## Measurement

1. Use the federal tax tables and information given below.

**2007 Tax Table** — *Continued*

| If line 43 (taxable income) is— | | And you are— | | | |
|---|---|---|---|---|---|
| At least | But less than | Single | Married filing jointly * | Married filing sepa-rately | Head of a house-hold |
| | | Your tax is — | | | |
| **50,000** | | | | | |
| 50,000 | 50,050 | 8,930 | 6,721 | 8,930 | 7,681 |
| 50,050 | 50,100 | 8,943 | 6,729 | 8,943 | 7,694 |
| 50,100 | 50,150 | 8,955 | 6,736 | 8,955 | 7,706 |
| 50,150 | 50,200 | 8,968 | 6,744 | 8,968 | 7,719 |
| 50,200 | 50,250 | 8,980 | 6,751 | 8,980 | 7,731 |
| 50,250 | 50,300 | 8,993 | 6,759 | 8,993 | 7,744 |
| 50,300 | 50,350 | 9,005 | 6,766 | 9,005 | 7,756 |
| 50,350 | 50,400 | 9,018 | 6,774 | 9,018 | 7,769 |
| 50,400 | 50,450 | 9,030 | 6,781 | 9,030 | 7,781 |
| 50,450 | 50,500 | 9,043 | 6,789 | 9,043 | 7,794 |
| 50,500 | 50,550 | 9,055 | 6,796 | 9,055 | 7,806 |
| 50,550 | 50,600 | 9,068 | 6,804 | 9,068 | 7,819 |
| 50,600 | 50,650 | 9,080 | 6,811 | 9,080 | 7,831 |
| 50,650 | 50,700 | 9,093 | 6,819 | 9,093 | 7,844 |
| 50,700 | 50,750 | 9,105 | 6,826 | 9,105 | 7,856 |
| 50,750 | 50,800 | 9,118 | 6,834 | 9,118 | 7,869 |
| 50,800 | 50,850 | 9,130 | 6,841 | 9,130 | 7,881 |
| 50,850 | 50,900 | 9,143 | 6,849 | 9,143 | 7,894 |
| 50,900 | 50,950 | 9,155 | 6,856 | 9,155 | 7,906 |
| 50,950 | 51,000 | 9,168 | 6,864 | 9,168 | 7,919 |

**2008 Tax Table** — *Continued*

| If line 43 (taxable income) is— | | And you are— | | | |
|---|---|---|---|---|---|
| At least | But less than | Single | Married filing jointly * | Married filing sepa-rately | Head of a house-hold |
| | | Your tax is — | | | |
| **50,000** | | | | | |
| 50,000 | 50,050 | 8,850 | 6,701 | 8,850 | 7,569 |
| 50,050 | 50,100 | 8,863 | 6,709 | 8,863 | 7,581 |
| 50,100 | 50,150 | 8,875 | 6,716 | 8,875 | 7,594 |
| 50,150 | 50,200 | 8,888 | 6,724 | 8,888 | 7,606 |
| 50,200 | 50,250 | 8,900 | 6,731 | 8,900 | 7,619 |
| 50,250 | 50,300 | 8,913 | 6,739 | 8,913 | 7,631 |
| 50,300 | 50,350 | 8,925 | 6,746 | 8,925 | 7,644 |
| 50,350 | 50,400 | 8,938 | 6,754 | 8,938 | 7,656 |
| 50,400 | 50,450 | 8,950 | 6,761 | 8,950 | 7,669 |
| 50,450 | 50,500 | 8,963 | 6,769 | 8,963 | 7,681 |
| 50,500 | 50,550 | 8,975 | 6,776 | 8,975 | 7,694 |
| 50,550 | 50,600 | 8,988 | 6,784 | 8,988 | 7,706 |
| 50,600 | 50,650 | 9,000 | 6,791 | 9,000 | 7,719 |
| 50,650 | 50,700 | 9,013 | 6,799 | 9,013 | 7,731 |
| 50,700 | 50,750 | 9,025 | 6,806 | 9,025 | 7,744 |
| 50,750 | 50,800 | 9,038 | 6,814 | 9,038 | 7,756 |
| 50,800 | 50,850 | 9,050 | 6,821 | 9,050 | 7,769 |
| 50,850 | 50,900 | 9,063 | 6,829 | 9,063 | 7,781 |
| 50,900 | 50,950 | 9,075 | 6,836 | 9,075 | 7,794 |
| 50,950 | 51,000 | 9,088 | 6,844 | 9,088 | 7,806 |

- **In 2007, Jason's taxable income was $50,000 and he filed his taxes as a *single* taxpayer.**

- **In 2008, Jason's taxable income was $420 more than in 2007, and he filed as *Married filing jointly* with his new spouse who had no taxable income.**

How did Jason's federal taxes in 2008 compare to his federal taxes in 2007?

A.  His tax was $20 more in 2008.

B.  His tax was $40 more in 2008.

C.  His tax was $2,169 less in 2008.

D.  His tax was $2,229 less in 2008.

2. John, Robert, and Tom have the same type of cellular phone. Each man measured his phone's length; the results are shown in the table below.

| Name | Measured Length |
|---|---|
| John | 9 cm |
| Robert | 10.3 cm |
| Tom | 9.85 cm |

The actual length of the phone is 9.5 cm. Who had the most accurate measurement?

A.  John

B.  Robert

C.  Tom

D.  All three measurements were equally accurate.

3. To make fudge, the candy mix must be heated to a temperature of 115° Celsius. What is the approximate equivalent temperature in Fahrenheit?

A.  96° F

B.  175° F

C.  239° F

D.  265° F

4. The temperature in San Diego is 86° Fahrenheit. What is the approximate equivalent temperature in Celsius?

A.  16° C

B.  30° C

C.  66° C

D.  97° C

5. A student is measuring the length of a textbook with a ruler. Which shows the ruler with the greatest precision?

A.

inch  1     2

B.

inch  1     2

C.

inch  1     2

D.

inch  1     2
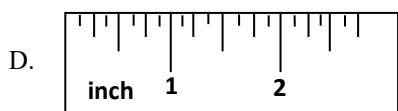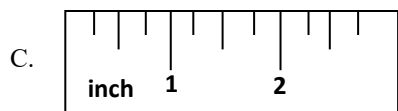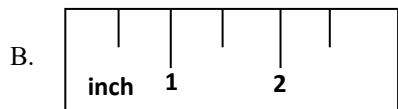
6. Which measurement of length is the most precise?

A. centimeter

B. kilometer

C. meter

D. millimeter

7. Which is the most precise measurement?

A. 1.54 kilometers

B. 1.54 meters

C. 1.54 centimeters

D. 1.54 millimeters

8. Which tool would be most appropriate to use to measure the perimeter of a school building?

A. protractor

B. ruler

C. meterstick

D. tape measure

9. Tara and Brian leave a concert at 11:30 pm. They travel in opposite directions. Tara drives 55 miles per hour and Brian drives 45 miles per hour. At what time will they be 150 miles apart?

A. 12:00 a.m.

B. 12:10 a.m.

C. 1:00 a.m.

D. 1:20 a.m.

10. The table below shows the advertised and allowable weights of four brands of cereal when their boxes are filled.

| Brand | Advertised Weight | Allowable Minimum Weight | Allowable Maximum Weight |
|---|---|---|---|
| A | 12 oz | 10.7 oz | 13.3 oz |
| B | 16 oz | 14.9 oz | 17.1 oz |
| C | 20 oz | 18.5 oz | 21.5 oz |
| D | 24 oz | 22.7 oz | 25.3 oz |

Which brand of cereal has the smallest allowable weight tolerance when filled?

A. Brand A

B. Brand B

C. Brand C

D. Brand D

11. Brock borrows $2,000 from his father and repays the money after 2 years, plus 5% simple interest. How much interest does Brock pay on the loan?

A. $100

B. $200

C. $1,000

D. $2,000

12. The weight ($w$) of a package is measured in ounces. Each package must be in the range below.

$$14.20 < w < 14.30$$

What is the tolerance for the weight of the package?

A. $14.20 \pm 0.05$ oz

B. $14.20 \pm 0.10$ oz

C. $14.25 \pm 0.05$ oz

D. $14.25 \pm 0.10$ oz

13. The table below shows the high temperatures for Paris, France and New York City, USA over the same 4-day period.

| | High Temperature | |
|---|---|---|
| Day | Paris | New York City |
| Thursday | 12°C | 48°F |
| Friday | 19°C | 53°F |
| Saturday | 12°C | 53°F |
| Sunday | 13°C | 48°F |

Which city had the higher mean temperature?

A. Paris had the higher mean temperature.

B. New York City had the higher mean temperature.

C. Their mean temperatures were the same.

D. One cannot compare mean temperatures when measured in different systems.

14. The graph below represents the percentages of total spending in Amy's personal budget.
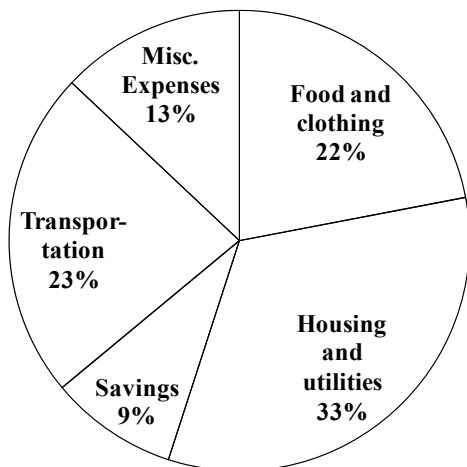


Amy receives a pay increase and decides to put the entire amount into the savings category. When she does this, how will the sizes of the graph's sectors be affected?

A. The sectors will remain the same because there will be the same number of categories.

B. The sectors will remain the same because the percentage in each category will remain the same.

C. The sectors will change because the percentage of savings will increase and the percentages in the other categories will decrease.

D. The sectors will change because the percentage in each category will increase.

15. The table below shows Jeremy's monthly expenses.

| Monthly Expense | Percent of Monthly Income |
|---|---|
| Food and Clothing | 22% |
| Housing and Utilities | 33% |
| Transportation | 13% |
| Health & Personal Care | 6% |
| Savings | 9% |
| Miscellaneous | 17% |

Jeremy earned $4,500 last month. How much did he pay for transportation?

A. $163

B. $180

C. $346

D. $585

16. Dave's windshield has a crack. He must decide who will fix it. Relevant information is listed below.

- Replacing the windshield costs $200.

- Repairing the crack costs $70.

- If he has the windshield repaired, the insurance company will pay half of the cost.

- If he has the windshield replaced by Glass Plus, he pays $25 plus 20% of the cost. His insurance pays the rest.

- If he has the windshield replaced by Mobile Glass, he must pay the full cost; insurance pays nothing.

What is the least amount of money Dave must pay to get the windshield repaired or replaced?

A. $35

B. $65

C. $100

D. $200

17. A bank offers savings certificates as investments. Interest is earned for the actual amount of time the money is in the bank. There are penalties if a certificate is cashed in before the end of its term. The table below shows the interest rates and penalties for certificates of different lengths.

| Length of Certificate | Simple Interest Rate | Early Penalty |
|---|---|---|
| 3–11 months | 0.5% per year | Lose all interest |
| 12–23 months | 1.0% per year | Lose 2 months interest |
| 24–35 months | 2.0% per year | Lose 4 months interest |
| 36–59 months | 3.0% per year | Lose 6 months interest |
| 60 months | 4.0% per year | Lose 6 months interest |

Lucy invested $1,000 in a 36-month certificate, but cashed it in after 30 months. How much interest did Lucy earn?

A. $90

B. $75

C. $60

D. $45

18. A carpenter measures a board to be 37.9 inches in length. The board is actually 38 inches in length. Which expression shows the **percent error** of the carpenter's measurement?

A. $\dfrac{(38-37.9)}{100}$

B. $(38-37.9)\times100$

C. $\left(\dfrac{38-37.9}{37.9}\right)\times100$

D. $\left(\dfrac{38-37.9}{38}\right)\times100$

19. In the diagram below, square ABCD is inscribed inside circle O. The diameter of circle O is 10 feet.
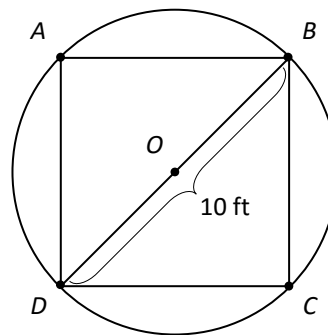


What is the area of square ABCD?

A. 10 ft²

B. 50 ft²

C. 100 ft²

D. 200 ft²

20. The formula for the volume V of a rectangular pyramid is shown below, where h is the height and B is the area of the rectangular base.

$$V = \frac{1}{3}Bh$$

When the volume of a rectangular pyramid is 18 cubic inches, its height is 9 inches, and the length of the base is 3 inches, what is the width of the base?
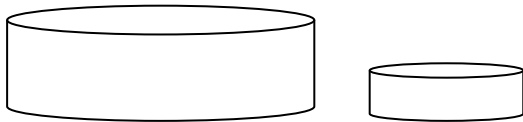
A. 1 inch

B. 2 inches

C. 3 inches

D. 6 inches

21. The cylinder and cone shown in the diagram below have equal volumes and equal heights.
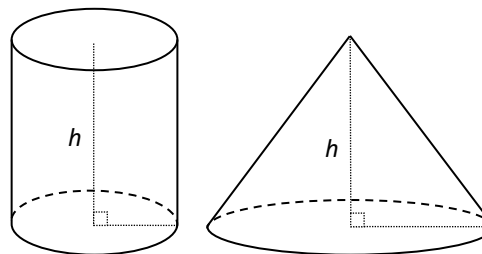


What is the ratio of the radius of the cylinder to the radius of the cone?

A. 1:3

B. 3:1

C. $1:\sqrt{3}$

D. $\sqrt{3}:1$

22. Use the diagrams of cylinders below.



The larger cylinder has a radius of 0.8 inches and a height of 0.6 inches. The smaller cylinder has a radius of 0.4 inches and a height of 0.3 inches. What is the ratio of the volume of the larger cylinder to that of the smaller cylinder?

A.   2 to 1

B.   3 to 1

C.   4 to 1

D.   8 to 1

23. Swimming pools X and Y are similar rectangular prisms. The ratio of the surface area of Pool X to Pool Y is 4:9. What is the capacity of Pool X in terms of the capacity of Pool Y?

A.   $X = \dfrac{8}{27}Y$

B.   $X = \dfrac{27}{8}Y$

C.   $X = \dfrac{4}{9}Y$

D.   $X = \dfrac{9}{4}Y$

24. The formula for the surface area $S$ of a sphere is shown below, where $r$ is the length of the radius.

$$S = 4\pi r^2$$

When the surface area of a sphere is $64\pi$ cm³, what is the length of the radius?

A.   4 cm

B.   8 cm

C.   16 cm

D.   64 cm

25. The diagram below shows a dart board of three rings. The goal is to hit the center ring. A dart player threw five darts and the X's represent the points where the darts hit the board.
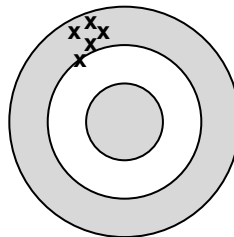


Which statement best describes the dart player's accuracy and precision?

A.   accurate—no;  precise—yes

B.   accurate—no;  precise—no

C.   accurate—yes;  precise—yes

D.   accurate—yes;  precise—no