+6\bullet 3)$ c) $12-7+18\div 3\bullet 2$

22) Using the order of operations, simplify the following expression. $\frac{1}{5}\left[42-\frac{(15)^2}{8}\right]$

23) Simplify: $7p+(1-p)(8)$

24) True or False: $4\bullet 8+7-2=4\bullet(8+7)-2$

25) Translate into a mathematical phrase: The difference of 14 and 9 divided by the product of 2 and 3.

26) Of the 36 students in the class, 19 are male and 17 are female. What is the ratio of female to male students?

27) A map has a scale of 2 cm to 5 miles. If 2 cities are 12 cm apart on the map, how many miles apart are they?

28) You spend $372 in 6 weeks on gasoline for your car. At that rate, how much would you spend for gasoline in 52 weeks?

29) Solve for x: 8x + 15 – 6x = 23

30) Solve for x: $450{,}000+8x=400{,}000+12x$

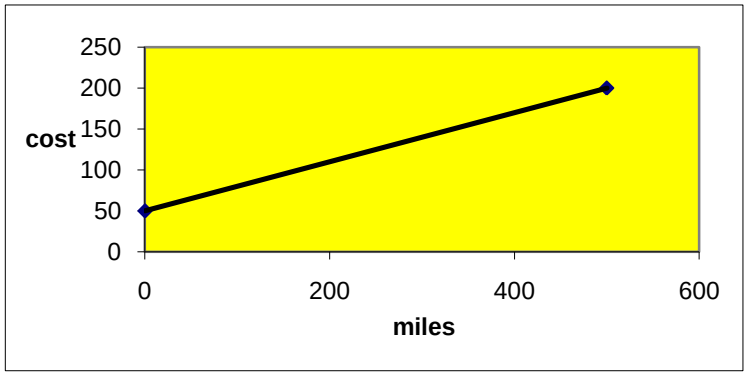
31) A company that makes pens makes a profit of $0.25 per box. How many boxes must be sold to have a profit of at least $100,000?

32) Given that $z=\frac{x-\mu}{\sigma}$, find z *when* $x=65,\ \mu=20$ *and* $\sigma=10$.

33) Is the point (-8,5) a solution to the equation $y=\frac{1}{2}x+9$?

34) A company makes calculators. Each week, the company makes and sells x calculators. The weekly cost C of making the x calculators is C = 14x + 350. The company sells each calculator for $16.50. The weekly revenue R from selling x calculators is R = 16.5x. The break- even point is that level of production where the revenue equals the cost. Find the break-even point.

35) The following graph represents the cost to rent a car.



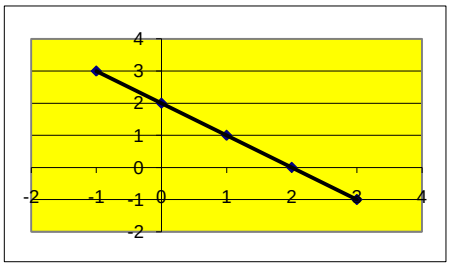
a) Is the slope of the graph positive or negative?

b) Approximate the cost to rent a car if you travel 400 miles.

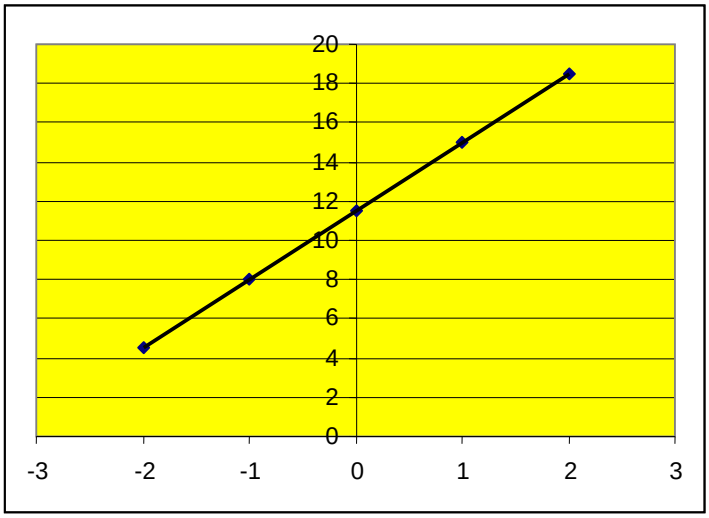
c) Does the equation ***Cost = 100 + 0.3 miles*** represent the graph?

36) What is the slope of the line that passes through the points (2, 4) and (-3, 5)?

37) Why couldn't **y = 2x - 2** be the equation of the following line? (The horizontal axis is x and the vertical axis is y.)



38) Calculate the slope of the given line.



ANSWERS

(Worked out solutions can be found below these answers.)

1) a) $\frac{3}{4} < \frac{4}{5}$ b) 27.025 < 27.25 2) $\frac{21}{32}$ 3) $\frac{25}{21} = 1\frac{4}{21}$

4) Your monthly rent is $125. 5) The closing price is $4\frac{7}{8}$.

6) The 16 ounce box of cereal is the better buy.

7) The percent change from 2005 to 2010 was 40%. 8) 22.2327

9) 169.004 10) 0.448 11) 0.714 12) 0.88

13) 0.64 14) 35% 15) 0.67 16) 4.79%

17) $\frac{9}{25}$ 18) 0.0475 19) 22.5 20) 90

21) a) -71 b) 184 c) 17 22) 2.775

23) -p + 8 24) false 25) $\frac{14-9}{2 \bullet 3}$ 26) 17: 19

27) The two cities are 30 miles apart. 28) $3224 would be spent on gasoline for 52 weeks.

29) x = 4 30) x = 12,500

31) The company must sell at least 400,000 boxes to make a profit of at least $100,000.

32) z = 4.5 33) (-8,5) is a solution to $y = \frac{1}{2}x + 9$.

34) The company will break-even when it has sold 140 calculators.

35) a) positive b) It will cost approximately $170 to travel 400 miles.
c) No, the equation ***Cost =100 + 0.3 miles*** does not represent the graph because the y-intercept of the graph is 50, but the equation states the y-intercept is 100.

36) m = $\frac{-1}{5}$

37) y = 2x – 2 cannot be the equation of the given line because the graph shows a negative slope, but the equation states the slope is 2. Also, the y-intercept on the graph is 2, whereas, the equation states the y-intercept is -2.

38) m = 3.5

SOLUTIONS

1)a) To compare the fractions, find a common denominator, write the equivalent fractions and then compare numerators.

$\frac{3}{4} = \frac{15}{20}$ and $\frac{4}{5} = \frac{16}{20}$ Thus, $\boxed{\frac{3}{4} < \frac{4}{5}}$.

Another way to compare the fractions would be to convert them to decimals and then compare.

$\frac{3}{4} = 3 \div 4 = 0.75$ and $\frac{4}{5} = 4 \div 5 = 0.8$ Thus, $\boxed{\frac{3}{4} < \frac{4}{5}}$.

1)b) To compare decimals, line up the decimal points and add zeroes so that both numbers have the same number of decimal places.

27.025
27.250

Since both whole numbers are 27, look at the decimal portions as whole numbers and compare them. 25 is less than 250 so $\boxed{27.025 < 27.25}$.

2) To add fractions, find a common denominator, write equivalent fractions, add the numerators, and then place the sum over the common denominator. Write answer in lowest terms.

$$\frac{3}{8} + \frac{9}{32} = \frac{12}{32} + \frac{9}{32} = \frac{12+9}{32} = \boxed{\frac{21}{32}}$$

3) To divide fractions, re-write the first fraction, change division to multiplication, and then write the reciprocal of the second fraction. Perform the resulting multiplication. Write answer in lowest terms.

$$\frac{5}{12} \div \frac{7}{20} = \frac{5}{12} \bullet \frac{20}{7} = \frac{100}{84} = \boxed{\frac{25}{21} = 1\frac{4}{21}}$$

4) To answer this question, you need to find out what $\frac{1}{4}$ of your monthly income is. To do that, you can either multiply 500 by $\frac{1}{4}$, or divide 500 by 4.

$\frac{1}{4} \bullet \frac{500}{1} = 125$ or $4\overline{)500}^{125}$

Therefore, your rent is $125.

5) To find the closing price, you need to subtract $\frac{7}{8}$ from $5\frac{3}{4}$.

$5\frac{3}{4} - \frac{7}{8} = 5\frac{6}{8} - \frac{7}{8}$

Since you cannot subtract $\frac{7}{8}$ from $\frac{6}{8}$, make $5\frac{6}{8}$ into an improper fraction and then subtract.

$\frac{46}{8} - \frac{7}{8} = \frac{39}{8} = 4\frac{7}{8}$.

Therefore, the closing price is $4\frac{7}{8}$.

6) To determine which cereal is the better buy, calculate the price per ounce of each cereal.

$\frac{\$2.89}{12\ oz} = \$0.24/oz$ $\frac{\$3.29}{16\ oz} = \$0.21/oz$

Therefore, the 16 ounce box of cereal is the better buy.

7) To determine the percent change, use the following formula.

$$percent\ change = (\frac{new - original}{original}) \times 100$$

$$(\frac{7000 - 5000}{5000}) \times 100 = (\frac{2000}{5000}) \times 100 = (0.4) \times 100 = 40\%$$

Therefore, the percent change from 2005 to 2010 was 40%.

8) To simplify 14.059 + 8.2 – 0.0263, first add 14.059 and 8.2. Remember to line up the decimal points.

$$\begin{array}{r} 14.059 \\ +\ 8.200 \\ \hline 22.259 \end{array}$$

Then, subtract 0.0263 from 22.259.

$$\begin{array}{r} 22.2590 \\ -\ 0.0263 \\ \hline \boxed{22.2327} \end{array}$$

9) To multiply decimals, multiply as if they are whole numbers, then count the number of decimal places in the factors and put that many in the answer.

$$\begin{array}{r} 33.4 \\ \times\ 5.06 \\ \hline 2004 \\ 000x \\ \underline{1670xx} \\ 169.004 \end{array}$$

Therefore, $\boxed{(33.4)(5.06) = 169.004}$

10) To divide 2.7 by 6.03, move both decimal points over two places to the right. (Recall that you need to make 6.03 a whole number before dividing, but if you change that decimal, you need to do the same to the other decimal.) Then you will be dividing 270 by 603.

$$\begin{array}{r} 0.4477 \\ 603\overline{)270.0000} \\ \underline{2412} \\ 2880 \\ \underline{2412} \\ 4680 \\ \underline{4221} \\ 4590 \\ \underline{4221} \end{array}$$

Since you are asked to round to the nearest thousandths, you need to carry out the division to the ten-thousandths place and use that digit to round to the thousandths.

Therefore, $\boxed{2.7 \div 6.03 = 0.448}$.

11) To convert a fraction to a decimal, divide the numerator by the denominator.

$\frac{5}{7} = 5 \div 7 = \boxed{0.714}$

$$\begin{array}{r} 0.7142 \\ 7\overline{)5.0000} \\ \underline{49} \\ 10 \\ \underline{7} \\ 30 \\ \underline{28} \\ 20 \\ \underline{14} \end{array}$$

12) To add a decimal and a fraction, either change both to fractions or both to decimals.

$0.48 + \frac{2}{5} = \frac{48}{100} + \frac{2}{5} = \frac{48}{100} + \frac{40}{100} = \frac{88}{100} = 0.88$ OR $0.48 + \frac{2}{5} = 0.48 + 0.4 = 0.88$

Therefore, $\boxed{0.48 + \frac{2}{5} = 0.88}$

13) To square a number, multiply the number by itself.

$(0.8)^2 = (0.8)(0.8) = \boxed{0.64}$

14) To write $\frac{7}{20}$ as a percent, divide 7 by 20 to get a decimal and then move the decimal point two places to the right to convert to a percent.

$$20\overline{)7.00}\quad 0.35$$

$$\underline{60}$$

$$100$$

$$\underline{100}$$

$$0$$

Thus, $\frac{7}{20} = 35\%$

Another way to write $\frac{7}{20}$ as a percent is to create a proportion $\frac{7}{20} = \frac{x}{100}$ since percent means "per hundred." Now solve for x: $20x = 700$

$x = 35.$

Thus, $\frac{7}{20} = 35\%$.

15) To write a percent as a decimal, move the decimal point 2 places to the left (divide by 100) and remove the percent sign.

$67\% = \boxed{0.67}$

16) To write a decimal as a percent, move the decimal point 2 places to the right (multiply by 100) and write the percent sign.

$0.0479 = \boxed{4.79\%}$

17) To write a percent as a fraction, remove the percent sign, and write the number over 100. Write in lowest terms.

$$36\% = \frac{36}{100} = \boxed{\frac{9}{25}}$$

18) To convert $4\frac{3}{4}\%$ to a decimal, first convert $\frac{3}{4}$ to a decimal and write $4\frac{3}{4}\%$ as 4.75%. Note that this value is now a decimal-percent, NOT a pure decimal. To make 4.75% a pure decimal, you need to move the decimal point two places to the left.

Thus, $\boxed{4.75\% = 0.0475}$.

19) To determine what 30% of 75 is, multiply 75 by 0.30 to get $\boxed{22.5}$.

20) There are two ways to answer this question – either translate the question into a mathematical equation or write a proportion.

40.5 is 45% of what number? OR 40.5 is 45% of what number?

$40.5 = 0.45 \times n$

$n = \dfrac{40.5}{0.45} = 90$

Therefore, 40.5 is 45% of 90.

$\dfrac{45}{100} = \dfrac{40.5}{n}$

$45n = (40.5)(100)$

$45n = 4050$

$n = \dfrac{4050}{45} = 90$

21) To simplify, use the order of operations.

i) Grouping
ii) Exponents
iii) Multiplication and Division from left to right as they appear in the problem
iv) Addition and Subtraction from left to right as they appear in the problem

a) $9 - 5(1+3)^2$

$9 - 5(4)^2$

$9 - 5(16)$

$9 - 80$

-71

b) $8(5 + 6 \bullet 3)$

$8(5 + 18)$

$8(23)$

184

c) $12 - 7 + 18 \div 3 \bullet 2$

$12 - 7 + 6 \bullet 2$

$12 - 7 + 12$

$5 + 12$

17

22) To simplify $\dfrac{1}{5}\left[42 - \dfrac{(15)^2}{8}\right]$, use the order of operations.

$\dfrac{1}{5}\left[42 - \dfrac{(15)^2}{8}\right] = \dfrac{1}{5}\left[42 - \dfrac{225}{8}\right]$ square 15

$= \dfrac{1}{5}[42 - 28.125]$ divide 225 by 8

$= \dfrac{1}{5}[13.875]$ subtract 28.125 from 42

$= 2.775$ divide 13.875 by 5

23) To simplify 7p + (1- p)(8), use the order of operations.

7p + (1- p)(8) = 7p + 8 – 8p distribute the 8

$= -p + 8$ combine 7p and –8p

24) To determine if $4 \bullet 8 + 7 - 2 = 4 \bullet (8 + 7) - 2$ is true or false, evaluate each side of the equation, using the order of operations.

$$4 \bullet 8 + 7 - 2 \overset{?}{=} 4 \bullet (8 + 7) - 2$$

$$32 + 7 - 2 \qquad 4 \bullet 15 - 2$$

$$39 - 2 \qquad 60 - 2$$

$$37 \neq 58$$

Since the left side does not equal the right side, the statement is **false** .

25) Recall that the sum is the answer to an addition problem, the difference is the answer to a subtraction problem, the product is the answer to a multiplication problem, and the quotient is the answer to a division problem.

Translating the difference of 14 and 9 divided by the product of 2 and 3, results in

$(14 - 9) \div (2 \bullet 3)$ OR $\dfrac{14 - 9}{2 \bullet 3}$

26) The ratio of female to male is 17:19.

27) To determine how many miles apart the two cities are, create a proportion and then solve.

$$\frac{2\ cm}{5\ miles} = \frac{12\ cm}{x\ miles}$$

$$2x = 60$$

$$x = 30$$

Therefore, the two cities are 30 miles apart.

28) To determine the amount of gasoline used, create a proportion and then solve.

$$\frac{\$372}{6\ weeks} = \frac{\$x}{52\ weeks}$$

$$6x = (372)(52)$$

$$6x = 19344$$

$$x = 3224$$

Therefore, $3224 would be spent on gasoline for 52 weeks.

29) To solve for x, first combine any like terms on either side of the equation, and then get all the variables on one side of the equation and all the numbers on the other side by performing the opposite operation of what is given.

$$8x + 15 - 6x = 23$$

$$2x + 15 = 23$$

$$2x = 8$$

$$x = 4$$

30) To solve for x, get all the variables on one side of the equation and all the numbers on the other side by performing the opposite operation of what is given.

$$450{,}000 + 8x = 400{,}000 + 12x$$
$$-8x \qquad\qquad -8x$$
$$450{,}000 = 400{,}000 + 4x$$
$$-400{,}000 \quad -400{,}000$$
$$50{,}000 = 4x$$
$$\boxed{x = 12{,}500}$$

31) To determine how many boxes must be sold to make a profit of at least \$100,000, write an inequality and then solve.

$0.25x \geq 100{,}000$ Use $\geq$ since at least 100,000 means 100,000 or more.

$x \geq 400{,}000$ Divide both sides by 0.25.

Therefore, the company must sell at least 400,000 boxes to make a profit of at least \$100,000.

32) To find z, substitute the values for $x, \mu, \text{and } \sigma$, and then simplify.

$$z = \frac{x - \mu}{\sigma} = \frac{65 - 20}{10} = \frac{45}{10} = \boxed{4.5}$$

33) To determine if (-8, 5) is a solution to $y = \frac{1}{2}x + 9$, substitute –8 for x and 5 for y.

$$y = \frac{1}{2}x + 9$$
$$5 = \frac{1}{2}(-8) + 9$$
$$5 = -4 + 9$$
$$5 = 5$$

Since the statement is true, (-8,5) is a solution to $y = \frac{1}{2}x + 9$.

34) To find the break-even point, set the cost equal to the revenue and solve for x.

$$14x + 350 = 16.5x$$
$$-14x \qquad -14x$$
$$350 = 2.5x$$
$$x = 140$$

Divide both sides by 2.5

Therefore, the company will break-even when it has sold 140 calculators.

35) a) The slope of the graph is positive because as x increases so does y.

b) Referring to the graph, it will cost approximately $\boxed{\$170}$ to travel 400 miles.

c) $\boxed{\text{No,}}$ the equation Cost =100 + 0.3 miles does not represent the graph because the y-intercept of the graph is 50, but the equation states the y-intercept is 100.

36) To determine the slope of the line passing through the points (2, 4) and (-3, 5), use the formula

$$slope = \frac{change\ in\ y}{change\ in\ x} = \frac{5-4}{-3-2} = \frac{1}{-5} = \boxed{\frac{-1}{5}}.$$

37) y = 2x – 2 cannot be the equation of the given line because the graph shows a negative slope, but the equation states the slope is 2. Also, the y-intercept on the graph is 2, whereas, the equation states the y-intercept is -2.

38) To calculate the slope of the given line, first determine two points on the line, for example, (-1, 8) and (1, 15). Next, calculate the slope.

$$slope = \frac{change\ in\ y}{change\ in\ x} = \frac{15-8}{1--1} = \frac{7}{2} = \boxed{3.5}$$