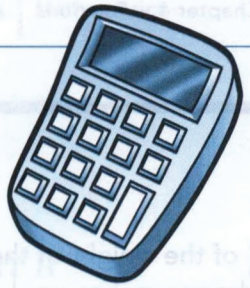


Chapter 5

Ratio and Proportion

GED Mathematics pp. 137–148
Complete GED pp. 285–292

Basic Skills

Directions: Solve each problem.

For problems 1–3, simplify each ratio.

1. 16:28 = 6:45 = 72:63 = 8:600 =

2. \$60 to \$100 = 2 to 500 = 75 to 3 = 28 to 56 =

3. $\frac{38}{18} =$ $\frac{1.3}{5.2} =$ $\frac{12{,}000}{42{,}000} =$ $\frac{65}{15} =$

For problems 4 and 5, solve for the unknown in each proportion.

4. $\frac{x}{5} = \frac{7}{9}$ $\frac{12}{x} = \frac{5}{2}$ $\frac{1}{8} = \frac{x}{20}$ $\frac{9}{2} = \frac{15}{x}$

5. $\frac{3}{20} = \frac{x}{120}$ $\frac{8}{5} = \frac{100}{x}$ $\frac{x}{45} = \frac{4}{9}$ $\frac{24}{x} = \frac{6}{7}$

For problems 6–8, choose the correct answer.

6. Which of the following is *not* equal to the ratio 60:80?

   (1) 6:8 (2) 3:4 (3) 3 to 4 (4) $\frac{3}{4}$ (5) $\frac{4}{3}$

7. For the proportion $\frac{9}{12} = \frac{6}{8}$, what are the two cross products?

   (1) 9×12 and 6×8
   (2) 9×6 and 12×8
   (3) 9×8 and 12×6
   (4) 9×6 and 8×12

8. Which of the following represents the cross products of the proportion 7:5 = 3:*x*?

   (1) $7 \times 5 = 3 \times x$
   (2) $7 \times x = 5 \times 3$
   (3) $7 \times 3 = 5 \times x$
   (4) $5 \times 7 = x \times 3$

Problems 9–11 refer to the following information.

The lot at a car dealership has 21 new cars and 15 used cars.

9. What is the ratio of new cars to used cars?

10. What is the ratio of used cars to the total number of cars in the lot?

11. What is the ratio of new cars to the total number of cars?

Problems 12 and 13 refer to the following information.

On a math test Oliver got four problems right for every problem that he got wrong.

12. What was the ratio of the number of problems right to the total number of problems?

13. There were 60 problems on the test. How many problems did Oliver get right?

Problems 14 and 15 refer to the following information.

For every three new tomato plants that grew in Juanita's garden, one failed to grow.

14. What is the ratio of the number of tomato plants that grew to the number that were planted?

15. Altogether, Juanita planted 24 tomato plants. How many grew?

Answers are on page 137.

GED PRACTICE

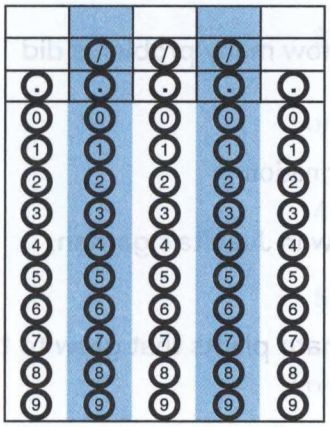
PART I

Directions: You may use a calculator to solve the following problems. For problems 1–3, mark each answer on the corresponding number grid.

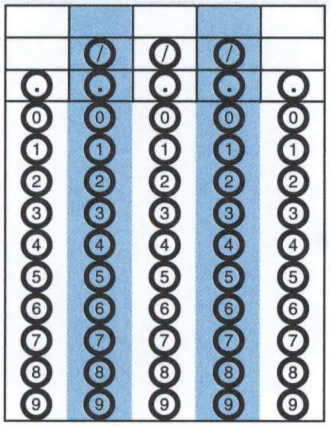
Problems 1–3 refer to the following information.

Each month Mr. and Mrs. Sagan pay $620 for their home mortgage. This leaves them with $1860 for other expenses.

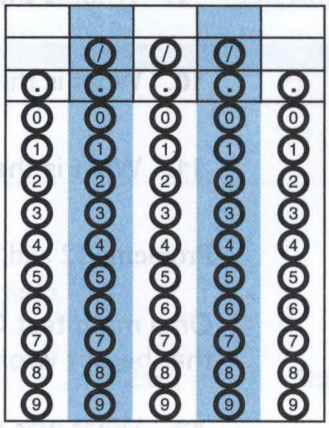
1. What is the ratio of the Sagans' mortgage payment to the amount they have each month for other expenses? Express the answer as a reduced fraction.



2. What is the ratio of the Sagans' mortgage payment to their monthly income? Express the answer as a reduced fraction.



3. In dollars, what is the Sagans' yearly income?



Choose the correct answer to each problem.

4. What is the solution for m in $\frac{5}{8} = \frac{12}{m}$?

(1) $3\frac{1}{3}$

(2) $7\frac{1}{2}$

(3) $12\frac{5}{8}$

(4) $19\frac{1}{5}$

(5) $21\frac{2}{3}$

5. Which of the following represents the solution for c in $\frac{2}{3} = \frac{c}{11}$?

(1) $\frac{2 \times 11}{3}$

(2) $\frac{3 \times 11}{2}$

(3) $\frac{2 \times 3}{11}$

(4) $\frac{2}{3 \times 11}$

(5) $\frac{3}{2 \times 11}$

GED PRACTICE

6. Laura wants to enlarge a photograph to make a poster. The photograph is 4 inches wide and 5 inches long. The long side of the poster will be 30 inches. Find the measurement, in inches, of the short side.

(1) 16

(2) 20

(3) 24

(4) $26\frac{1}{2}$

(5) $37\frac{1}{2}$

7. For a year, the budget of the Central County Senior Services Agency is $360,000. For every $10 in the budget, $1.50 goes to administration. What is the yearly budget for administration at the agency?

(1) $24,000
(2) $32,000
(3) $36,000
(4) $48,000
(5) $54,000

8. To make 2.5 gallons of maple syrup, a farmer needs to collect 100 gallons of sap. How many gallons of sap are needed to make 20 gallons of maple syrup?

(1) 200
(2) 400
(3) 600
(4) 800
(5) 1000

9. To make a certain color of paint, Mavis needs 4 units of yellow paint for every 1 unit of white paint. She estimates that she will need 15 gallons of paint to complete her job. How many gallons of white paint will she need?

(1) 2
(2) 3
(3) 5
(4) 6
(5) 8

10. If three oranges sell for $1.29, what is the price of 8 oranges?

(1) $2.19
(2) $2.33
(3) $2.77
(4) $3.29
(5) $3.44

11. One inch on the scale of a map is equal to 48 miles. How many miles apart are two cities that are $3\frac{1}{4}$ inches apart on the map?

(1) 156
(2) 135
(3) 119
(4) 107
(5) 90

12. Boston is 315 miles from Philadelphia. If the scale on the map is 1 inch = 20 miles, how many inches apart are Boston and Philadelphia?

(1) $10\frac{1}{2}$

(2) $12\frac{1}{3}$

(3) $15\frac{3}{4}$

(4) $18\frac{1}{4}$

(5) $19\frac{1}{2}$

GED PRACTICE

13. Which of the following is *not* equivalent to the ratio 24:32?

(1) 9:12
(2) $\frac{3}{4}$
(3) 0.75
(4) 15:21
(5) $6 \div 8$

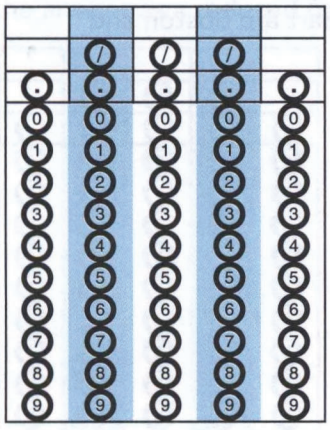
14. Which of the following expresses the simplified form of the ratio $\frac{7}{8}$ to $\frac{5}{6}$?

(1) 10:9
(2) 13:12
(3) 16:15
(4) 19:18
(5) 21:20

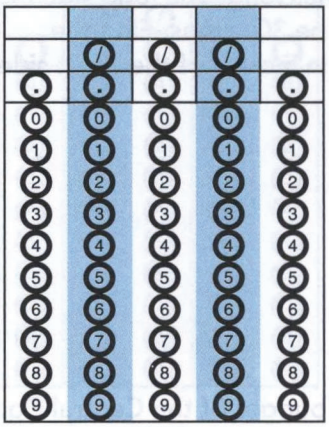
PART II

Directions: Solve the following problems without a calculator. For problems 15 and 16, mark each answer on the corresponding number grid.

15. A newspaper printed 10,000 copies. Of these copies, 80 were defective and had to be discarded. What is the ratio of defective copies to the total number printed? Express your answer as a reduced fraction.



16. Solve for n in $\frac{n}{10} = \frac{7}{40}$. Express your answer as a decimal.



Choose the correct answer to each problem.

17. In Buffalo one November, rain was recorded on 9 days; snow was recorded on 6 days; and on another 3 days, a combination of rain, snow, or other precipitation was recorded. What is the ratio of the number of days when some precipitation was recorded to the total number of days in the month?

(1) 1:2
(2) 2:3
(3) 3:4
(4) 3:5
(5) 4:5

18. Phil saves $1 for every $8 that he spends. If Phil takes home $720 a week, how much does he save each week?

(1) $75
(2) $80
(3) $85
(4) $90
(5) $95

GED PRACTICE

19. A 9-foot-tall sapling casts a shadow 2.5 feet long. At the same time, an old pine tree casts a shadow 20 feet long. How many feet tall is the pine tree?

(1) 54
(2) 63
(3) 72
(4) 81
(5) 90

Problems 20–22 refer to the following information.

A polling organization interviewed 600 people about a proposed cement plant in their community. Of the people interviewed, 312 were in favor of the new plant in their community, 193 were against it, and the rest were undecided.

20. How many people were undecided?

(1) 115
(2) 105
(3) 95
(4) 85
(5) 75

21. What is the approximate ratio of the number of people who were in favor of the plant to the number who were against it?

(1) 6:5
(2) 5:4
(3) 4:3
(4) 3:2
(5) 2:1

22. What was the approximate ratio of the number of people who were undecided to the total number of people who were interviewed?

(1) 1:2
(2) 1:3
(3) 1:4
(4) 1:5
(5) 1:6

Problems 23–25 refer to the following information.

One commonly used formula for making concrete is to mix 1 unit of cement to 2 units of sand and 4 units of gravel.

23. What is the ratio of sand to gravel in the mixture?

(1) 1:2
(2) 2:3
(3) 3:4
(4) 4:5
(5) 5:6

24. What is the ratio of cement to the combination of sand and gravel?

(1) 1:6
(2) 1:5
(3) 1:4
(4) 1:3
(5) 1:2

25. A 1000-pound slab of concrete contains about how many pounds of sand?

(1) 110
(2) 190
(3) 290
(4) 330
(5) 390

GED PRACTICE

Choose the correct answer to each problem.

26. Which of the following represents a solution to the proportion $4:5 = x:70$?

(1) $x = \frac{5}{4 \times 70}$

(2) $x = \frac{4}{5 \times 70}$

(3) $x = \frac{4 \times 5}{70}$

(4) $x = \frac{4 \times 70}{5}$

(5) $x = \frac{5 \times 70}{4}$

27. For every \$1 that Angie spends in a restaurant, she leaves a tip of 15¢. When Angie took her father out to lunch, the bill came to \$29.89. Which of the following is the closest approximation of the tip that she left?

(1) \$1.50
(2) \$2.50
(3) \$3.75
(4) \$4.50
(5) \$6.00

28. A baseball team won 3 games for every 2 that they lost. In a season when the team played 160 games, how many games did they win?

(1) 74
(2) 85
(3) 96
(4) 101
(5) 108

29. A farmer estimates that 1 acre will produce 120 bushels of corn. How many acres of corn should he plant in order to yield 3000 bushels of corn?

(1) 15
(2) 25
(3) 35
(4) 40
(5) 50

Answers are on page 137.

16. (4) \$800 $\$2413 \rightarrow \$2400$
$\frac{1}{3} \times \$2400 = \$800$

17. (3) \$3330 $\frac{2}{3} \times \frac{5000}{1} = \frac{10{,}000}{3} = \$3333\frac{1}{3} \rightarrow \$3330$

18. (1) $\frac{3}{8}$ $1\frac{1}{8} + \frac{1}{2} = 1\frac{1}{8} + \frac{4}{8} = 1\frac{5}{8}$
$2 - 1\frac{5}{8} = \frac{3}{8}$ pound

19. (4) $2 \times \$5 = \$10$ $1\frac{7}{8} \rightarrow 2$ and $\$4.99 \rightarrow \$5$
$2 \times \$5 = \$10$

20. (4) $4\frac{1}{2}$ $3 \times 1\frac{1}{2} = \frac{3}{1} \times \frac{3}{2} = \frac{9}{2} = 4\frac{1}{2}$ inches

21. (5) 0.000026 The decimal point moves 5 places to the left.

22. (1) $\frac{3}{4}$ $\frac{13}{20} + \frac{1}{10} = \frac{13}{20} + \frac{2}{20} = \frac{15}{20} = \frac{3}{4}$

23. (3) 18 $179 \rightarrow 180$
$\frac{1}{10} \times 180 = 18$ pounds

24. (2) \$26,000 x = price of entire job
$\frac{1}{4}x = \$6500$
$x = \$6500 \times 4 = \$26{,}000$

Chapter 5

Basic Skills, page 48

1. $16:28 = 4:7$ $6:45 = 2:15$ $72:63 = 8:7$ $8:600 = 1:75$

2. \$60 to \$100 = \$3 to \$5 2 to 500 = 1 to 250
75 to 3 = 25 to 1 28 to 56 = 1 to 2

3. $\frac{38}{18} = \frac{19}{9}$ $\frac{1.3}{5.2} = \frac{1}{4}$ $\frac{12{,}000}{42{,}000} = \frac{2}{7}$ $\frac{65}{15} = \frac{13}{3}$

4.

$\frac{x}{5} = \frac{7}{9}$	$\frac{12}{x} = \frac{5}{2}$	$\frac{1}{8} = \frac{x}{20}$	$\frac{9}{2} = \frac{15}{x}$
$9x = 35$	$5x = 24$	$8x = 20$	$9x = 30$
$x = 3\frac{8}{9}$	$x = 4\frac{4}{5}$	$x = 2\frac{1}{2}$	$x = 3\frac{1}{3}$

5.

$\frac{3}{20} = \frac{x}{120}$	$\frac{8}{5} = \frac{100}{x}$	$\frac{x}{45} = \frac{4}{9}$	$\frac{24}{x} = \frac{6}{7}$
$20x = 360$	$8x = 500$	$9x = 180$	$6x = 168$
$x = 18$	$x = 62\frac{1}{2}$	$x = 20$	$x = 28$

6. (5) $\frac{4}{3}$

7. (3) $9 \times 8 = 12 \times 6$

8. (2) $7 \times x = 5 \times 3$

9. new:used = 21:15 = 7:5

10. 21 new + 15 used = 36 total
used:total = 15:36 = 5:12

11. new:total = 21:36 = 7:12

12. 4 right + 1 wrong = 5 total
right:total = 4:5

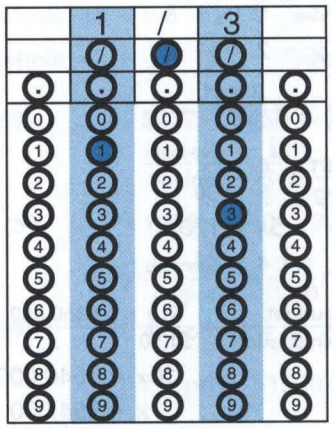
13. $\frac{\text{right}}{\text{total}} = \frac{4}{5} = \frac{x}{60}$
$5x = 240$
$x = 48$

14. 3 grew + 1 failed = 4 total
grew:planted = 3:4

15. $\frac{\text{grew}}{\text{planted}} = \frac{3}{4} = \frac{x}{24}$
$4x = 72$
$x = 18$

GED Practice, Part I, page 50

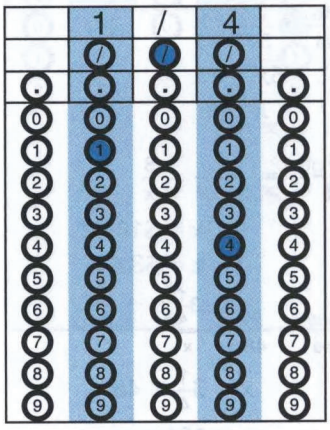
1. $\frac{1}{3}$ $\frac{\text{mortgage}}{\text{other}} = \frac{\$620}{\$1860} = \frac{1}{3}$



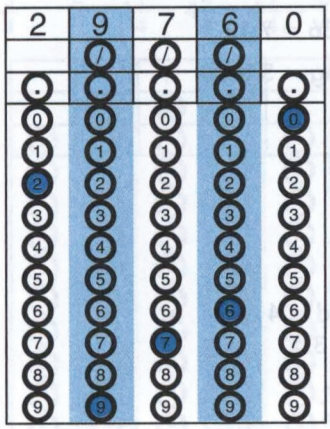
2. $\frac{1}{4}$

mortgage + other = \$620 + \$1860 = \$2480 total

$\frac{\text{mortgage}}{\text{total}} = \frac{\$620}{\$2480} = \frac{1}{4}$



3. $29,760 $\$2480 \times 12 = \$29{,}760$



4. (4) $19\frac{1}{5}$

$$\frac{5}{8} = \frac{12}{m}$$
$$5m = 96$$
$$m = 19\frac{1}{5}$$

5. (1) $\frac{2 \times 11}{3}$

$$\frac{2}{3} = \frac{c}{11}$$
$$3c = 2 \times 11$$
$$c = \frac{2 \times 11}{3}$$

6. (3) 24

$$\frac{\text{short}}{\text{long}} = \frac{4}{5} = \frac{x}{30}$$
$$5x = 120$$
$$x = 24$$

7. (5) $54,000

$$\frac{\text{budget}}{\text{administration}} = \frac{\$10}{\$1.50} = \frac{\$360{,}000}{x}$$
$$10x = \$540{,}000$$
$$x = \$54{,}000$$

8. (4) 800

$$\frac{\text{syrup}}{\text{sap}} = \frac{100}{2.5} = \frac{x}{20}$$
$$2.5x = 2000$$
$$x = 800$$

9. (2) 3

yellow + white = 4 + 1 = 5 total

$$\frac{\text{white}}{\text{total}} = \frac{1}{5} = \frac{x}{15}$$
$$5x = 15$$
$$x = 3$$

10. (5) $3.44

$$\frac{\text{oranges}}{\$} = \frac{3}{\$1.29} = \frac{8}{x}$$
$$3x = \$10.32$$
$$x = \$3.44$$

11. (1) 156

$$\frac{\text{inches}}{\text{miles}} = \frac{1}{48} = \frac{3\frac{1}{4}}{x}$$
$$x = 3\frac{1}{4} \times 48$$
$$x = 156$$

12. (3) $15\frac{3}{4}$

$$\frac{\text{inches}}{\text{miles}} = \frac{1}{20} = \frac{x}{315}$$
$$20x = 315$$
$$x = 15\frac{3}{4}$$

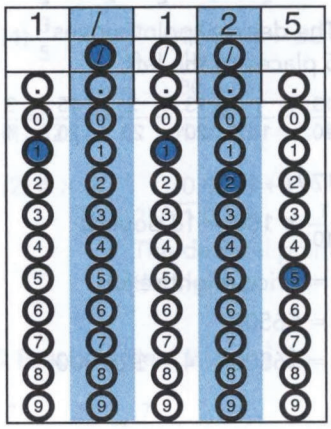
13. (4) 15:21 The others all equal $\frac{3}{4}$ or 24:32.

14. (5) 21:20 $\frac{7}{8} : \frac{5}{6} = \frac{7}{8} \div \frac{5}{6} = \frac{7}{8} \times \frac{6}{5} = \frac{42}{40} = \frac{21}{20}$

GED Practice, Part II, page 52

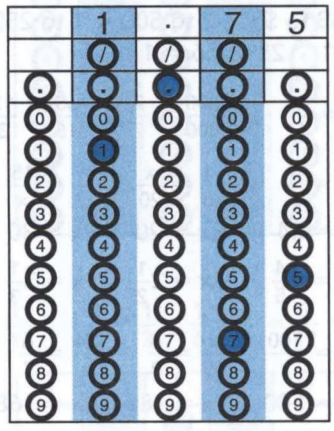
15. $\frac{1}{125}$

$$\frac{\text{defective}}{\text{total}} = \frac{80}{10{,}000} = \frac{1}{125}$$



16. 1.75

$$\frac{n}{10} = \frac{7}{40}$$
$$40n = 70$$
$$n = 1.75$$



17. (4) 3:5

9 + 6 + 3 = 18 days of precipitation

18:30 = 3:5

18. (2) $80

$1 saved + $8 spent = $9 total

$$\frac{\text{saved}}{\text{total}} = \frac{1}{9} = \frac{x}{720}$$
$$9x = 720$$
$$x = 80$$

19. (3) 72 $\frac{\text{height}}{\text{shadow}} = \frac{9}{2.5} = \frac{x}{20}$

$2.5x = 180$

$x = 72$

20. (3) 95 $312 + 193 = 505$

$600 - 505 = 95$

21. (4) 3:2 $312 \rightarrow 300$ and $193 \rightarrow 200$

for:against = 300:200 = 3:2

22. (5) 1:6 $95 \rightarrow 100$

undecided:total = 100:600 = 1:6

23. (1) 1:2 sand:gravel = 2:4 = 1:2

24. (1) 1:6 sand + gravel = 2 + 4 = 6

cement:mixture = 1:6

25. (3) 290

cement + sand + gravel = 1 + 2 + 4 = 7 total

$\frac{\text{sand}}{\text{total}} = \frac{2}{7} = \frac{x}{1000}$

$7x = 2000$

$x = 285.7 \rightarrow 290$

26. (4) $x = \frac{4 \times 70}{5}$ $4:5 = x:70$

$5x = 4 \times 70$

$x = \frac{4 \times 70}{5}$

27. (4) \$4.50 $\$29.89 \rightarrow \$30$

$\frac{\text{tip}}{\text{total}} = \frac{0.15}{1} = \frac{x}{30}$

$x = \$4.50$

28. (3) 96 3 won + 2 lost = 5 played

$\frac{\text{won}}{\text{played}} = \frac{3}{5} = \frac{x}{160}$

$5x = 480$

$x = 96$

29. (2) 25 $\frac{\text{acres}}{\text{bushels}} = \frac{1}{120} = \frac{x}{3000}$

$120x = 3000$

$x = 25$

Chapter 6

Basic Skills, page 55

1. $\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$

2. $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$

3. $\frac{1}{3}$ $\frac{2}{3}$

4. $\frac{1}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ $\frac{7}{8}$

5. 0.01 0.1 1.0 10.0

6. 0.25 0.5 0.75

7. 0.2 0.4 0.6 0.8

8. 0.08 0.045 0.85 1.1

9. $\frac{1}{5}$

10. 2

11. 8

12. 25%

13. 32

14. 35

15. 1%

16. 3500

17. part; $\frac{1}{2} \times 66 = 33$ part; $\frac{1}{3} \times 120 = 40$

part; $\frac{4}{5} \times 35 = 28$

18. part; $0.1 \times 325 = 32.5$ part; $0.4 \times 90 = 36$

part; $0.065 \times 200 = 13$

19. percent; $\frac{8}{32} = \frac{1}{4} = 25\%$

percent; $\frac{19}{38} = \frac{1}{2} = 50\%$

20. percent; $\frac{10}{200} = \frac{1}{20} = 5\%$

percent; $\frac{12}{36} = \frac{1}{3} = 33\frac{1}{3}\%$

21. whole; $16 \div 0.8 = 20$ whole; $17 \div 0.5 = 34$

22. whole; $40 \div \frac{1}{3} = 120$ whole; $150 \div 0.6 = 250$

23. 6% \$477 − \$450 = \$27

$\frac{\text{increase}}{\text{original}} = \frac{\$27}{\$450} = \frac{3}{50} = 6\%$

24. 25% 1200 − 900 = 300

$\frac{\text{decrease}}{\text{original}} = \frac{300}{1200} = \frac{1}{4} = 25\%$

25. \$70 4 months $= \frac{4}{12} = \frac{1}{3}$ year

$i = prt = \$1500 \times 0.14 \times \frac{1}{3} = \$70$

GED Practice, Part I, page 57

1. $\frac{3}{20}$ $15\% = \frac{15}{100} = \frac{3}{20}$