



GRE Quantitative GMAT

GRE / GMAT

数量能力测试
精解与题库

● 张万娟 陈一 / 编著

GRE

吉林大学出版社

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GRE/GMAT 常用数学符号

Symbbl(符号)	Meaning(含义)	汉译
$=$	is equal to	等于
$\neq$	is not equal to	不等于
$\approx$	is approximately equal to	约等于
$>$	is greater than	大于
$\geq$	is greater than or equal to	大于或等于
$<$	is less than	小于
$\leq$	is less than or equal to	小于或等于
$\sqrt{\quad}$	square root	平方根
$\cdot \overline{6}$	the repeating decimal . 666.....	小数循环
$\pm$	plus or minus	加减
$r^{\circ}s't''$	r degree s minutes t seconds	r 度 s 分 t 秒
$\angle$	angle	角
$\square$	right angle	直角
$\perp$	is perpendicular to	垂直于
$\triangle$	triangle	三角
$\sim$	is similar to	相似于
$\cong$	is congruent to	全等于
Δx	delta x	三角 x
$\widehat{ST}$	arc ST	弧 ST
π	Pi(3. 1415.....)	圆周率
$\parallel$	is parallel to	平行于

GRE/GMAT 常用数学术语

Addition 加法

plus 加

total 总数

Subtraction 减法

Subtract 减

difference 差

reduced 减低

Multiplication 乘法

multiply 乘

multiplier 乘数

product 积

common multiple 公倍数

Division 除法

divisor 除数

quotient 商数

common divisor 公约数

divided evenly 被整除

proportion 比例

Numbers 数

natural number 自然数

integer 整数

positive number 正数

even number 偶数

prime number 质数

factor 因数

irrational 无理数

average 平均数

geometric mean 几何平均值

reciprocal 倒数

square 平方数

cube 立方数

fraction 分数

improper fraction 假分数

denominator 分母

least common multiple 最小公倍数

decimal point 小数点

absolute value 绝对值

minimum 最小值

Geometry 几何

triangle 三角形

equilateral triangle 等边三角形

scalene triangle 不等边三角形

sum 和

increase 增加

minus 减

decreased 减少

have left 剩余

times 倍

multiple 倍数

total 总数

dividend 被除数

remainder 余数

divisible 可整除的

ratio 比例, 比

whole number 整数

Consecutive integer 连续整数

negative number 负数

odd number 奇数

prime factor 质因数

rational 有理数

medium 中间数

arithmetic mean 算术平均值

composite number 合成数

3-digit number 三位数

square root 平方根

power 次方

proper fraction 真分数

numerator 分子

least common denominator 分母最小公倍数

decimal 小数

algebra 代数

maximum 最大值

right triangle 直角三角形

isosceles triangle 等腰三角形

quadrilateral 四边形

parallelogram 平行四边形
 rectangle 长方形
 square 正方形
 regular polygon 正多边形
 hexagon 六边形
 decagon 十边形
 concentric Circle 同心圆
 cube 立方体
 cylinder 圆柱体
 cone 圆锥
 quadrihedron 三角锥
 hypotenuse 斜边
 base 底
 length 长
 perimeter 边长
 diameter 直径
 arc 弧
 inscribe 内切, 内接
 circumference 圆周长
 surface area 表面积
 vertex angle 顶角
 adjacent angle 邻角
 right angle 直角
 straight angle 平角
 interior angle 内角
 Complementary angles 余角
 intersect 相交
 angle bisector 角平分线
 mid point 中点
 parallel line 平行线
 number lines 数线
 arithmetic progression 等差级数
 permutation 排列
 abscissa 横座标
 coordinate 座标的

trapezoid 梯形
 rhombus 菱形
 polygon 多边形
 pentagon 五边形
 octagon 八边形
 circle 圆
 center 圆心
 rectangular prism 长方体
 sphere 球体
 pyramid 角锥
 arm, leg 直角 $\triangle$ 的股
 altitute, height 高
 side 边(长)
 width 宽
 radius 半径
 chord 弦
 radian 弧度
 circumscribe 外切, 外接
 area 面积
 volume 体积
 verticle angle 对顶角
 acute angle 锐角
 obtuse angle 钝角
 exterior angle 外角
 Supplementary angles 补角
 tangent 相切
 bisect 平分
 median of a triangle 三角形中线
 diagonal 对角线
 perpendicular lines 垂直线
 segment 线段
 geometric progression 等比级数
 combination 组合
 ordinate 纵座标
 quadrant 象限

GRE/GMAT 一般题型及应试技巧

本书集 GRE(研究生入学资格考试)和 GMAT(商管研究生入学考试)的数量部分于一体,包括 GRE 标准多项选择题、GRE 数量比较题、GMAT 标准多项选择题和 GMAT 数据充足判断题。由于我国 GRE 考生大大超过 GMAT 考生,所以本书以提供 GRE 全真试题为主,并突出真、新、全、详等特点,对 1988~1990 年的全真试题加以详解,同时提供 1991~1995 年的全真试题以供考生考前自测、增强信心、提高水平和应试能力之用。

考场须知

- 凭准考证与带照片和本人签字的身份证入场。
- 携带两、三支 B2 铅笔和上好的橡皮,考场不为考生备铅笔。
- 每部分(Section)考题都有固定时间限制。
- 不经监考、主考允许不得越区答题。
- 不准携带书本、格尺、滑尺或计算器入场。
- 不准携带草纸,计算或验算等均可在试题页空白处进行。
- 如果考试期间离开考场,所失时间不补。

考试成绩

约在试后四至六个星期左右,考生可接到成绩单, GRE 试者将接到“语文能力测试成绩单”、“数量能力测试成绩单”和“分析能力测试成绩单”。GMAT 试者将接到“语文能力测试成绩单”、“数量能力测试成绩单”和“总成绩表”。此成绩并非按百分制计算,而是根据分组等级制计算。

接到成绩单后,考生可以申请索要一套试题、自己的答题纸、答案和评分标准。此项服务于 1980 年依“考试实情”法而设。

参试须知(以下各条适于美国、加拿大一切标准考试):

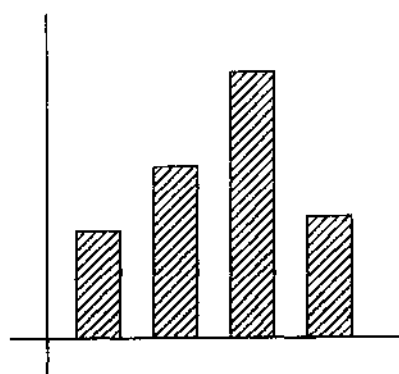
1. 考试前夜必须睡得好,“临阵磨枪”必适得其反。
2. 考试前必须吃一顿丰盛的早餐。GRE 和 GMAT 需 3-4 小时,“肚里无食心必慌”。
3. 考前应熟悉考场、座位及周围环境。
4. 事先熟悉考题类型、格式、题量和时间等。ETS(教育考试中心)将为考生提供小册子。
5. 考试期间应首先快而准地读 Directions,以确知面前的考题与你所准备的相一致。
6. 考试时做到快速、准确、不马虎。GRE 和 GMAT 每道题的分值相等,所以不必在某一题上耽搁时间。
7. 先答简单易答的题,然后如有时间再答难题。
8. 碰到难题不气馁。一般情况下,大多数考生只能答完全部试题的 3/4。
9. GRE 考生即使在时间不够的情况下也应靠猜测(guessing)答完每一道题,因为答错不扣分;GMAT 考生则不能胡乱猜测,每答对一题得一分,空题未答不得分,而答错一题则扣 1/4 分。即是说,如果对问题一无所知,那就万万不要猜测。
10. 切记把答案填在准确的位置,弄准题号,保持答题纸清洁、清楚;如有改涂,必先擦拭干净。

标准多项选择数学题

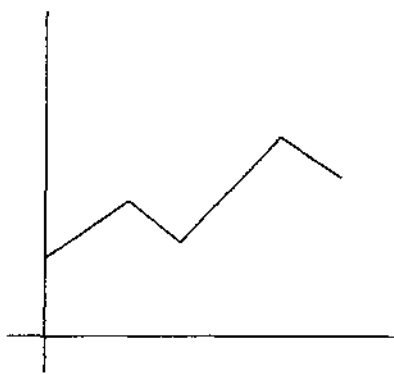
此类题型为美国高中数学课内容,包括算术(arithmetic)、代数(algebra)和几何(geometry),普遍见于 GRE 和 GMAT。

1. 仔细审题;弄清已知、未知和必须满足的关系和条件。
2. 必要时根据已知条件作图式,这在解几何问题时尤其有效。
3. 辨别以前是否做过类似题。
4. 多项选择中也常常含有提示或暗示解题方法。
5. 写下有关的计算公式。
6. 用字母代表未知数,把所给条件用符号形式表示出来。
7. 不必浪费时间做不必要的计算,尽可能估算。
8. 由于考生只能用考题册上的空白作草纸,所以不要浪费有限的空间。
9. 如在一、两分钟内尚不能解答,那最好做下一道题,待时间允许再回头解答。
10. 答案必须写在所给的一组选择内。
11. 约简分数简化平方根。在关于圆的问题中,要弄清答案是否以 π 的形式出现,或是否要求代入 3.14 或 $\frac{22}{7}$ 等数的值。
12. 即使你的答案与所给选择不相符合,也可能是正确的,这要看你是否以不同形式写出答案。如 $ab+ac$ 可以改写成 $a(b+c)$ 。

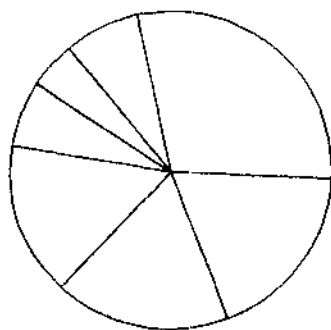
在这部分问题中,基于数据的问题往往以表格和图表的形式出现。最常见的图表(graphs)有条式图表(Bar Graph)、线式图表(Line Graph)和圆式图表(Circle Graph);



Bar Graph



Line Graph



Circle Graph

条式图表:用于比较不同的量,或不同时间的相同量。量值由条的高度来决定。

线式图表:用来表明两个不同量的相互变化或一个量在不同时间的变化。在后种情况下,线斜上表示量的增加,线斜下表示量的减少,线水平表示量不变。

圆式图表:用来表明一个整量如何被分成不同部分。圆中的扇形区与所代表的部分成正比。比如:表示整量的 $\frac{1}{4}$ 的一个扇形区将有一个 $\frac{1}{4} \cdot 360^\circ$ 或 90° 角。区内表示的值往往不是实值,而是百分数。由于扇形区表示一个整量的不同部分,所以百分数的和应是 100%。此外,这个整量的总值通常在圆的附近以某种形式表达出来。

图表问题答题要领

1. 大略浏览一下图表,寻找下列重要信息:

- 图表的标题
- 线轴所表示的量或扇形区表示的量
- 日期
- 测量单位
- 阴影部分或其他符号所代表的关键内容
- 条式或线式图表中线轴所表示的量的范围
- 圆式图表的总值

切记不要试图一下子看懂整个图表,要在回答问题的过程中逐渐理解之。

2. 如果题中不只有一个图表,注意寻找正确的图表。

3. 先选勿需计算的题做。如 In which year was the quantity the largest? (哪一年的量最大?)这类问题通常不用计算(只凭观察)就可答出。

4. 必要时用铅笔或答题纸边缘测量线轴或条块所表示的量的大小。

5. 切记不要把小数和百分数混为一谈。要把小数变成百分数时,把小数点向右移动两位(D→P);要把百分数变成小数时,把小数点向左移两位(P→D);如:0.173=17.3%,6.5%=.065

6. 借助所给答案,它们将有助于估计你所得答案的准确程度。

7. 不要进行大数的计算(为了省时),可利用线轴上的单位,最后将其换算成实际值。如线轴上的每一单位表示 \$ 2,000,000,那么 $3\frac{1}{2}$ units + $4\frac{1}{2}$ units = 8 units 或 \$ 16,000,000。

8. 如若回答两个扇形的值的比率,只需找出其百分数的比例,而不必将百分数变成实值。

9. 在推断题中(make inferences),切记只用图表中所给的信息。

10. 尽可能用视觉(通过观看)而不用计算回答问题。

STANDARD MULTIPLE-CHOICE QUESTIONS—SAMPLE TEST I

(Suggested time —40 minutes)

30 Questions

Directions: Solve each of the problems that follow, and then indicate the best answer in the appropriate space on the answer sheet.

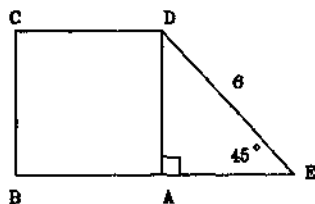
Note: Figures which accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that its figure is not drawn to scale. All figures lie in a plane unless otherwise stated. All numbers used are real numbers.

1. 68.4 is 34.2 percent of

(A) 50
(B) 68.4
(C) 34.2
(D) 200
(E) 100

2. If a train travels M miles in H hours, how many hours will it take the train to travel the next N miles at the same rate?

(A) $\frac{H}{MN}$
(B) $\frac{HM}{N}$
(C) $\frac{HN}{M}$
(D) $\frac{M}{HN}$
(E) $\frac{MN}{H}$



3. In the figure above, what is the area of square ABCD?

(A) $3\sqrt{2}$
(B) 18
(C) 24
(D) 36
(E) 72

4. If the average of A and B is Q , and the average of C , D , and E is R , what is the average of A , B , C , D , and E in terms of Q and R ?

(A) $\frac{Q+R}{2}$
(B) $\frac{2Q+R}{5}$
(C) $\frac{Q+3R}{5}$
(D) $\frac{6QR}{5}$
(E) $\frac{2Q+3R}{5}$

5. A bottle of water is 80% full. After $\frac{3}{4}$ of the water is poured out, what percent of the bottle is empty?

(A) 10%
(B) 20%
(C) 25%
(D) 75%
(E) 80%

6. A certain copying machine can make 8 copies in 12 seconds. How many copies can this same machine make in 7 minutes?

(A) 630
(B) 672
(C) 336
(D) 224
(E) 280

7. The average of 20 numbers is what percent of the sum of the 20 numbers?

(A) 20%

- (B) 5%
- (C) 10%
- (D) 50%
- (E) 2%

8. If $\frac{x}{2} + \frac{x}{3} = 20$, then $\frac{x}{4} =$

- (A) 24
- (B) 12
- (C) 5
- (D) 6
- (E) 25

9. The radius of a circle is the same length as the side of a square. What is the ratio of the circumference of the circle to the perimeter of the square?

- (A) $\frac{\pi}{2}$
- (B) $\frac{4}{\pi}$
- (C) $\frac{\pi}{1}$
- (D) $\frac{\pi}{4}$
- (E) $\frac{2}{\pi}$

10. Which of the following is closest to $\frac{(.75)(.6667)}{(.8)(.8333)}$?

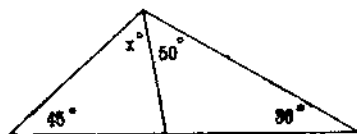
- (A) $\frac{5}{7}$
- (B) $\frac{2}{3}$
- (C) $\frac{3}{4}$
- (D) $\frac{27}{40}$
- (E) 1

11. If the simple interest earned on \$500 after 4 months is \$25, what is the annual rate of interest?

- (A) $33\frac{1}{3}\%$
- (B) 25%
- (C) 20%
- (D) 5%
- (E) 15%

12. A certain truck can travel M miles on G gallons of gasoline. How many gallons of gasoline are needed for 7 of these trucks if each one must travel 300 miles?

- (A) $\frac{2100G}{M}$
- (B) $\frac{2100M}{G}$
- (C) $\frac{M}{2100G}$
- (D) $\frac{G}{2100M}$
- (E) $\frac{300M}{7G}$



13. In the figure above, what is the value of x ?

- (A) 55
- (B) 30
- (C) 40
- (D) 100
- (E) 65

14. If the ratio of x to y is $\frac{3}{4}$, and the ratio of y to z is $\frac{12}{13}$, what is the ratio of z to x ?

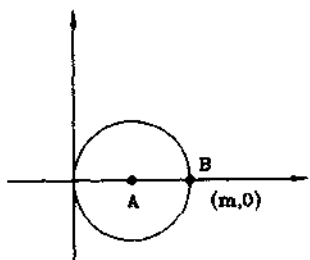
- (A) $\frac{9}{13}$
- (B) $\frac{16}{13}$
- (C) $\frac{3}{13}$
- (D) $\frac{13}{9}$
- (E) $\frac{13}{16}$

15. A guitar, which is valued at \$800 new, increases in value by 10% per year. What is its value at the end of 2 years?

- (A) \$880
- (B) \$900
- (C) \$968
- (D) \$1,000
- (E) \$1,068

16. If $x^2 - y^2 = 100$ and $x - y = 4$, then $x + y =$

- (A) 96
- (B) 46
- (C) 25
- (D) 10
- (E) 14



17. In the figure above, point A is the center of the circle, and point B is located at $(m, 0)$. If the area of the circle is 36π , what is the value of m ?

- (A) 6
- (B) 36
- (C) 18
- (D) 12
- (E) 24

18. Mark earns \$16,000 per year, which is $\frac{2}{3}$ of Ken's annual salary. If Ken's annual salary is $\frac{3}{5}$ of Rupert's annual salary, how much money does Rupert earn per year?

- (A) \$26,000
- (B) \$40,000
- (C) \$6,400
- (D) \$14,400
- (E) \$48,000

19. If 30% of 40% of 50 equals $60x$, what is the value of x ?

- (A) 100
- (B) 10
- (C) 1
- (D) .1
- (E) .01

20. Which of the following represents the largest value?

- (A) $3 + 3(3)^4$
- (B) 3^5
- (C) $\frac{3^5}{3}$
- (D) $3(3)^4$
- (E) $3^2(3)^3 - 3$

21. A rectangle of area 60 is divided into exactly 5 nonoverlapping squares of equal area. What is the perimeter of the rectangle?

- (A) $2\sqrt{3}$
- (B) 120
- (C) 144
- (D) $24\sqrt{3}$
- (E) $20\sqrt{3}$

22. On a final exam, the average grade of the class was 84. If 10% of the class averaged 90, and 30% of the class averaged 80, what was the average grade of the rest of the class?

- (A) 83
- (B) 84
- (C) 85
- (D) 86
- (E) 87

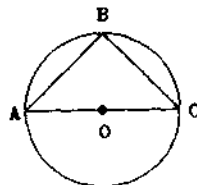
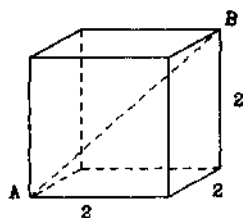
23. A family budgets 30% of its monthly income for rent and 20% of what is left for food. What percent of the monthly income is budgeted for rent and food?

- (A) 56%
- (B) 54%
- (C) 52%
- (D) 50%
- (E) 44%

24. In the formula $r = \sqrt{x^2 + y^2}$, if $r = \frac{10}{3}$ and $y =$

$\frac{8}{3}$, what is the value of x ?

- (A) 4 or -4
- (B) $\sqrt{6}$ or $-\sqrt{6}$
- (C) 3 or -3
- (D) 2 or -2
- (E) $\sqrt{2}$ or $-\sqrt{2}$



25. In the cube above, what is the length of diagonal AB?

- (A) $2\sqrt{6}$
- (B) $2\sqrt{2}$
- (C) $2\sqrt{5}$
- (D) 4
- (E) $2\sqrt{3}$

26. Eddie earns \$12 per hour for a normal 8-hour workday and $1\frac{1}{2}$ times this rate for hours worked overtime. If, on a certain day, Eddie earned \$141, how long did she work?

- (A) 9 hrs. 30 min.
- (B) 10 hrs. 15 min.
- (C) 10 hrs. 36 min.
- (D) 11 hrs.
- (E) 10 hrs. 30 min.

27. Lenny bought 4 dozen oranges at \$6 per dozen, and sold all of them at a price of 75 cents per orange. What was the percent of profit on his cost?

- (A) 50%
- (B) $33\frac{1}{3}\%$
- (C) 150%
- (D) $66\frac{2}{3}\%$
- (E) $133\frac{1}{3}\%$

28. Tony is now 3 years older than Howard. If 5 years ago the sum of their ages was 59, how old is Tony now?

- (A) 26
- (B) 29
- (C) 33
- (D) 36
- (E) 39

29. In the figure above, isosceles triangle ABC is inscribed in a semi-circle. What is the ratio of the area of circle O to the area of triangle ABC?

- (A) $\frac{2}{\pi}$
- (B) $\frac{\pi}{1}$
- (C) $\frac{2\pi}{3}$
- (D) $\frac{1}{\pi}$
- (E) $\frac{\pi}{2}$

30. If a taxi driver charges C cents for the first quarter-mile, and $\frac{C}{4}$ cents for each additional quarter-mile, how much does it cost, in cents, for a trip of M miles?

- (A) $C(M + \frac{1}{4})$
- (B) $\frac{C}{4}(M + \frac{4}{15})$
- (C) $C(M + \frac{3}{4})$
- (D) $C(M - \frac{1}{4})$
- (E) $C(M - \frac{3}{4})$

SAMPLE TEST I—ANSWER KEY

1. D	6. E	11. E	16. C	21. D	26. E
2. C	7. B	12. A	17. D	22. C	27. A
3. B	8. D	13. A	18. B	23. E	28. D
4. E	9. A	14. D	19. D	24. D	29. B
5. E	10. C	15. C	20. A	25. E	30. C

ANSWERS AND SOLUTIONS

1. (D) $\frac{\text{Part}}{\text{Whole}} = \frac{\text{Percent}}{100\%}$
 $\frac{68.4}{x} = \frac{34.2}{100}$ (cross-multiply)
 $34.2x = 6840$
 $x = 200$

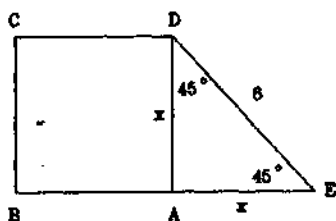
2. (C) Let x = the number of hours it will take the train to travel the next N miles.

$$\frac{\text{miles} \rightarrow M}{\text{hours} \rightarrow H} = \frac{N}{x} \text{ (cross-multiply)}$$

$$Mx = HN$$

$$x = \frac{HN}{M}$$

3. (B)



Since $\angle ADE = \angle AED$, side AE = side AD .
 Using the Pythagorean Theorem,

$$(AD)^2 + (AE)^2 = (DE)^2$$

$$x^2 + x^2 = 6^2$$

$$2x^2 = 36$$

$$x^2 = 18$$

$$\begin{aligned} \text{The area of square } ABCD &= (AD)^2 \\ &= x^2 \\ &= 18 \end{aligned}$$

4. (E)

$$\frac{A+B}{2} = Q \quad \left| \quad \frac{C+D+E}{3} = R \right.$$

$$A+B = 2Q \quad \left| \quad C+D+E = 3R \right.$$

Thus, the average of

$A, B, C, D,$ and

$$E = \frac{A+B+C+D+E}{5}$$

$$= \frac{2Q+3R}{5}$$

5. (E) After $\frac{3}{4}$ of the water is poured out, $\frac{1}{4}$ of

$80\% = \frac{1}{4} \times 80\% = 20\%$ of the bottle remains filled with water.

Thus, the percent of the bottle that is now empty = $100\% - 20\% = 80\%$.

6. (E) Let x = the number of copies the machine can make in 7 minutes.

Since 7 minutes = $7(60 \text{ seconds}) = 420$ seconds,

$$\frac{\text{copies} \rightarrow 8}{\text{seconds} \rightarrow 12} = \frac{x}{420} \text{ (cross-multiply)}$$

$$12x = 3360$$

$$x = 280 \text{ copies}$$

7. (B) Let S = the sum of the 20 numbers.

Thus, the average of the 20 numbers = $\frac{S}{20}$.

Let x = the percent that the average of the 20 numbers is of the sum of the 20 numbers.

$$\frac{\text{Part}}{\text{Whole}} = \frac{\text{Percent}}{100\%}$$

$$\frac{\text{Average}}{\text{Sum}} = \frac{x}{100}$$

$$\frac{\frac{S}{20}}{S} = \frac{x}{100} \text{ (cross-multiply)}$$

$$Sx = \frac{S}{20} \cdot 100$$

$$\$ x = \$ 5$$

$$x = 5\%$$

$$8. (D) \frac{x}{2} + \frac{x}{3} = 20 \text{ (multiply by 6)}$$

$$\frac{3}{6} \cdot \frac{x}{2} + \frac{2}{6} \cdot \frac{x}{3} = 6 \cdot 20$$

$$3x + 2x = 120$$

$$5x = 120$$

$$x = 24$$

$$\text{Thus } \frac{x}{4} = \frac{24}{4} = 6$$

9. (A) Let x = the radius of the circle and the side of the square.

The circumference of the circle

$$= \pi(\text{diameter})$$

$$= \pi(2x)$$

$$= 2\pi x$$

The perimeter of the square

$$= 4(\text{side})$$

$$= 4x$$

$$\text{Thus, } \frac{\text{circumference}}{\text{perimeter}} = \frac{2\pi x}{4x} = \frac{\pi}{2}$$

$$10. (C) \frac{(.75)(.6667)}{(.8)(.8333)} \approx \left(\frac{3}{4}\right)\left(\frac{2}{3}\right) \div \left(\frac{8}{10}\right)\left(\frac{5}{6}\right)$$

$$\approx \frac{1}{2}$$

$$\approx \frac{2}{2}$$

$$\approx \frac{2}{3}$$

$$\approx \frac{1}{2} \div \frac{2}{3}$$

$$\approx \frac{1}{2} \times \frac{3}{2}$$

$$\approx \frac{3}{4}$$

11. (E) Since 4 months is $\frac{1}{3}$ of a year, the interest

earned in a year is $3(\$25)$, or $\$75$.

Let x = the annual rate of interest.

$$\frac{\text{Part}}{\text{Whole}} = \frac{\text{Percent}}{100\%}$$

$$\frac{\$75}{\$500} = \frac{x}{100} \text{ (cross-multiply)}$$

$$500x = 7500$$

$$x = 15\%$$

12. (A) Since 7 trucks must each travel 300 miles, the total distance travelled will be 2100 miles.

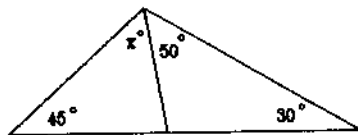
Let x = the number of gallons of gasoline needed to travel 2100 miles.

$$\frac{\text{miles}}{\text{gallons}} \rightarrow \frac{M}{G} = \frac{2100}{x} \text{ (cross-multiply)}$$

$$Mx = 2100G$$

$$x = \frac{2100G}{M}$$

13. (A)



Since the sum of the angles in a triangle is 180° ,

$$45 + 30 + (x + 50) = 180$$

$$x + 125 = 180$$

$$x = 55$$

$$14. (D) \frac{x}{y} = \frac{3}{4} \text{ and } \frac{y}{z} = \frac{12}{13}$$

$$\text{Thus, } \frac{x}{y} \cdot \frac{y}{z} = \frac{3}{4} \cdot \frac{12}{13}$$

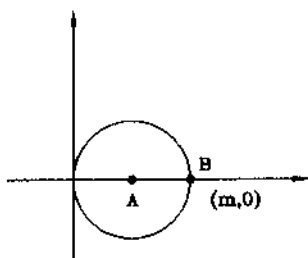
$$\frac{x}{z} = \frac{9}{13}$$

$$\text{or } \frac{z}{x} = \frac{13}{9}$$

15. (C) After one year, the value of the guitar is 110% of $\$800 = 1.10 \times \$800 = \$880$. After two years, the value of the guitar is 110% of $\$880 = 1.10 \times \$880 = \$968$.

16. (C) $x^2 - y^2 = 100$
 $(x-y)(x+y) = 100$
 Since $x-y=4$,
 $(4)(x+y) = 100$
 $x+y = 25$

17. (D)



The area of the circle $= \pi(\text{radius})^2$
 $36\pi = \pi(AB)^2$
 $36 = (AB)^2$
 $\sqrt{36} = AB$
 $6 = AB$

Since $AB=6$, the distance from the origin to point $B = 2(6) = 12$. Thus, point B has coordinates $(12, 0)$, or $m=12$.

18. (B) Let K = Ken's annual salary,
 and R = Rupert's annual salary.

$$\$16,000 = \frac{2}{3}K$$

$$\$48,000 = 2K$$

$$\$24,000 = K$$

Thus,

$$\$24,000 = \frac{3}{5}R$$

$$\$120,000 = 3R$$

$$\$40,000 = R$$

19. (D) 30% of 40% of 50 equals $60x$

$$\text{Thus, } .30 \times .40 \times 50 = 60x$$

$$6 = 60x$$

$$.1 = x$$

20. (A) $3 + 3(3)^4 = 3 + 3^5 \leftarrow \text{largest}$

$$3^5 = 3^5$$

$$\frac{3^5}{3} = 3^4$$

$$3(3)^4 = 3^5$$

$$3^2(3)^3 = 3 = 3^5 - 3$$

21. (D)



Let x = the side of each square

The area of the rectangle

$$= (\text{length})(\text{width})$$

$$60 = (5x)(x)$$

$$60 = 5x^2$$

$$12 = x^2$$

$$\sqrt{12} = x$$

$$\sqrt{4 \cdot 3} = x$$

$$2\sqrt{3} = x$$

Thus, the perimeter of the rectangle

$$= 12x$$

$$= 12(2\sqrt{3})$$

$$= 24\sqrt{3}$$

22. (C) Let x = the average grade of the rest of the class (the remaining 60%).

$$84 = \frac{10\%(90) + 30\%(80) + 60\%(x)}{100\%}$$

$$84 = \frac{.10(90) + .30(80) + .60(x)}{1.00}$$

$$84 = \frac{9 + 24 + .60x}{1}$$

$$84 = 33 + .60x$$

$$51 = .60x$$

$$85 = x$$

23. (E) 30% of the monthly income is budgeted for rent. Thus, the percent budgeted for food is 20% of the 70% left, or $.20 \times 70\% = 14\%$.

The percent budgeted for rent and food = $30\% + 14\% = 44\%$

24. (D) $r = \sqrt{x^2 + y^2}$

$$\frac{10}{3} = \sqrt{x^2 + \left(\frac{8}{3}\right)^2}$$

$$\frac{10}{3} = \sqrt{x^2 + \frac{64}{9}} \quad (\text{square both sides})$$

$$\left(\frac{10}{3}\right)^2 = \left(\sqrt{x^2 + \frac{64}{9}}\right)^2$$