

## Grade 7 Mathematics Midterm Exam Review

Name: Key

### Unit 1: Patterns and Relations:

1. Complete the table by writing the divisibility rule for each number.

Number	Divisibility Rule: A number is divisible by:
2	If the last digit is even (0, 2, 4, 6 or 8).
3	If the sum of the digits is divisible by 3. ex: 153 $\rightarrow 1+5+3=9$ , since 9 is divisible by 3 so is 153.
4	If the digit formed by the last two numbers is divisible by 4.
5	If it ends in a 5 or 0.
6	If it is divisible by 2 and 3.
8	If the digit formed by the last 3 digits is divisible by 8.
9	If the sum of the digits is divisible by 9.
10	If it ends in a 0.

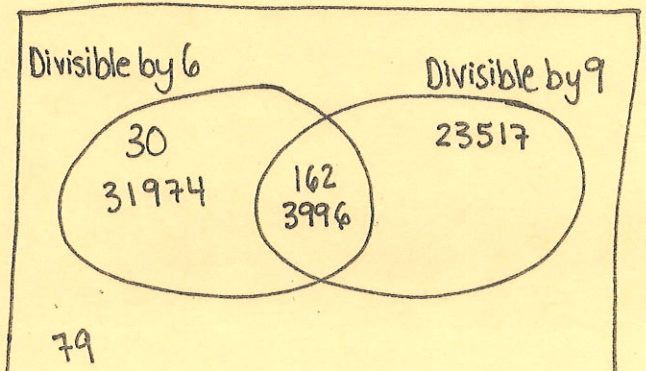
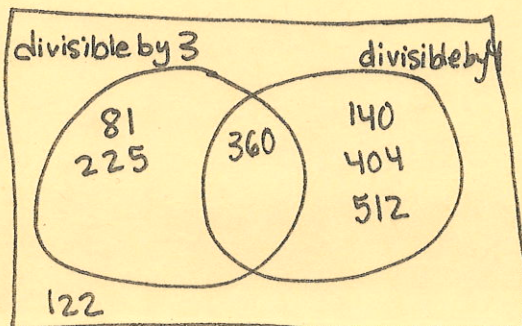
2. Fill in the chart for divisibility rules with either yes / no.

	2	3	4	5	6	8	9	10
324	Yes	Yes	Yes	No	Yes	No	Yes	No
1 234	Yes	No	No	No	No	No	No	No
900 000	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

3. Use a Venn or Carroll diagram to sort each set of numbers:

A. 81, 122, 140, 225, 360, 404, 512  
(Divisible by 3 and/or 4)

B. 30, 79, 162, 3996, 23517, 31974  
(Divisible by 6 and/or 9)



4. Name each of the following as either an equation or an expression:

A)  $3x$   
expression

B)  $5m+3$   
expression

C)  $5t = 9$   
equation

D)  $4s + 3 = 7$   
equation

E)  $4m + 8m - 3$   
expression

5. Identify the variable, constant term and numerical coefficient for each of the following expressions and equations.

	Variable	Constant Term	Numerical Coefficient
$3b+1$	$b$	$1$	$3$
$2w$	$w$	$-$	$2$
$y + 6$	$y$	$6$	$1$
$-4n-6$	$n$	$-6$	$-4$
$5$	$-$	$5$	$-$

6. Write each expression below as an algebraic expression

A) 6 more than a number  $n+6$  or  $6+n$

B) 10 less than a number  $n-10$

C) Double a number  $2n$

D) 5 more than 6 times a number  $5+6n$  or  $6n+5$

7. Substitute the value  $x = 2$  into the following expressions

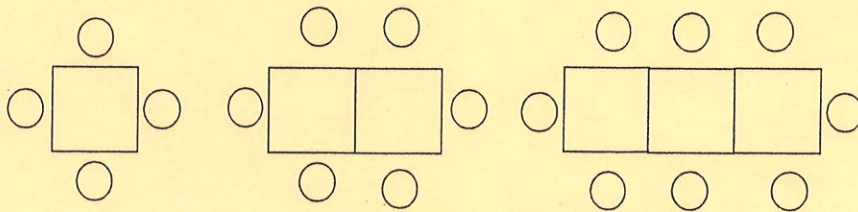
A)  $3x + 5 = 3(2) + 5 = 6 + 5 = 11$

B)  $\frac{x}{2} - 3 = \frac{2}{2} - 3 = 1 - 3 = -2$

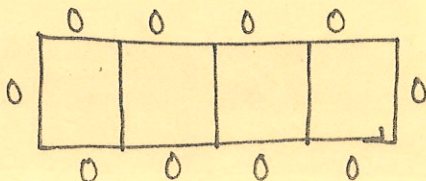
C) Three less than  $x$   $x - 3 = 2 - 3 = -1$

D)  $10 - \frac{x}{2} = 10 - \frac{2}{2} = 10 - 1 = 9$

8. Look at the pattern of people sitting at tables below.



A.) Draw the next figure



B.) Complete the table of values

Number of Tables $n$	Number of People $P$
1	4
2	6
3	8
4	10
5	12

numerical coefficient.

C.) Describe the pattern in words.

The number of people is 2 more than 2 times the number of tables.

D.) Use a variable to write a relation for the number of people that can be seat at  $n$  tables.

$$2n + 2$$

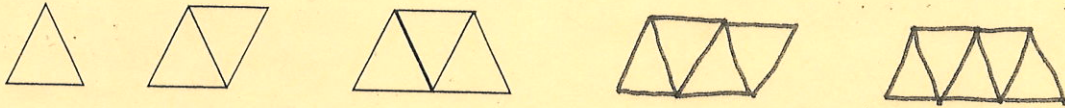
E.) How many people would be seated at 7 tables?

$$n = 7$$

$$\begin{aligned} 2n + 2 \\ = 2(7) + 2 \\ = 14 + 2 \\ = 16 \end{aligned}$$

16 people can sit at 7 tables.

9. Use the diagrams below to answer the questions.



A.) Continue the pattern to the fifth diagram.

B.) Complete the table to show how the pattern grows.

Diagram number (n)	Number of sticks (s)
1	3
2	5
3	7
4	9
5	11

numerical coefficient.

C.) Describe in writing how the pattern grows

The number of sticks is 1 more than 2 times the diagram number.

D.) Write an algebraic expression to show the relationship between the diagram number (n) and the number of sticks (s).

$$2n + 1$$

E.) How many sticks are in Diagram # 30? (Use the expression)

$$n = 30$$

$$\begin{aligned} 2n + 1 \\ = 2(30) + 1 \\ = 60 + 1 \\ = 61 \end{aligned}$$

There are 61 sticks in diagram #30.

10. Determine the expression from the table:

Input n	Output ?
1	9
2	18
3	27
4	36

} 9  
} 9  
} 9

Input n	Output ?
1	3
2	7
3	11
4	15

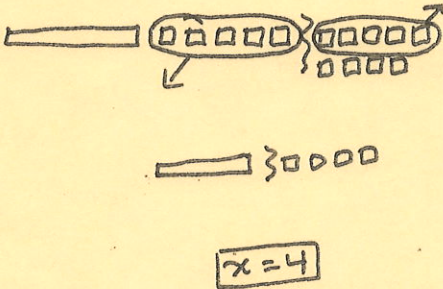
} 4  
} 4  
} 4

Input n	Output ?
1	6
2	8
3	10
4	12

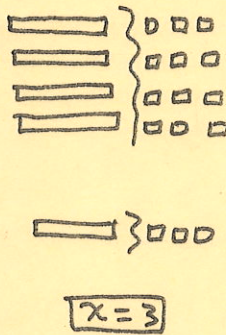
} 2  
} 2  
} 2

11. Solve each equation by modelling with algebra tiles:

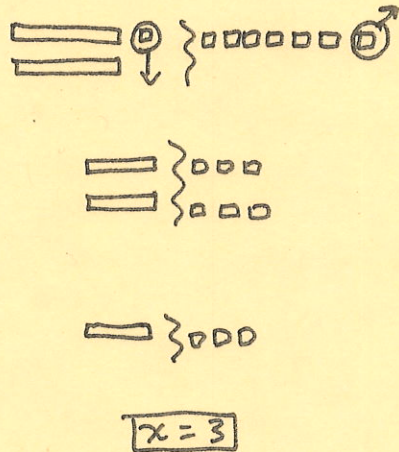
A.  $x + 5 = 9$



B.  $4x = 12$



C.  $2x + 1 = 7$



check:  $x + 5 = 9$   
 $4 + 5 \stackrel{?}{=} 9$   
 $9 = 9 \checkmark \text{ 😊}$

check:  $4x = 12$   
 $4(3) \stackrel{?}{=} 12$   
 $12 = 12 \checkmark \text{ 😊}$

check:  $2x + 1 = 7$   
 $2(3) + 1 \stackrel{?}{=} 7$   
 $6 + 1 \stackrel{?}{=} 7$   
 $7 = 7 \checkmark \text{ 😊}$

12. A grade 7 class decided to take a trip to Disney World. It costs \$200 for a school group pass and \$10 for each student to get a park pass.

A) Write a relation to show how much the trip to the Disney World cost in relation to the number of students that go.

$200 + 10n$       or       $10n + 200$

B) How much would it cost for 40 students to go on the trip?

$n = 40$

$$200 + 10n$$

$$= 200 + 10(40)$$

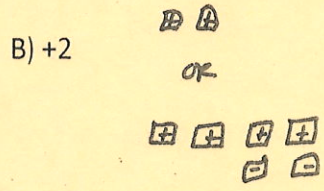
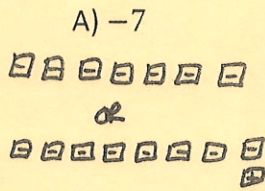
$$= 200 + 400$$

$$= 600$$

It would cost  
 \$600, for 40 students  
 to go on the trip.

## Unit 2: Integers

1. Use integer tiles (positive and negative) to represent each integer in 2 ways. *Answers may vary.*



2. What integer is represented by the integer tiles? ● = positive

A) ● ● ● ○ +2

○ = negative

B) ○ ○ ● -1

C) ○ ● ○

3. Arrange from least to greatest. a) ~~9~~, 6, ~~-4~~, 0, ~~2~~ b) ~~3~~, ~~1~~, ~~-10~~, ~~1~~, ~~2~~

a) -9, -4, -2, 0, 6

b) -10, -3, -1, 1, 2

4. Stephanie has a golf score of -3 and George has a golf score of +7. What is the difference in their scores?

$$\begin{aligned} &(-3) - (7) \\ &= (-3) + (-7) \\ &= -10 \end{aligned}$$

*instead of subtracting integers Keep, Change, Change.*

5. Rebecca has -\$46 in her bank account and \$81 in her savings account. What is the total amount of money that she has?

$$(-46) + 81 = \$35$$

*She has \$35.*

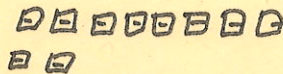
$$\begin{array}{r} 781 \\ -46 \\ \hline 35 \end{array}$$

6. Use integer tiles to evaluate the following:

A)  $(-8) + (-2)$

A)  $(-8) + (-2) = -10$

B)  $(+3) - (-3)$



C)  $(+9) + (-4)$

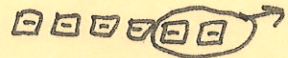
c)  $(+9) + (-4) = 5$

D)  $(-6) - (-2)$

B)  $(+3) - (-3) = 6$

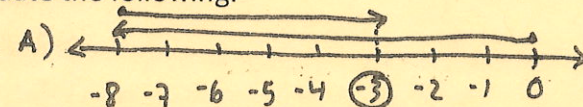


D)  $(-6) - (-2) = -4$

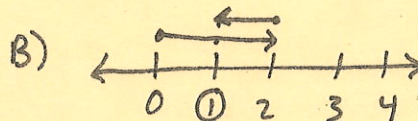


7. Use a number line to evaluate the following:

A)  $(-8) + (+5) = -3$

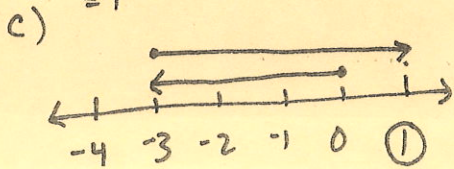


B)  $(+2) - (+1) = 1$



C)  $(-3) - (-4) = 1$   
 $= (-3) + (+4)$   
 $= 1$

$(2) - (1)$   
 $= (2) + (-1)$   
 $= 1$



8. Evaluate:

A.  $(-4) + (-3)$   
 $= -7$

B.  $(-3) - (+1)$   
 $= (-3) + (-1)$   
 $= -4$

C.  $(+5) + (-2)$   
 $= 3$

D.  $(+4) - (-1)$   
 $= (4) + (+1)$   
 $= 5$

E.  $(-8) - (+5)$   
 $= (-8) + (-5)$   
 $= -13$

F.  $(-3) - (-4) - (-5)$   
 $= (-3) + (+4) - (-5)$   
 $= 1 - (-5)$   
 $= 1 + 5$   
 $= 6$

Unit 3: Fractions, Decimals, and Percents:

1. If  $\frac{1}{11} = 0.\overline{09}$ ,  $\frac{2}{11} = 0.\overline{18}$ , and  $\frac{3}{11} = 0.\overline{27}$

A)  $\frac{4}{11} = ?$   $0.\overline{36}$

B)  $\frac{5}{11} = ?$   $0.\overline{45}$

C)  $\frac{9}{11} = ?$   $0.\overline{81}$

2. Match each set of fractions and decimals.

A)  $\frac{1}{3}, \frac{2}{3}, \frac{3}{3}, \frac{4}{3}$  — i)  $0.\overline{16}, 0.\overline{3}, 0.5, 0.\overline{6}$

B)  $\frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}$  — ii)  $0.2, 0.4, 0.6, 0.8$

C)  $\frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}$  — iii)  $0.\overline{3}, 0.\overline{6}, 1.0, 1.\overline{3}$

D)  $\frac{1}{9}, \frac{2}{9}, \frac{3}{9}, \frac{4}{9}$  — iv)  $0.\overline{09}, 0.\overline{18}, 0.\overline{27}, 0.\overline{36}$   $0.\overline{1}, 0.\overline{2}, 0.\overline{3}, 0.\overline{4}$

3. Convert the following decimals into fractions in their simplest form.

A) 0.4

A)  $0.4 = \frac{4}{10} = \frac{2}{5}$

D)  $1.9 = 1\frac{9}{10} = \frac{19}{10}$

B) 0.63

B)  $0.63 = \frac{63}{100}$

E)  $0.005 = \frac{5}{1000} = \frac{1}{200}$

C) 0.02

C)  $0.02 = \frac{2}{100} = \frac{1}{50}$

D) 1.9

E) 0.005

4. Order the following sets of numbers from smallest to the largest.

A) ~~2.3~~, ~~2.4~~, ~~2.32~~, 2.36, 2.327

2.3, 2.32, 2.327, ~~2.36~~, 2.4

B) 0.96, 0.9, 0.9, ~~0.96~~, ~~0.99~~

0.09, 0.9, 0.96, ~~0.96~~, ~~0.9~~

B) ~~0.9600~~  
~~0.9999...~~  
~~0.9000~~  
~~0.9696...~~  
~~0.0900~~

D)  $0.55, \frac{1}{2}, 1.13, \frac{15}{3}$

$\downarrow$   $\downarrow$   
 $0.5$   $5$

$0.5, 0.55, 1.13, \frac{15}{3}$

C)  $\frac{1}{4}, \frac{1}{2}, \frac{1}{3}$



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

4.  
~~2.300~~  
~~2.400~~  
~~2.320~~  
~~2.360~~  
~~2.327~~

5. If  $0.\overline{01} = \frac{1}{99}$ ,  $0.\overline{02} = \frac{2}{99}$ ,  $0.\overline{03} = \frac{3}{99}$ , what is  $0.\overline{04}$  as a fraction?

$$0.\overline{04} = \frac{4}{99}$$

6. What number could replace the ?

A)  $0.4 < ? < 0.41$

B)  $\frac{3}{10} < ? < \frac{4}{10}$

$0.400 \quad \underline{\quad} \quad 0.410$

$$\frac{3 \times 2}{10 \times 2}$$

$$\frac{4 \times 2}{10 \times 2}$$

$$\frac{6}{20}$$

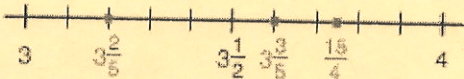
$$\frac{7}{20}$$

$$\frac{8}{20}$$

Any # between 0.400 and 0.410

So, 0.401, 0.402, ..., 0.409

7. Identify which number has been placed in the wrong position.



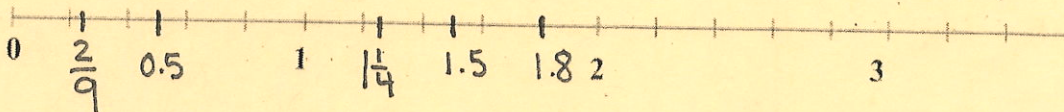
8. Use the number line indicated to order the set of numbers and place them on the number line in their correct positions.

$$\frac{15}{12} = 1\frac{3}{12} = 1\frac{1}{4}$$

$$\frac{2}{9}$$

$$0.5$$

$$1.8$$



9. Solve the following addition and subtraction questions. Check your answer by using front - end estimation.

A)  $9.2 + 3.5$

B)  $0.36 + 0.8$

C)  $9.6 - 1.42$

D)  $14.31 - 5.7$

est:  $9 + 3 = 12$

$$\begin{array}{r} 9.2 \\ +3.5 \\ \hline 12.7 \end{array}$$

B.)  $0 + 0 = 0$

$$\begin{array}{r} 0.36 \\ +0.80 \\ \hline 1.16 \end{array}$$

C)  $9 - 1 = 8$

$$\begin{array}{r} 9.60 \\ -1.42 \\ \hline 8.18 \end{array}$$

D)  $14 - 5 = 9$

$$\begin{array}{r} 14.31 \\ -5.70 \\ \hline 8.61 \end{array}$$

B) Grade 7 classes have raised \$43.21, \$63.2, \$89.90 selling cookies. How much money have they raised so far?

$$\begin{array}{r} 43.21 \\ 63.20 \\ +89.90 \\ \hline \$196.31 \end{array}$$

They have raised  
\$196.31

C) Neila wants to be 181.2 cm tall and she is now 121.4 cm. How much more does she need to grow?

$$\begin{array}{r} 181.2 \\ -121.4 \\ \hline 59.8 \text{ cm} \end{array}$$

She needs to grow  
another 59.8 cm

10. Solve the following multiplication problems without the use of a calculator (you may use a model or long multiplication).

A)  $1.4 \times 2.1$

$$\begin{array}{r} 1 \times 2 = 2.00 \\ 0.1 \times 9 = 0.90 \\ 0.01 \times 4 = 0.04 \\ \hline 2.94 \end{array}$$

B)  $2.6 \times 1.5$

	20	6	
10	$10 \times 20 = 200$	$10 \times 6 = 60$	200
5	$20 \times 5 = 100$	$5 \times 6 = 30$	60
			100
			+ 30
			3.90

Est:  $3 \times 2 = 6$

C)  $0.8 \times 0.7$

$$\begin{array}{r} 0.8 \\ \times 0.7 \\ \hline 0.56 \end{array}$$

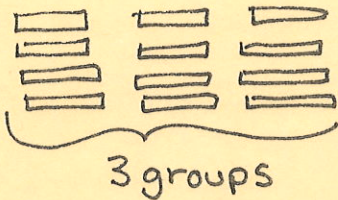
D)  $8.9 \times 0.4$

$$\begin{array}{r} 8.9 \\ \times 0.4 \\ \hline 2.76 \end{array}$$

11. Solve the following division problems without the use of a calculator (you may use base 10 blocks or long multiplication). Check your answers using estimation.

How many groups of 0.4 makes 1.2?

A)  $1.2 \div 0.4 = 3$



B)  $4.2 \div 0.2 = 21$

$$\begin{array}{r} 21 \\ 2 \overline{)42} \\ \underline{-42} \\ 02 \\ \underline{-2} \\ 0 \end{array}$$

OR

C)  $8.76 \div 0.4 = 21.9$

$$\begin{array}{r} 21.9 \\ 4 \overline{)87.6} \\ \underline{-8} \phantom{0} \\ 07 \phantom{0} \\ \underline{-4} \phantom{0} \\ 36 \\ \underline{-36} \\ 0 \end{array}$$

OR

12. How many 0.3 L glasses can be filled from a 1.5L bottle of water?

$1.5 \div 0.3$

$$\begin{array}{r} 5 \\ 3 \overline{)15} \\ \underline{-15} \\ 0 \end{array}$$

OR

5 glasses

13. Use Order of Operations:

A)  $9.9 + (5.6 \times 6.1) \div 4$

$$\begin{array}{r} 9.9 + 34.16 \div 4 \\ 9.9 + 8.54 \\ 18.44 \end{array}$$

B)  $26.9 - 4 + 8.7 \times 5$

$$\begin{array}{r} 26.9 - 4 + 43.5 \\ 22.9 + 43.5 \\ 66.4 \end{array}$$

$$\begin{array}{r} 8.7 \\ \times 5 \\ \hline 43.5 \end{array}$$

$$\begin{array}{r} 26.9 \\ - 4.0 \\ \hline 22.9 \end{array}$$

$$\begin{array}{r} 8.54 \\ 4 \overline{)34.16} \\ \underline{-32} \phantom{0} \\ 21 \phantom{0} \\ \underline{-20} \phantom{0} \\ 16 \\ \underline{-16} \\ 0 \end{array}$$

OR

$$\begin{array}{r} 9.90 \\ + 8.54 \\ \hline 18.44 \end{array}$$

$$\begin{array}{r} 22.9 \\ + 43.5 \\ \hline 66.4 \end{array}$$

Express the following percents as decimals and fractions.

A) 30%

A)  $30\% = 0.30 = \frac{30}{100} = \frac{3}{10}$

D)  $68\% = 0.68 = \frac{68}{100} = \frac{34}{50} = \frac{17}{25}$

B) 4%

B)  $4\% = 0.04 = \frac{4}{100} = \frac{1}{25}$

E)  $35\% = 0.35 = \frac{35}{100} = \frac{7}{20}$

C) 31%

D) 68%

E) 35%

C)  $31\% = 0.31 = \frac{31}{100} = 0.31$

15. At Washington High School, 35% of all students own a Wii system. If there are 500 students at the school, how many own a Wii game system?

35% of 500

$0.35 \times 500$

$$\begin{array}{r} 500 \\ \times 0.35 \\ \hline 2500 \\ + 15000 \\ \hline 17500 \end{array}$$

175 students own their own Wii game system.



16. Jill got 37 marks out of 48 on a test. What percent did she get?

$$\frac{37}{48} = 37 \div 48 = 0.77 = 77\%$$

17. Kaylee was shopping for a jacket. The jacket she wanted was on sale at Athlete's World with a rate of discount of 30% off. If the regular price of the jacket is \$68.99, find the total cost if tax is 13%.

Discount is 30% of \$68.99  
 Discount =  $0.30 \times 68.99$   
 = \$20.70

Sale Price = Original price - Discount  
 =  $68.99 - 20.70$   
 = \$48.29

Tax is 13% of \$48.99  
 Tax =  $0.13 \times 48.99$   
 = \$6.37

Total Price = 48.99 + Tax  
 =  $48.99 + 6.37$   
 = \$55.36

The total price is \$55.36

Unit 4: Circles and Area:

1. Find the radius of the following circles with the given diameters.

A) $d = 10 \text{ mm}$ $r = 10 \div 2 = 5 \text{ mm}$	B) $d = 6 \text{ cm}$ $r = 6 \div 2 = 3 \text{ cm}$	C) $d = 20 \text{ m}$ $r = 20 \div 2 = 10 \text{ m}$	D) $d = 2 \text{ cm}$ $r = 2 \div 2 = 1 \text{ cm}$	E) $d = 7 \text{ m}$ $r = 7 \div 2 = 3.5 \text{ m}$
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2. Find the diameter of the following circles with the given radius.

A) $r = 6 \text{ cm}$ $d = 2 \times 6 = 12 \text{ cm}$	B) $r = 10 \text{ m}$ $d = 2 \times 10 = 20 \text{ m}$	C) $r = 9 \text{ cm}$ $d = 2 \times 9 = 18 \text{ cm}$	D) $r = 3 \text{ mm}$ $d = 2 \times 3 = 6 \text{ mm}$	E) $r = 2.6$ $d = 2 \times 2.6 = 5.2$
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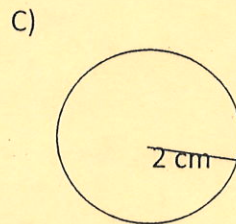
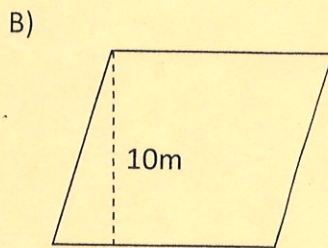
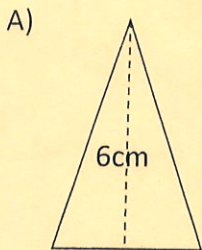
3. Estimate the circumference of the circles with given radius or diameter.

A) $r = 6 \text{ cm}$ $C = 2\pi r$ $= 2(3)(6)$ $= 36 \text{ cm}$	B) $r = 3 \text{ cm}$ $C = 2\pi r$ $= 2(3)(3)$ $= 18 \text{ cm}$	C) $d = 8 \text{ cm}$ $C = \pi d$ $= (3)(8)$ $= 24 \text{ cm}$	D) $d = 10 \text{ cm}$ $C = \pi d$ $= (3)(10)$ $= 30 \text{ cm}$
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4. Find the circumference of the circles with given radius or diameter.

A) $r = 6 \text{ cm}$ $C = 2\pi r$ $= 2(3.14)(6)$ $= 37.68 \text{ cm}$	B) $r = 3 \text{ cm}$ $C = 2\pi r$ $= 2(3.14)(3)$ $= 18.84 \text{ cm}$	C) $d = 8 \text{ cm}$ $C = \pi d$ $= (3.14)(8)$ $= 25.12 \text{ cm}$	D) $d = 10 \text{ cm}$ $C = \pi d$ $= (3.14)(10)$ $= 31.4 \text{ cm}$
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5. Find the area of the following shapes (be sure to include your units).



$$\begin{aligned} A_{\text{circle}} &= \pi r^2 \\ &= (3.14)(2)^2 \\ &= (3.14)(4) \\ &= 12.56 \text{ cm}^2 \end{aligned}$$

$A_{\text{triangle}} = \frac{bh}{2}$   
 $= \frac{(4)(6)}{2}$   
 $= 24$

$A_{\text{parallelogram}} = bh$   
 $= (8)(10)$   
 $= 80 \text{ m}^2$

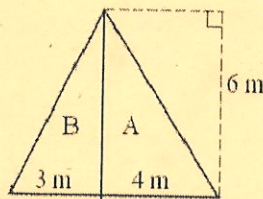
6. Daniel just bought a new sailboat but both of his sails will need to be replaced. How much fabric does Daniel need to buy?

Sail B

$$A_{\text{triangle}} = \frac{bh}{2} = \frac{(3)(6)}{2} = \frac{18}{2} = 9\text{m}^2$$

Sail A

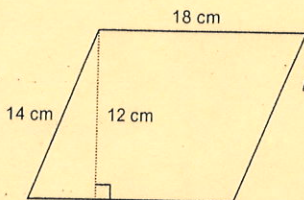
$$A_{\text{triangle}} = \frac{bh}{2} = \frac{(4)(6)}{2} = \frac{24}{2} = 12\text{m}^2$$



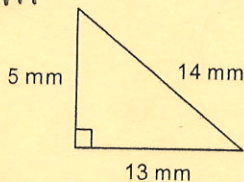
Total Area =  $9\text{m}^2 + 12\text{m}^2 = 21\text{m}^2$

7. Find the area of each object.

(i)



Area of parallelogram =  $bh = (18)(12) = 216\text{cm}^2$



Area of triangle =  $\frac{bh}{2} = \frac{(13)(5)}{2}$

8. Find the area of the circles with the following radius or diameter.

A)  $A = \pi r^2 = (3.14)(10)(10) = 314\text{mm}^2$

B)  $A = \pi r^2 = (3.14)(6)(6) = 113.04\text{cm}^2$

C)  $A = \pi r^2 = (3.14)(20)(20) = 1256\text{m}^2$

D)  $d = 2\text{cm} \rightarrow r = 1\text{cm}$   
 $A = \pi r^2 = (3.14)(1)(1) = 3.14\text{cm}^2$

E)  $d = 7\text{m} \rightarrow r = 3.5\text{m}$   
 $A = \pi r^2 = (3.14)(3.5)(3.5) = 38.465\text{m}^2$

9. Mr. Baker had a coconut cream pie with the diameter of 35 cm. He cut the pie into 8 slices. Find the area of each slice.

Area of entire pie =  $\pi r^2 = (3.14)(17.5)(17.5) = 961.625\text{cm}^2$

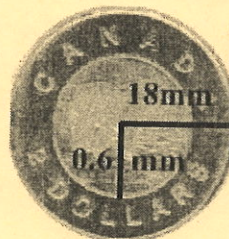
Area of each slice =  $961.625 \div 8 = 120.20\text{cm}^2$

The area of each slice is  $120.20\text{cm}^2$

10. A Toonie has a radius of 18 mm. The inside circle of the Toonie has a radius of 6 mm. What is the area of the outside ring on the Toonie?

Area of entire Toonie =  $\pi r^2 = (3.14)(18)(18) = 1017.36$

Area of inside circle =  $\pi r^2 = (3.14)(6)(6) = 1.1304$

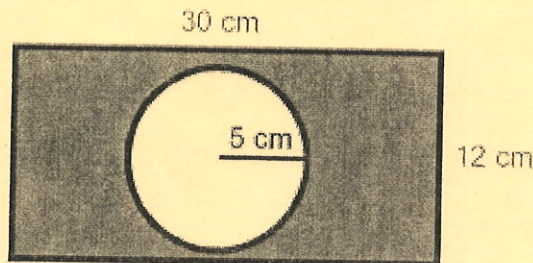


Area of Outside Ring on Toonie =  $1017.36 - 1.1304 = 1016.23\text{mm}^2$

11. John is drilling a hole in a block of wood. What is the area of the shaded region?

Area of Rectangle =  $bh = (30)(12) = 360\text{cm}^2$

Area of circle =  $\pi r^2 = (3.14)(5)(5) = 78.5\text{cm}^2$



Area of Shaded Region =  $360 - 78.5 = 281.5\text{cm}^2$