

**New Syllabus Mathematics 1**  
**Discovering Mathematics 1**

This test covers material taught in New Syllabus and Discovering Mathematics 1 Texts  
(<http://www.singaporemath.com/>)

Calculators should not be used unless indicated.

1. Find the highest common factor and lowest common multiple of 7,200, 2,700, and 360. Give your answer in index notation. [2]
2. A bell rings every 25 minutes while another bell rings every 40 minutes. Suppose they rang together at 6 a.m., when will they ring together again? [2]
3. Evaluate:
  - (a)  $105 + 27 \times (-8) - 144 \div (-9)$  [2]
  - (b)  $\{[(54 - 39) \div (-5) + 7] \times (-3) + (-6)\} - (-3 + 1)$  [2]
  - (c)  $(-2)^2 \times 5 - 2 \times (-5)^2 - (-3)^3$  [2]
  - (d)  $\frac{1}{4} \left[ \frac{1}{5} + \frac{1}{15} \div \left( -\frac{1}{12} \right) \right]$  [2]
4. Which of the following are rational numbers?  
 $0.7272\dots$  ;  $-\sqrt{64}$  ;  $-\pi$  ;  $\frac{22}{7}$  ;  $\sqrt{8}$  ;  $\sqrt[3]{\frac{125}{27}}$  ;  $\sqrt{\frac{1}{2}}$  [2]
5. Use a calculator to evaluate the following:  
$$\frac{30\frac{1}{4} \times \frac{6}{11} - 4\frac{4}{5} \div \frac{32}{65}}{4\frac{1}{2} \times \left( 3\frac{1}{4} - 4\frac{3}{4} \right)}$$
 [2]
6. Which of the following is nearest in value to  $\frac{312.8 \times 61.6}{58.4 \times 2980}$  ? [2]  
(A) 0.01      (B) 0.1      (C) 1      (D) 10
7. Evaluate the following if  $a = 4$ ,  $b = \frac{1}{2}$ ,  $c = -3$ , and  $d = -\frac{3}{4}$ 
  - (a)  $3a^2b - 6dc$  [2]
  - (b)  $\frac{1}{2}(2a - 3b) + \frac{c}{d}$  [2]

8. Simplify:
- (a)  $2(a + b) - 5(a + 2b)$  [2]
- (b)  $\frac{2(4x - y)}{8} - \frac{3x - 7y}{16}$  [2]

9. Factorize:
- (a)  $3a + 24ay$  [2]
- (b)  $2ax - 6bx + 24by - 8ay$  [2]

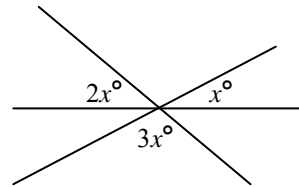
10. There are four consecutive even numbers. The second number is denoted by  $n$ . Find the sum of the four numbers in terms of  $n$ . [2]

11. Solve for  $x$ :
- (a)  $5(3x - 2) - 7(x - 1) = 13$  [2]
- (b)  $\frac{x}{3} - \frac{x + 2}{9} = 1 - \frac{2x + 4}{6}$  [2]

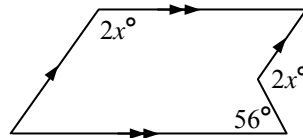
12. Peter is 8 years younger than Alex. In 9 years' time, the sum of their ages will be 76. How old is Alex now? [3]

13. A plant is 7 cm tall and will grow 4 cm per week. Another plant is 11 cm tall and will grow 3 cm per week. In how many weeks will the first plant be the same height as the second plant at the same time? [3]

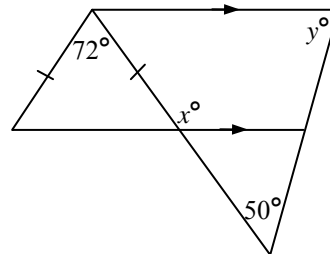
14. In this picture, three straight lines intersect at a point. Form an equation in  $x$  and solve for  $x$ . [2]



15. Find the value of  $x$ . [3]



16. Find the values of  $x$  and  $y$ . [3]





24. Test the following points in order to find out which lie on the line  $y = -\frac{1}{2}x - 2$ . [3]

$$A(2, -1), B(-4, 0), C\left(\frac{2}{3}, -\frac{7}{3}\right), D\left(-\frac{1}{2}, -\frac{7}{4}\right), E(10, -3)$$

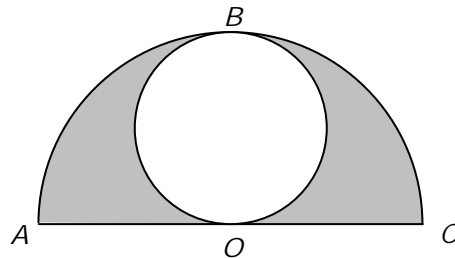
25. Plot the graph of  $y = 2\frac{1}{2}x + 3$  and find the gradient. [2]

26. Solve the following inequalities: [2]

(a)  $2x < -18$

(b)  $\frac{1}{3}x > 3$  [2]

27.  $ABC$  is a semi-circle, with center  $O$ , and a circle is enclosed as shown.  $OC = 3$  cm,  $\pi = 3.14$



- (a) Find the area of the shaded region to 3 significant figures. [3]  
 (b) Find the total length of the boundary of the shaded region to 3 significant figures. [2]

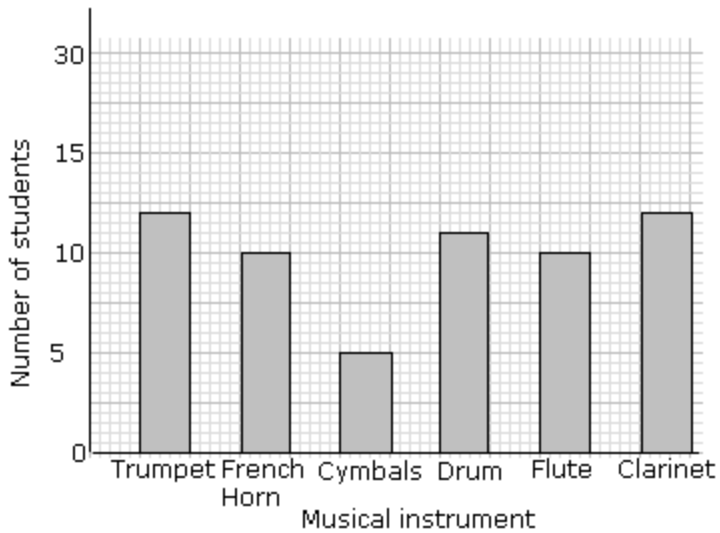
28. Water flows at 4.5 m per second through a pipe. The water is collected in an empty cylindrical tank of an internal diameter 10 times the internal diameter of the pipe. Find the height of the water in cm after 2 minutes. [4]

29. The temperatures in degrees Celsius ( $^{\circ}\text{C}$ ) each day over an eight-week period were as follows:

32, 28, 30, 32, 31, 29, 31, 27, 28, 30, 31, 31, 32, 31,  
 33, 30, 29, 27, 31, 31, 32, 30, 31, 31, 30, 32, 32, 32,  
 30, 29, 28, 28, 29, 27, 30, 32, 32, 31, 28, 32, 33, 32,  
 33, 30, 28, 27, 28, 29, 27, 29, 28, 30, 31, 32, 33, 32

- (a) Construct a frequency chart. [1]  
 (b) Draw a histogram to represent the results. [1]  
 (c) What is the most common temperature? [1]  
 (d) Find the fraction of days in which the temperatures were  $30^{\circ}\text{C}$  or lower. [2]

30. The bar graph shows the number of students in a school band who play a particular musical instrument.



- (a) Find the percentage of students who play the trumpet. [2]
- (b) Find the angle in a pie chart that represents the number of students that play the flute. [3]

## Answer Key

1. Highest common factor:  $2^2 \times 3^2 \times 5$       Lowest common multiple:  $2^5 \times 3^3 \times 5^2$
2. 9:20 a.m.
3. (a)  $-95$       (b)  $-16$       (c)  $-3$       (d)  $-\frac{3}{20}$
4.  $0.7272\dots$ ;  $-\sqrt{64}$ ;  $\frac{22}{7}$ ;  $\sqrt[3]{\frac{125}{27}}$
5.  $-1$
6. B
7. (a)  $10\frac{1}{2}$       (b)  $7\frac{1}{4}$
8. (a)  $-3a - 8b$       (b)  $\frac{13x+3y}{16}$
9. (a)  $3a(1+8y)$       (b)  $2(x-4y)(a-3b)$
10.  $4n+4$
11. (a) 2      (b) 1
12. 33
13. 4 weeks
14. 30
15. 59
16.  $x = 126$ ;  $y = 76$
17. \$7.20
18. (a) 48 min, 84 min, 72 min      (b) 105 km, 84 km  
(c) 67.9 km/h      (d) 21 : 30 : 28
19. 25%
20. 8%
21. (a) 17      (b) 50<sup>th</sup>
22. (a)  $5n - 3$       (b) 47
23. The letter W
24. B, C, and D
25.  $2\frac{1}{2}$
26. (a)  $x < -9$       (b)  $x > 9$
27. (a)  $7.07 \text{ cm}^2$       (b) 24.8 cm
28. 540 cm
29. (c)  $32^\circ \text{ C}$       (b)  $\frac{1}{2}$
30. (a) 20%      (b)  $60^\circ$