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Representatives in Australasia, Pacific region and South-East Asia for



**Homeschool Placement Guide
and Adapted Tests
for Australia & New Zealand**

Test originally developed by Saxon Publishers

Modified for Australian use and republished by Kingsley Educational Pty Ltd

2nd Edition January 2005

TO THE STUDENT

You will need two sharpened pencils, a rubber, a ruler, several sheets of clean paper on which to write answers.

Other equipment needed only as stated.

Put your name and age, and the date on each sheet of answers.

Show all your work. This will increase your score. Do not use scrap paper for calculations - show these in your work.

No calculators, cue sheets or reminders.

Leave hard ones till last. Number the answers clearly.

Put the unit (eg \$, m², ft, kg) in each answer.

Remember, this is not a measure of your quality, just of what you have learnt. Don't feel guilty if you don't know.

Work neatly. It helps if you underline final answers.

This is not a time based test, but we expect that you will be able to complete one Part in 30 minutes. However you may take longer if you need.

To the Parent/Teacher

Just as not all twelve year olds wear size 12 clothes, age alone is not the best judge of level. Maths knowledge needs to be based on a firm foundation of previous knowledge and skill. It is essential that each student be placed in the text that meets their individual skill level, rather than a grade level. Thus Saxon offers Placement Tests free to purchasers of their books, to ensure that students begin at their level.

SELECTING TESTS FOR EACH STUDENT

To administer this placement test, select from **Table 1** the tests you will be using. The student should complete one part of one test per sitting. Each sitting should take $\frac{1}{2}$ to $\frac{3}{4}$ of an hour but you may allow a little longer if you wish. Sittings should be on separate days for best results, but if you are in a hurry you could offer up to three parts in a day, with long breaks between when some non-mathematical activity is done.

Having selected the range of tests to be completed, present the student with the first part of the first test, ensuring that the answer sheets are removed. Read through the student instructions with them. Check the starting time and warn the student when they have exceeded 30 minutes; however allow them to continue.

MARKING THE TESTS

When both Part A and Part B have been completed, mark the papers as follows.

Each question is worth 5 points.

Full marks for correct answers with units.

Illegible or ambiguous answers are counted as wrong.

When an answer is wrong but workings are shown, give some credit for correct steps and units.

Take off one point for a unit not shown.

Silly errors (ie you know that the student knew enough to get it right but they lost concentration and made an error in the final answer) are counted as wrong.

Excessive slowness should be taken into account when placing the student - it implies poor recall, and indicates that the student may take the same amount of time over every lesson in that book. (Normal Saxon lessons should be completable in 45 minutes.) If the score is close to 160 but the student exceeded 60 minutes to complete one part of the test, count it as below 160.

Add all the points for parts A & B. If the total is 160 or more, set the next test from your selection for the next day. Do not test beyond the appropriate selection according to **Table 1**. When you reach the end of the selection, or when the child scores below 160 for a test, use **Table 2** to allocate the book to start with.

AGE	DO TESTS
9	1 only
10	1-2
11	1-3
12	1-4
13	2-5
14	3-6
15	4-7
16+	5-8

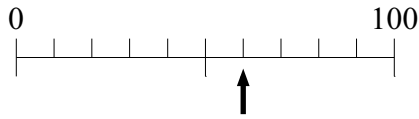
Table 1

LAST TEST >160 score	BEGIN AT
0	Horizons 3
1	Maths 54
2	Maths 65
3	Maths 76
4	Maths 87
5	Algebra 1/2
6	Algebra 1
7	Algebra 2
8	Advanced Math

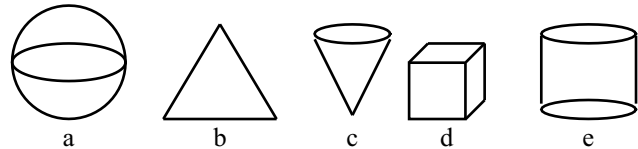
Table 2

TEST ONE Part A

- (a) In the number 87,654,321, which digit is in the Hundred's place?
(b) Which is in the Hundred-Thousand's place?
- Name the place value of the 8 in 185.
- Write the numeral One thousand and Twenty Five.
- Write the standard numeral for $(3 \times 100) + (2 \times 10)$.
- Write 42345 with commas.
- Compare: 60 () 600 .
- Write the answer to $10 \times (2+3) =$
- Which number is next in this series? 24, 20, 16, 12, ?
- To what number is the arrow pointing?



- (a) Which is a triangle? (b) Which is a cylinder?

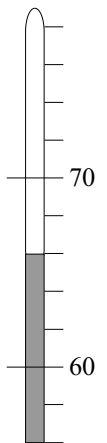
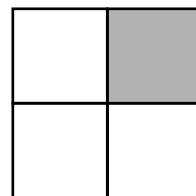
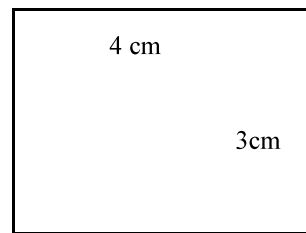


- How many inches is six feet? (1 foot = 12 inches)

- What is the temperature shown on the thermometer?

- What is the perimeter of the rectangle?

- (a) Round 68 to the nearest ten.
(b) Round 142 to the nearest ten.
- (a) Round 123 to the nearest hundred.
(b) Round 478 to the nearest hundred.
- Round 32 and 29 to tens and multiply.
- What fraction of the square is shaded?



- Compare: $\frac{4}{4}$ () 1
- Write the fraction seven tenths.
- (a) $\frac{3}{7} + \frac{2}{7} =$

(b) $\frac{9}{10} - \frac{2}{10} =$

CHECK YOUR WORK

Take a break. Proceed to part B next time.

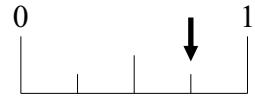
TEST ONE Part B

1. What fraction of the circles is shaded? ○ ○ ● ○ ○
 2. Which is greater than 1? $3/2$, $3/3$, $3/4$ ● ○ ○ ○ ●
 3. Compare: $1/4$ () $1/2$

4. (a) $11/3 + 11/3 =$ (b) $3\frac{1}{2} + 2 =$
 5. (a) $34/7 - 13/7 =$ (b) $4\frac{3}{4} - 2 =$

6. To what number is the arrow pointing?

7. (a) Write the decimal numeral for $43/10$.
 (b) Write the decimal numeral for twelve hundredths.

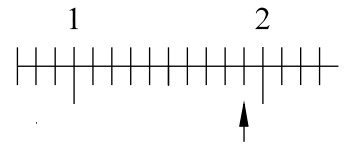


8. Compare: 1 () .2

9.
$$\begin{array}{r} .4 \\ + .5 \\ \hline \end{array}$$
 10.
$$\begin{array}{r} 4.6 \\ - 1.2 \\ \hline \end{array}$$

11. To what decimal is the arrow pointing?

12. (a)
$$\begin{array}{r} \overline{) 70} \\ 20 \\ \hline \end{array}$$
 (b)
$$\begin{array}{r} \overline{) 120} \\ 30 \\ \hline \end{array}$$



13. (a)
$$\begin{array}{r} \overline{) 480} \\ 40 \\ \hline \end{array}$$
 (b)
$$\begin{array}{r} \overline{) 500} \\ 30 \\ \hline \end{array}$$

14.
$$\begin{array}{r} \overline{) 654} \\ 50 \\ \hline \end{array}$$
 15.
$$\begin{array}{r} \overline{) 234} \\ 10 \\ \hline \end{array}$$

16.
$$\begin{array}{r} 25 \\ \times 25 \\ \hline \end{array}$$
 17.
$$\begin{array}{r} 70 \\ \times 24 \\ \hline \end{array}$$

18.
$$\begin{array}{r} 324 \\ \times 24 \\ \hline \end{array}$$
 19.
$$\begin{array}{r} 704 \\ \times 43 \\ \hline \end{array}$$

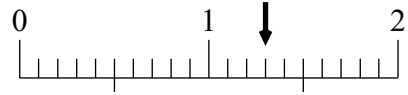
20. $12 \times 125 =$

CHECK YOUR WORK

Hand in Parts A & B for correcting.

TEST TWO Part B

1. (a) Write $\frac{3}{10}$ as a decimal number.
 (b) Use digits to write the decimal number ten and twelve hundredths.
2. The arrow points to what decimal number?



3.
$$\begin{array}{r} \underline{\hspace{1cm}} \\ 6) \$2.34 \end{array}$$
4. (a) $\frac{2}{3} + \frac{2}{3} =$ (b) $\frac{2}{3} \div \frac{1}{2}$
5. (a) $\frac{2}{3} \times \frac{4}{5} =$ (b) $\frac{2}{3} \times 4 =$
6. Compare $\frac{1}{2}$ () $\frac{3}{6}$
7. (a) What number is $\frac{2}{3}$ of 15? (b) $\frac{1}{5} \times 4 \frac{1}{2}$
8. Reduce: $\frac{4}{6}$

9.
$$\begin{array}{r} \underline{\hspace{1cm}} \\ 19) 595 \end{array}$$
10. $6.2 \div 3 + 4.25$

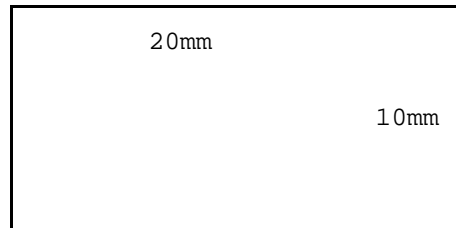
11. $3 - 1.2$
12. Round 7.36 to the nearest whole number.

13.
$$\begin{array}{r} 2.4 \\ \times .6 \\ \hline \end{array}$$

14. Write 40% as a reduced fraction.

15. $.12 \times .3 =$

16. What is the area of this rectangle?



17. (a) $\frac{5}{6} - \frac{2}{3} =$ (b) $.024 \div 3 =$

18.
$$\begin{array}{r} 3 \frac{1}{2} \\ + 1 \frac{1}{3} \\ \hline \end{array}$$
19.
$$\begin{array}{r} \underline{\hspace{1cm}} \\ .6) 2.34 \end{array}$$

20. What is the average of 5, 7, 8 and 12?

CHECK YOUR WORK

Hand in Parts A & B for correcting.

TEST THREE Part A

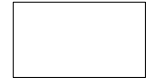
1. Find the average of 9, 7, 12 and 16.
2. If a dozen eggs cost \$1.32, how much would 36 eggs cost?
3. Write the following sentence using digits and symbols.
"The sum of one third and one sixth is one half."
4. If $5a = 20$, then what number is equal to $3a - 1$?
5. Which of these polygons is a hexagon?
6. Write 80% as a reduced fraction.
7. Name the number of shaded circles:



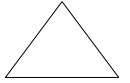
a.



b.



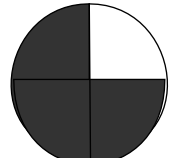
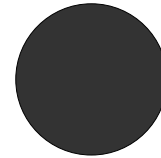
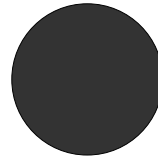
c.



d.

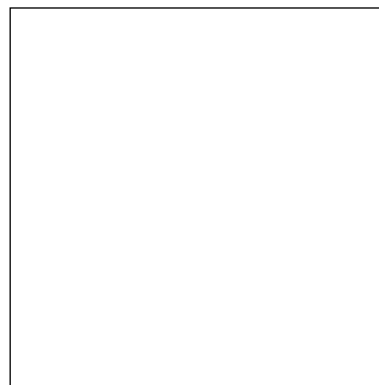
a) as an improper fraction and

b) as a mixed number.

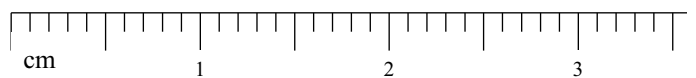


8. $36.42 + 18 + 6.5 =$
9. $5 - 1.375 =$
10. $4.3 \times 10 =$
11. $3.6 \div 100 =$
12. $.42 \times .2 =$
13. $1.2 \div 5 =$
14. $\overline{\quad}$
4) .16
15. $\frac{3}{4} \div \frac{1}{2} =$
16. $\frac{2}{3} - \frac{1}{9} =$
17. $2\frac{1}{2} + 1\frac{1}{3} =$
18. What is the perimeter of this square?

19. What is the area of this square?



20. (a) $10.4 + 6.05 =$
(b) $2.1 \times 0.03 =$



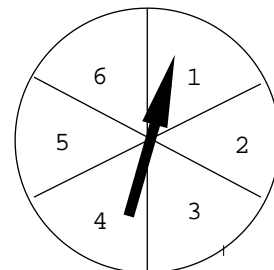
CHECK YOUR WORK

Take a break. Proceed to part B next time.

TEST THREE Part B

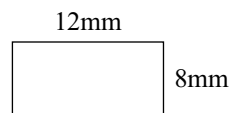
1. If $3a = 9$, then what number is equal to $2a - 1$?
2. Which of these is not equal to $\frac{1}{2}$?
 a) $\frac{5}{10}$ b) $.05$ c) 50% d) $.50$
3. Change $4\frac{1}{2}$ to an improper fraction.

4. What is the probability that the spinner will stop on 5?



5. What is the average of 7, 9, 12, 10 and 12?

6. What is the perimeter of this rectangle?

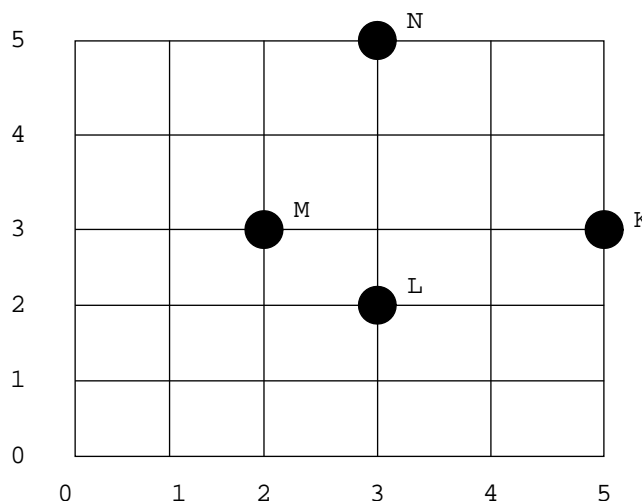


7. What is the area of this rectangle?

8. $3 - 5 =$

9. What letter names the point (3, 5)?

10. Write the location of point L.



11. $16 + 4.27 + 12 + .275 =$

12. $10 - (5.36 - 2) =$

13. $3.6 \times 12 =$

14.
$$\begin{array}{r} \\ 16 \overline{) 437} \end{array}$$

15. $1.8 \div 8 =$

16.
$$\begin{array}{r} \\ .4 \overline{) .56} \end{array}$$

17. $\frac{2}{3} + \frac{1}{4} =$

18.
$$\begin{array}{r} 5\frac{1}{2} \\ - 1\frac{1}{3} \\ \hline \end{array}$$

19. $1\frac{1}{3} \times 4 =$

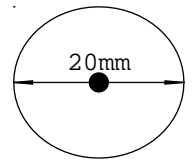
20. $\frac{1}{6} \div \frac{1}{8} =$

CHECK YOUR WORK

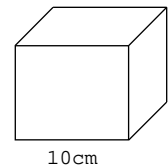
Hand in Parts A & B for correcting.

TEST FOUR Part A

1. If we know that two sides of an isosceles triangle are 6cm and 8cm, then we know that its perimeter must be either 20cm or what?
2. What is the circumference of the circle? (Use $\pi = 3.14$)
3. What is the area of the circle? (Use $\pi = 3.14$)
4. Arrange in order of size from least to greatest: $-1, \sqrt{3}, 2$
5. Find the number that completes the proportion $\frac{6}{y} = \frac{16}{40}$ $y =$
6. What is the probability of a coin landing tails up on one toss?
7. What is the volume of the cube?



8. Thirty is 10% of what number?
9. Six is what percent of twenty?
10. What quadrilateral has only one pair of parallel sides?
(trapezoid, rhombus, parallelogram)



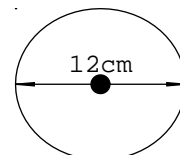
- | | Fraction | Decimal | Percent |
|-----|---|---------|---------|
| 11. | $\frac{7}{50}$ | (a) | (b) |
| 12. | (a) | 0.2 | (b) |
| 13. | (a) | (b) | 250% |
| 14. | $-3 + 7 =$ | | |
| 15. | $-3 - (-2) =$ | | |
| 16. | $(-2)(3) =$ | | |
| 17. | $(-8) \div (-2) =$ | | |
| 18. | $(6 \div 0.3) - (0.3 \div 6) =$ | | |
| 19. | $(1\frac{1}{2} \times 1\frac{1}{3}) - (1\frac{1}{2} \div 1\frac{1}{3}) =$ | | |
| 20. | $(20\% \text{ of } 30) - (30\% \text{ of } 20) =$ | | |

CHECK YOUR WORK

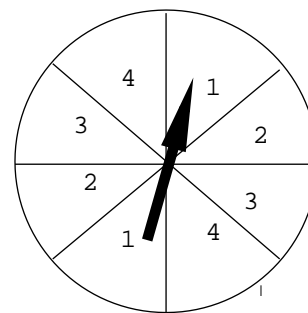
Take a break. Proceed to part B next time.

TEST FOUR Part B

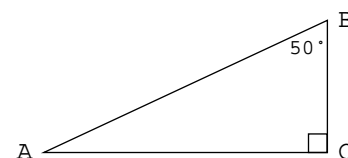
1. Divide 870 by 24 and write the quotient
a) as a mixed number and b) as a decimal number.
2. $3\frac{1}{3} - (1\frac{1}{2} + 1\frac{3}{4}) =$
3. $1\frac{2}{3} \times (3 \div 1\frac{1}{2}) =$
4. $(0.3 + 0.27) - (0.3 \times 0.27) =$
5. $0.5 \div (1 \div 0.05) =$
6. Complete the proportion: $\frac{16}{w} = \frac{12}{15}$ $w =$
7. $\sqrt{100} + 4^3 =$
8. What is the area of the circle? (Use $\pi = 3.14$)



9. What is the circumference of the circle? (Use $\pi = 3.14$)
10. What is the value of y in $y = a + bc$ when $a = 3$, $b = 4$ and $c = 5$?
11. What is the probability that the spinner will stop on 2?

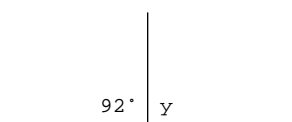


12. What is 6% of 200?
13. Twenty is 25% of what number?
14. (a) $(-8) + (-2) =$ (b) $(-8) - (+2) =$
15. (a) $(-8)(+2) =$ (b) $(-8) \div (-2) =$
16. What is the measure of the angle A in triangle ABC?



- | | Roman numeral | Arabic numeral |
|-----|---------------|----------------|
| 17. | CCXXIX | (a) |
| | (b) | 124 |

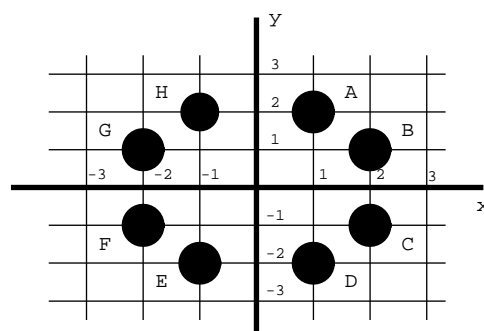
18. What is the measure of angle y ?
19. Which point has the coordinates $(1, -2)$?



20. What are the coordinates of the point H?

CHECK YOUR WORK

Hand in Parts A & B for correcting.



TEST FIVE Part A

- Find the (a) mean, (b) median, (c) mode, and (d) range for the following scores: 88, 92, 89, 95, 88, 90, 89, 88, 87, 84
- One card is drawn from a normal deck of 52 cards. What is the probability of drawing a red 5?

3. What is the area of the shaded region of this rectangle?

4. Maria can exchange \$200 for 300 Swiss francs. At that rate, how many dollars would a 210 franc Swiss watch cost?

5. The bag was filled with red marbles and blue marbles in the ratio of 5 to 7. If there were 180 marbles in the bag, how many were red?

6. During the off-season, the room rates at the resort were reduced 35%. If the usual rate was \$120 per day, what was the off-season rate?

7. Find the perimeter of this figure. Dimensions are in centimeters. Use 3.14 for pi (π).

8. Write an equation to solve: what is 7.5% of \$80?

9. Write an equation to solve: ten percent of what number is 350?

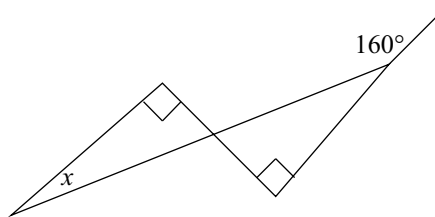
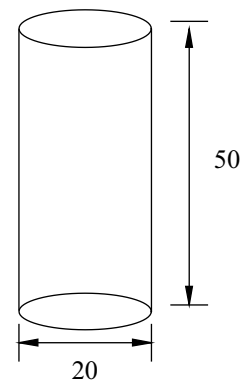
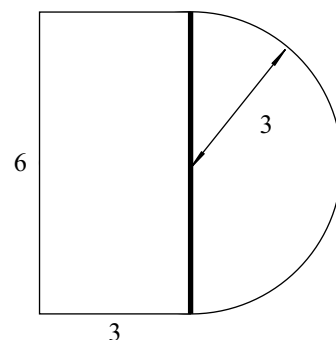
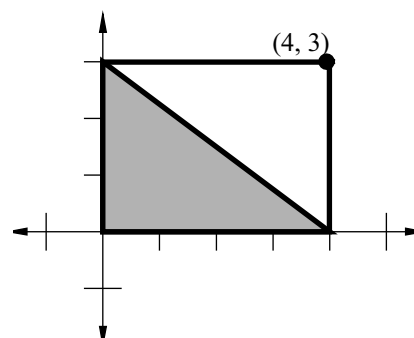
10. Use the formula $t = 0.06p$ to find t when p is 8.5.

11. Make a table that shows 3 pairs of numbers for the function $y = 2x - 1$. Then graph these pairs on the coordinate plane and draw a line through these points.

12. Find the volume of this right circular cylinder. Dimensions are in centimeters.

13. What is the surface area of a cube whose sides are 3 inches long?

14. Find $m\angle x$ in this figure.



For 15 to 19, solve and check.
Show all steps.

15. $1\frac{2}{3}x - 15 = 45$

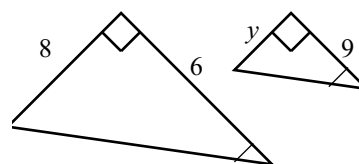
16. $\frac{m}{35} = 1.6/14$

17. $100 - \{80 - 3[2 + 2(3^2)]\}$

20. The triangles are similar. Find y .

18. $3\frac{3}{4} + 11\frac{1}{4} \times 8$

19. $\frac{(-6) - (7)(-4) - 1}{(-1) + (-2)}$

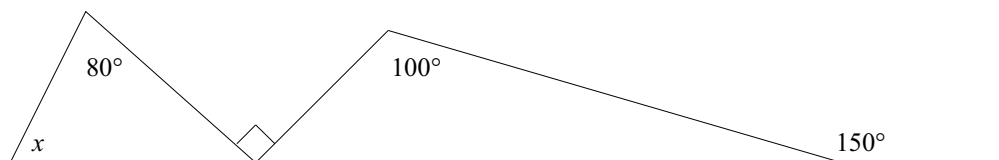
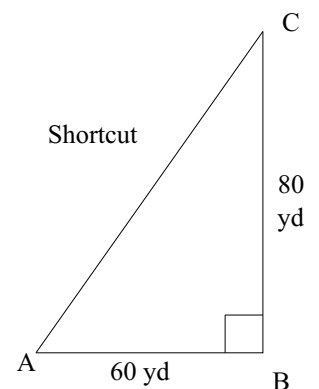


CHECK YOUR WORK

Take a break. Proceed to part B next time.

TEST FIVE Part B

1. The regular price was \$21, but the item was on sale for 30% off. What was the sale price?
2. If 22 kilograms of seed cost \$37, how much would 42 kilograms cost at the same price?
3. An item was on sale for 30% off the regular price. If the sale price was \$21, what was the regular price?
4. One American billion equals a thousand million. A British billion is a million million. Give two answers in scientific notation to this question: Ten billion is how much greater than nine hundred million?
5. The median of these numbers is how much less than the mean?
1.5, 0.6, 0.7, 0.85, 5.3
6. What is the probability of having a coin turn up heads on three consecutive tosses?
7. What percent of \$30 is \$4.50? Write an equation.
8. Tim left \$3000 in an account that paid 8% simple interest annually. How much interest was earned in 2 years?
9. The points (0,3), (-3,1), and (3,1) are the vertices of a triangle. Find the area of the triangle.
10. Convert 4 ft² to square inches.
11. If Jan walks from point A to point B to point C she walks 140 yards. How many yards would she save by taking the shortcut from point A to point C?
12. Find the volume of a pyramid 20m high, with a square base, 30m by 30m.
13. Make a table that shows 3 pairs of numbers for the function $y = -x + 2$. Then graph the number pairs on a coordinate plane and draw a line through the points to show the other number pairs of the function.
14. Use the formula $A = bh/2$ to find h where $A = 20$ and $b = 10$.
15. Find $m\angle x$.



Solve and check.
Show all steps.

16. $1\frac{3}{5}w - 17 = 23$
17. $7.5/a = 25/20$
18. $1.5 \text{ km} - 860 \text{ m} = \underline{\hspace{2cm}} \text{ m}$
19. $2\frac{2}{3} + (2\frac{1}{2} \div 6)$
20. $(-7) - (-3) + (2)(-3)/(-3) - (2)$

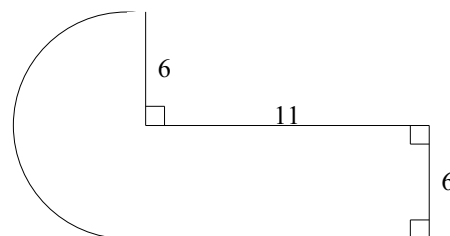
CHECK YOUR WORK

Hand in Parts A & B for correcting.

TEST SIX Part A

A PROTRACTOR, RULER, AND COMPASS ARE NEEDED FOR THIS TEST.

1. When the battle was over, the ratio of those standing to those who had fallen was 9 to 4. If 3978 began the battle, how many had fallen?
2. The product of a number and -7 increased by 13 is 53 more than the product of 4 and the number. What is the number?
3. The number of students taking the class increased 250 percent. If there are 70 students in the class, how many were there in the beginning?
4. A single six-sided dice is rolled three times. The first two tries are both six. What is the probability of the third try being a six?
5. What base 10 number does 10101 (base 2) represent?
6. What percent of 140 is 112? Draw a diagram of the problem.
7. Find the volume in cubic inches of a right solid whose base is shown on the left and whose height is 2 feet. Dimensions are in inches. Use 3.14 for π .
8. If $8x + 3 = -1$, what is the value of $4x + 2$?
9. Use the distributive property to multiply: $mn^2 (m^2 + m^2n + 3m/4n^2)$
10. Simplify by adding like terms: $2ab^2c + 3ac^2 - cac + bcba$
11. Use the cut-and-try method to estimate $\sqrt{67}$ to one decimal place.
12. Evaluate: $-3mn + 2m^2$ if $m = -2$ and $n = -1$



Solve:

13. $4x + 6 = -2x + x - 19$
14. $\frac{-1/4}{9/16} = \frac{x}{9/16}$
15. $-[(-3)^2]-3$
16. $5x^2yy^3xy^2x^3xy$
17. $\frac{-2^3 - 2^2(3-2^2)}{(-2)^3 - (-2)^2}$
18. Use a protractor to draw an 80° angle. Then use a straightedge and a compass to copy the angle.
19. Convert 43,218,065 millilitres to litres.
20. Use a ruler to draw a line segment 13 centimeters long. Construct a perpendicular to the line at a point 5 centimeters from the right endpoint.

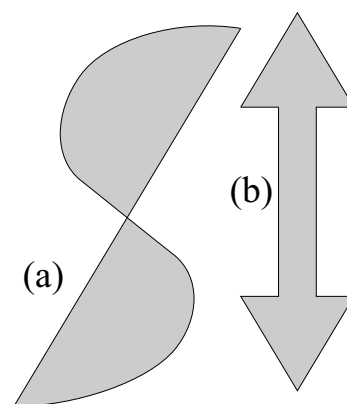
CHECK YOUR WORK

Take a break. Proceed to part B next time.

TEST SIX Part B

A PROTRACTOR, RULER, AND COMPASS ARE NEEDED FOR THIS TEST.

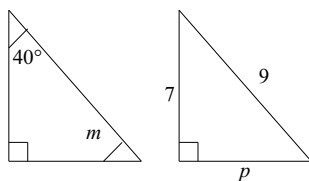
1. The urn contained 40 marbles: 12 were white, 18 were red, and 10 were blue. One marble was drawn and then put back. Then a second marble was drawn. What is the probability that both marbles were blue?
2. Forty percent of the voters did not like the candidate. If 8418 liked the candidate, how many voters were there?
3. The ratio of yellors to screamers was 6 to 11. If 476 were in the hall, how many of them were yellors?
4. Graph each point on a rectangular coordinate system: (a) (3,-2) (b) (-3,0)
(c) (-2,2)
5. Construct a triangle whose sides are 4 centimeters, 6 centimeters, and 3 centimeters.
6. Sketch the figures on the right and draw in the lines of symmetry. Which figure is symmetrical about a point?
7. Convert 10110110 (base 2) to base 10.
8. Thirty percent of what number is 183?
9. Convert 24 cubic yards to cubic inches.
10. If $12x - 7 = -1$, what is the value of $4x + 3$?
11. Evaluate: $mp^2 - m^3$ if $m = -3$ and $p = -2$



12. Solve $6x + 2 - 3x = -7 - 2x - x + 12$
13. Solve $-4\frac{1}{2}x + 3\frac{1}{3} = \frac{7}{4}$
14. Simplify: (a) $(-3)^{-4}$ (b) $-(\frac{1}{3})^{-4}$
15.
$$\frac{(-1)^9 - 3(2^3 - 3 \cdot 5)}{2(\sqrt[3]{-27} + 3^2)}$$

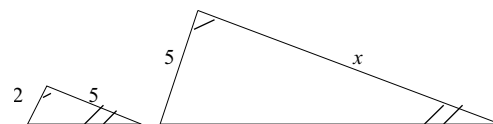
16. $\frac{3}{7}(2\frac{1}{3} \cdot \frac{1}{5} - \frac{1}{4} \cdot \frac{3}{5})$

17. Find (a) angle m and
(b) side p :



18. Find side x :

19. Use a protractor to draw a 103° angle. Then use a straightedge and a compass to bisect the angle.



20. (a) How many ways can 6 objects be arranged in a row? (b) How many ways can 4 of the 6 objects be arranged in a row?

CHECK YOUR WORK

Hand in Parts A & B for correcting.

TEST SEVEN Part A

1. Leans varied directly as fats squared. When there were 27 leans, there were 3 fats. How many leans would there be if there were 5 fats?
2. Hooks varied inversely as the number of crooks squared. When there were 8 hooks, there were 4 crooks. If there were 8 crooks, how many hooks would there be?
3. At first there were 1000 kangaroos in Australia. Their number tripled every year for 8 years. How many kangaroos were there at the end of 8 years?
4. Find x : $\frac{w}{x} - \frac{y}{z} = m$

Factor the following trinomials:

5. $2x^2 + 5x - 3$
6. $8 - 14x + 3x^2$
7. $-14x - 3 + 5x^2$

Factor by grouping:

8. $xy + 12 + 3x + 4y$
9. $mnp - mnq + 3p - 3q$
10. $ac^2 + abc + 5b + 5c$
11. Graph: $y \geq x/2 - 3$

Graph on a number line:

12. $-3 - |x| < -5$; $D = \{\text{Reals}\}$
13. $2 < x + 3 \leq 2$; $D = \{\text{Integers}\}$
14. Solve: $\sqrt{x - 3} - 5 = 4$
15. Solve: $\sqrt{2x + 3} + 1 = 6$
16. Find the equation of the line that passes through the points (1,4) and (-3,3)
17. Simplify: $\sqrt{7/2}$
18. $\frac{2\sqrt{18} - \sqrt{2}}{\sqrt{2}}$
19. Multiply: $(1 - 3\sqrt{2})(2 + \sqrt{2})$
20. Evaluate: $mn^2 - m^0n + n^2$ if $m + 2 = 1$ and $n - 1 = 1$

CHECK YOUR WORK

Take a break. Proceed to part B next time.

TEST SEVEN Part B

1. A single six-sided dice is rolled three times. What is the probability that a 6 will appear all three times?
2. The number of green beads varied inversely as the square of the number of yellow beads. When there were 8 greens, there were 5 yellows. How many greens would there be if there were 10 yellows?

Solve the following quadratic equations by completing the square:

3. $x^2 - 16 = 6x$
4. $x^2 + 1 = 3x$
5. $x^2 = 9 - 7x$

Use the quadratic formula to solve the following quadratic equations:

6. $3x = 4 - x^2$
7. $2x^2 - 6 = 3x$

Factorize the following trinomials:

8. $3x^2 + x - 14$
9. $15 + 2x^2 - 11x$

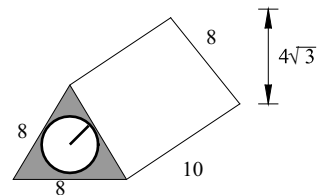
Factorize by grouping:

10. $xy - 2a - 2x + ay$
11. $2amn - 6n - 3m + am^2$
12. Simplify: $\frac{3\sqrt{3} + \sqrt{3}}{\sqrt{3}}$
13. Simplify: $(5 + 2\sqrt{3})(\sqrt{3} - 3)$
14. Solve: $\sqrt{3m - 5} - 4 = -3$
15. Solve: $5x/2 - x - 2/3 = 7$

16. Find the equation of the line through (3,-6) that is parallel to $y = 2/3x + 3$

17. Graph on a number line: $5 \leq x + 3 < 7$; $D = \{\text{Reals}\}$

18. A cylinder whose radius is 2 inches is removed from the right prism as shown. The ends of the prism have the shape of an equilateral triangle whose sides are 8 inches long. Find the volume of the remaining solid in cubic inches. Dimensions are in inches.



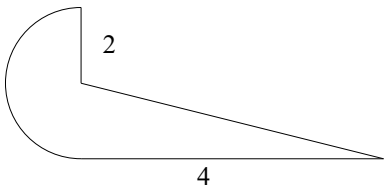
19. Melinda walked to the mall at 4 miles per hour and then rode back home in a bus at 24 miles per hour. If her total travelling time was 14 hours, how far was it to the mall?
20. Scott and Heather cut a 160-foot cord into two lengths. The ratio of the lengths was 7 to 1. How long was each length?

CHECK YOUR WORK

Hand in Parts A & B for correcting.

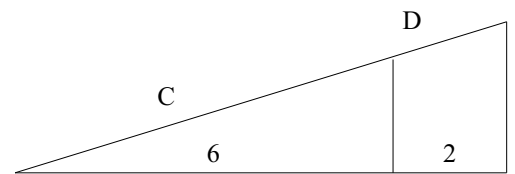
TEST EIGHT Part A

1. The money box contained three types of Australian coins - 9 coins in all. The total value was \$2.60. If there were three times as many ten cent pieces as fifty cent pieces, and the others were gold, how many of each type were there? (NB if you are not Australian, please convert this to your local currency. If this is difficult, talk to Kingsley Educational. In the texts you may want to do similar conversions)
2. After visiting the USA, your uncle showed you some coins he brought home. You note that the 25-cent coin is called a quarter, the 5-cent a nickel and the 1-cent a penny. He has 16 of these coins all together, with a total value of 80 cents. How many coins of each type were there, if there are five times as many pennies as quarters?
3. The sum of the digits of a two digit counting number was 8. When the digits were reversed, the new number was 18 greater than the original number. What was the original number?
4. A boat can travel 5 miles per hour on still water. It travelled 24 miles downstream in half the time it took to travel 12 miles upstream. What is the speed of the water?
5. Malcolm was in a hurry, so he did not object to paying \$60 for the machine, although it was marked up 75% of the selling price. What was the markup, and what did the store pay for it?
6. Complete the square as an aid in graphing: $y = -x^2 - 2x + 1$



7. The figure at left is the base of a solid 2 meters high. Dimensions are in meters. Find volume in cubic meters.
8. Find the pH of the solution when the concentration of hydrogen ions (H^+) in moles per litre is .00365
9. Find the pH when the concentration is 12.3×10^{-4}

10. Find the concentration of hydrogen ions when the pH of the liquid is 4.152
11. Find C in the triangle diagram at right.

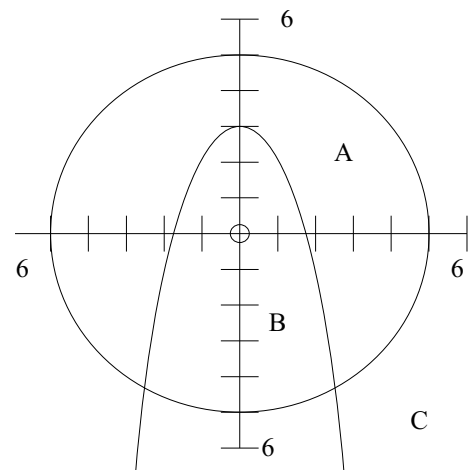


12. Graph on a number line: $A = \{x \in \mathbb{R} \mid x^2 > -x + 2\}$
13. Graph on a number line: $B = \{x \in \mathbb{J} \mid |x| - 2 \leq 1\}$
14. Express 2.018 as a fraction of integers.
15. Expand: $(x^{1/3} - y^{1/2})^2$
16. Factor: $x^3 - 8m^3y^9$
17. Express 5.875 as a fraction and as a percent.

18. The coordinates of points in which of the areas designated by the figure satisfy this pair of inequalities?

$$\begin{cases} x^2 + y^2 \leq 25 \\ y \geq -x^2 + 3 \end{cases}$$

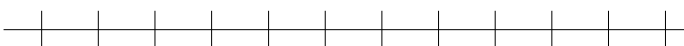
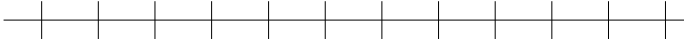
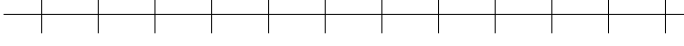
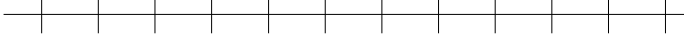
19. Simplify: $\frac{i-1}{1-i} + 2i^3$
20. Simplify: $\frac{2i^2 - 1}{1 - i^2}$

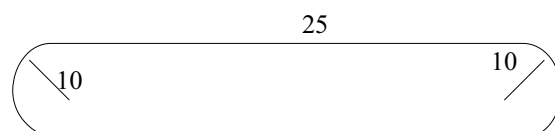
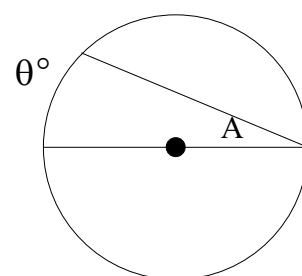


CHECK YOUR WORK

Take a break. Proceed to part B next time.

TEST EIGHT Part B
LOGARITHM TABLES NEEDED FOR THIS TEST

1. Sixty litres of a 60% alcohol solution must be weakened so that it is only 30% alcohol. How many litres of water must be added to the 60% solution to achieve the desired result?
2. The pressure of a quantity of ideal gas was held constant at 100 torr. The initial volume and temperature were 100 litres and 30 K. What would be the final temperature if the volume were decreased to 33 litres?
3. Carlos was twice as old as his younger brother Jorge. Six years later, Carlos discovered that twice his age exceeded three times Jorge's age by only 3. How old were Carlos and his brother in the beginning?
4. Little Winston was disappointed because he was 7 years younger than his big brother Luke. Yet in 10 years he was much happier because twice his age exceeded Luke's age by 17. How old were Winston and Luke in the beginning?
5. Graph on a number line: $(x - 2)/(x + 2) \leq 2$, $D = \{\text{Reals}\}$ 
6. Graph: $\{x \in \mathbb{J} \mid |x - 2| < 3\}$ 
7. Graph: $\{x \in \mathbb{R} \mid |x - 1| \geq 2\}$ 
8. Use logarithms to calculate $\frac{3.184 \text{ E } +3}{.0073 \text{ E } -4}$ 
9. Use logarithms to calculate $(316,000)^{1/2}$
10. Find the pH of the solution when the concentration of hydrogen ions (H^+) in moles per litre is 3.51×10^{-10}
11. Find the pH when the concentration of hydrogen ions is 7.62×10^{-4}
12. Find the concentration of hydrogen ions (H^+) in moles per litre when the pH of the liquid is 4.25.
13. In the circle on the right, prove that $m\angle A$ is half of θ .
14. Convert 400 centimeters per hour to yards per second.
15. Show that $.03\overline{6}$ is a rational number by expressing it as a fraction of integers.
16. Solve:
$$\begin{cases} 5x - y = 7 \\ x - 2z = -1 \\ y + z = -1 \end{cases}$$
17. Simplify: $\frac{3 - \sqrt{3}}{\sqrt{3} - 1}$
18. Complete the square as an aid in graphing $y = -x^2 - 6x - 6$
19. Find an angle whose measure is 3 greater than twice the measure of its complement.
20. Find the area of the figure. Dimensions are in centimeters.



CHECK YOUR WORK

Hand in Parts A & B for correcting.

Answers

- Test 1 Part A**
1. (a) 3 (b) 6
 2. tens
 3. 1025
 4. 320
 5. 42,345
 6. <
 7. 50
 8. 8
 9. 60
 10. (a) b (b) e
 11. 72
 12. 66°
 13. 14cm
 14. (a) 70 (b) 140
 15. (a) 100 (b) 500
 16. $30 \times 30 = 900$
 17. $\frac{1}{4}$
 18. =
 19. $\frac{7}{10}$
 20. (a) $\frac{5}{7}$ (b) $\frac{7}{10}$

- Test 1 Part B**
1. $\frac{3}{10}$
 2. $\frac{3}{2}$
 3. <
 4. (a) $\frac{22}{3}$ (b) $5\frac{1}{2}$
 5. (a) $\frac{21}{7}=3$ (b) $2\frac{3}{4}$
 6. $\frac{3}{4}$
 7. (a) 4.3 (b) 0.12
 8. >
 9. 0.9
 10. 3.4
 11. 1.9
 12. (a) $3\frac{1}{2}$ (b) 4
 13. (a) 12(b) $16\frac{2}{3}$
 14. $13\frac{4}{50}$
 15. 23.4
 16. 625
 17. 1680
 18. 7776
 19. 30272
 20. 1500

- Test 2 Part A**
1. 30
 2. 532
 3. 182
 4. 1480
 5. 82
 6. 4
 7. 73
 8. (a) 90 (b) 2
 9. 11:30am
 10. $\frac{1}{3}$
 11. (a) 500 (b) 2
 12. (a) $105\frac{5}{6}$ (b) 15.13
 13. b
 14. (a) $\frac{3}{8}$ (b) $6\frac{1}{3}$
 15. (a) 5 (b) $4\frac{2}{3}$
 16. 25mm
 17. 1,500,000
 18. 516
 19. 28,782
 20. $\frac{10}{10} = 1$

- Test 2 Part B**
1. (a) 0.3 (b) 10.12
 2. 1.3
 3. 39c
 4. (a) $1\frac{1}{3}$ (b) $1\frac{1}{3}$
 5. (a) $\frac{8}{15}$ (b) $\frac{8}{3} = 2\frac{2}{3}$
 6. =
 7. (a) 10 (b) $\frac{9}{10}$
 8. $\frac{2}{3}$
 9. 31 r 6
 10. 6.316
 11. 1.8
 12. 7
 13. 1.44
 14. $\frac{2}{5}$
 15. .036
 16. 200 mm²
 17. (a) $\frac{1}{6}$ (b) 0.008
 18. $4\frac{5}{6}$
 19. 3.9
 20. 8

- Test 3 Part A**
1. 11
 2. \$3.96
 3. $\frac{1}{3} + \frac{1}{6} = \frac{1}{2}$
 4. 11
 5. a
 6. $\frac{4}{5}$
 7. (a) $\frac{11}{4}$ (b) $2\frac{3}{4}$
 8. 60.92
 9. 3.625
 10. 43
 11. 0.036
 12. 0.084
 13. 0.24
 14. 0.04
 15. $1\frac{1}{2}$
 16. $\frac{5}{9}$
 17. $3\frac{5}{6}$
 18. 8 cm
 19. 4 cm²
 20. (a) 16.45 (b) 0.063

- Test 3 Part B**
1. 5
 2. b
 3. $\frac{9}{2}$
 4. $\frac{1}{6}$
 5. 10
 6. 40 mm
 7. 96 mm²
 8. -2
 9. N
 10. (3,2)
 11. 32.545
 12. 6.64
 13. 43.2
 14. 27 r 5
 15. 0.225
 16. 1.4
 17. $\frac{11}{12}$
 18. $4\frac{1}{6}$
 19. $5\frac{1}{3}$
 20. $\frac{1}{3}$

- Test 4 Part A**
1. 22 cm
 2. 62.8 mm
 3. 314 mm²
 4. -1, $\sqrt{3}$, 2
 5. $y = 15$
 6. $\frac{1}{2}$
 7. 1000 cm²
 8. 300
 9. 30%
 10. trapezoid
 11. (a) 0.14 (b) 14%
 12. (a) $\frac{1}{5}$ (b) 20%
 13. (a) $2\frac{1}{2}$ (b) 2.5
 14. 4
 15. -1
 16. -6
 17. 4
 18. 19.95
 19. $\frac{7}{8}$
 20. 0

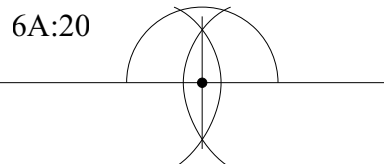
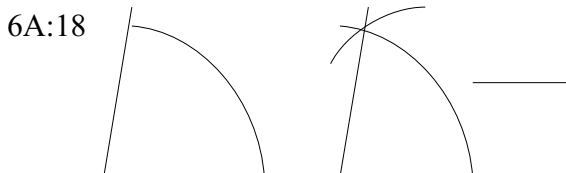
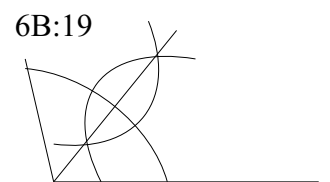
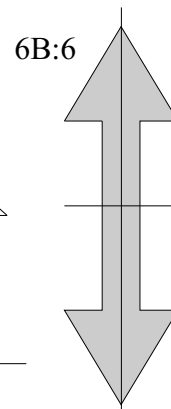
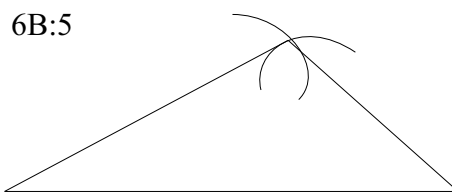
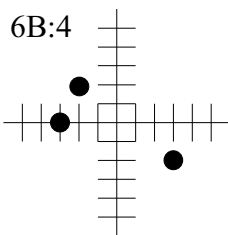
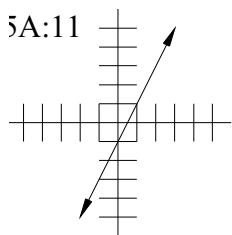
- Test 4 Part B**
1. (a) $36\frac{1}{4}$ (b) 36.25
 2. $\frac{1}{12}$
 3. $3\frac{1}{3}$
 4. 0.489
 5. $\frac{1}{40}$
 6. $w = 20$
 7. 74
 8. 226.08
 9. 37.68
 10. $y = 23$
 11. $\frac{1}{4}$
 12. 12
 13. 80
 14. (a) -10 (b) -10
 15. (a) -16 (b) 4
 16. 40°
 17. (a) 229 (b) CXXIV
 18. 88°
 19. D
 20. (-1, 2)

- Test 5 A**
- (a) 89 (b) 89.5
(c) 88 (d) 11
 - $\frac{1}{26}$
 - 6 units²
 - \$140.00
 - 75 marbles
 - \$78 per day
 - 21.42 cm
 - \$6.00
 - 3500
 - 0.51
 - (see below)
 - 15,700 cm³
 - 54 in.²
 - 20°
 - 36
 - 4
 - 80
 - 30 $\frac{1}{4}$
 - 7
 - 12

- Test 5 B**
- \$14.70
 - \$70.64
 - \$30
 - 9.1 x 10⁹
9.9991 x 10¹²
 - 1.16
 - $\frac{1}{8}$
 - 15%
 - \$480.00
 - 6 units²
 - 576 in.²
 - 40 yards
 - 6000 m³
 - y = -x + 2
 - 4
 - 60°
 - 25
 - 6
 - 640
 - 3 $\frac{1}{12}$
 - 2

- Test 6 A**
- 1224
 - $-\frac{40}{11}$
 - 28
 - $\frac{1}{6}$
 - 21
 - 80%
 - 2940.48 in.³
 - 0
 - m³n² + m³n³ + $\frac{3}{4}$ m²
 - 3ab²c + 2ac²
 - 8.2
 - 2
 - 5
 - $-\frac{1}{4}$
 - 6
 - 5x⁵y⁷
 - $\frac{1}{3}$
 - (see below)
 - 43281.065 litres
 - (see below)

- Test 6 B**
- $\frac{1}{16}$
 - 14030
 - 168
 - (see below)
 - (see below)
 - See below. (a) is symmetrical about a point.
 - 182
 - 610
 - 1119744 yd³ =
24(12)(12)(12)(3)(3)(3)
 - 5
 - 15
 - $\frac{1}{2}$
 - $\frac{19}{54}$
 - (a) $\frac{1}{81}$ (b) -81
 - $\frac{5}{3} = 1\frac{2}{3}$
 - $\frac{19}{140}$
 - (a) 50° (b) $\sqrt{32}$
 - $25/2 = 12\frac{1}{2}$
 - (see below)
 - (a) 720 (b) 24



Test 7 A

1. 75
2. 2
3. 6,561,000
4. $wz/(mz+y)$
5. $(2x-1)(x+3)$
6. $(3x-2)(x-4)$
7. $(5x+1)(x-3)$
8. $(y+3)(x+4)$
9. $(mn+3)(p-q)$
10. $(ac+5)(b+c)$
11. (see below)
12. (see below)
13. \emptyset
14. 84
15. 11
16. $y = x/4 + 15/4$
17. $\sqrt{14}/2$
18. 5
19. $-4 - 5\sqrt{2}$
20. -2

Test 7 B

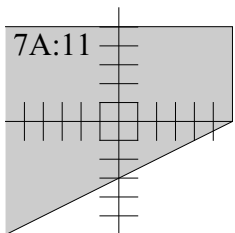
1. $1/216$
2. 2
3. 8, -2
4. $(3 \pm \sqrt{5})/2$
5. $(-7 \pm \sqrt{85})/2$
6. 1, -4
7. $(3 \pm \sqrt{57})/4$
8. $(3x+7)(x-2)$
9. $(2x-5)(x-3)$
10. $(x+a)(y-2)$
11. $(am-3)(2n+m)$
12. 4
13. $-9 - \sqrt{3}$
14. 2
15. $38/13$
16. $y = 2/3 x - 8$
17. (see below)
18. 151.53 in^3
19. 48 miles
20. 140 ft, 20 ft

Test 8 A

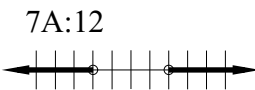
1. 1 \$1, 2 50c, 6 10c
2. 1 25c, 10 5c, 5 1c
3. 35
4. 3 mph
5. \$45; \$15
6. (see below)
7. $8+8\pi \text{ m}^3$
8. 2.4377
9. 2.9101
10. 7.05×10^{-5}
11. $3\sqrt{5}$
12. (see below)
13. (see below)
14. $1998/990$
15. $x^{2/3} - 2x^{1/3}y^{1/2} + y$
16. $(x - 2my^3)(x^2 + 2my^3x + 4m^2y^6)$
17. $57/8 \text{ } 587.5\%$
18. A
19. $-1/2 + 3/2j$
20. $-3 - \sqrt{2}$

Test 8 B

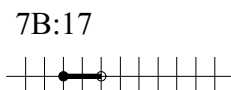
1. 60 litres
2. 110 K
3. 9 and 18
4. 14 and 21
5. (see below)
6. (see below)
7. (see below)
8. 4.42×10^9
9. 5.62×10^2
10. 9.4547
11. 3.1180
12. 5.62×10^{-5}
13. See diagram. Angles B and C are equal because the circle BCo is isosceles (two of its sides are radii and thus equal); similarly with A and D. Angle BoC has the same measure as θ (by definition). $A+D+o' = 180^\circ$; $o+B+C = 180^\circ$ (angles in a triangle). $B = C$
 $\therefore \theta + 2C = 180$. $A + (D+C) + B = 180^\circ \therefore 2A + 2C = 180^\circ$. Taking the last two statements, $2A = \theta$. QED.
14. $400/2.54/12/3/60/60 = 0.0012 \text{ yds/sec}$
15. $2/55$
16. (1, -2, 1)
17. $\sqrt{3}$
18. (see below)
19. 61°
20. 814 cm^2



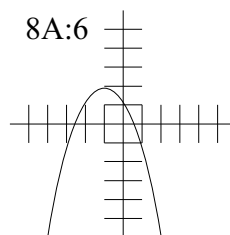
7A:11



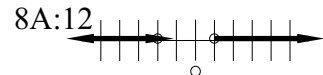
7A:12



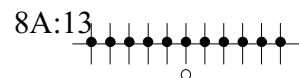
7B:17



8A:6



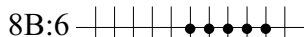
8A:12



8A:13



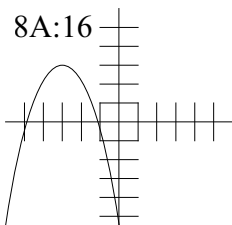
8B:5



8B:6

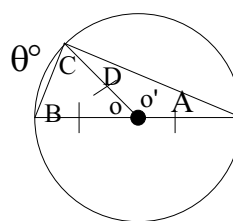


8B:7



8A:16

8B:13



8B:18