

## Review – Math Placement Test

1. Arrange the numbers 1.1, 1.231, 1.132, and 1.123 in
  - a) Increasing Order
  - b) Decreasing Order
2. Find the integer closest to  $\sqrt{27}$ ,  $\sqrt[3]{66}$  and  $(3.4)^2$
3. Find up to the nearest integer
  - a) the area of the circle of radius 3
  - b) the circumference of a circle of radius 3
4. Find
  - a)  $21 - (27 - 54)$
  - b)  $31 + 2(24 - 35)$
  - c)  $29 - 3(7 - 9)$
5. Find  $(-5)^2$ ,  $(-5)^3$ ,  $(-5)^{-2}$ , and  $(-5)^{-3}$ .
6. Find  $\frac{2}{3} + \frac{4}{5}$ ,  $\frac{2}{3} - \frac{4}{5}$ ,  $\frac{2}{3} \cdot \frac{4}{5}$  and  $\frac{2}{3} \div \frac{4}{5}$ .
7. Find  $3\frac{5}{6} + 1\frac{2}{7}$ ,  $3\frac{5}{6} - 1\frac{2}{7}$ ,  $3\frac{5}{6} \cdot 1\frac{2}{7}$ , and  $3\frac{5}{6} \div 1\frac{2}{7}$ .
8. Determine which of the numbers  $\frac{11}{10}$ ,  $\frac{4}{5}$ ,  $\frac{7}{6}$ ,  $\frac{13}{12}$ ,  $\frac{10}{11}$ ,  $\frac{21}{20}$  is
  - a) closest to 1
  - b) furthest from 1
9. Convert the following fractions to decimals:  $\frac{9}{45}$ ,  $\frac{99}{44}$ ,  $\frac{56}{64}$ ,  $\frac{19}{4}$ .
10. Convert the following percentages to decimals: 0.5%, 5%, 45%, 245% .
11. Find 5% of 20, 10% of 30, 20% of 40, 25% of 60, 50% of 80 and 200% of 100.
12. Suppose the width of a rectangle is 3 units less than the length of the rectangle. If the length of the rectangle is  $l$ , determine
  - a) the area of the rectangle
  - b) the perimeter of the rectangle
13. The length of a rectangle is 40 units. Find the width of the rectangle if
  - a) the area of the rectangle is 400 units
  - b) the perimeter of the rectangle is 200 units

14. Find an equation of the straight line in i) slope-intercept form and ii) standard form

- a) with slope 3 and y-intercept (0, 1)
- b) with slope  $-3/4$  passing through the point (2, 1)
- c) passing through points (2, -1) and (4, 3)

15. Simplify the following expressions:

a)  $(5x^4)(3x^3)$       b)  $\frac{(4x^2)^2}{(2x^3)^3}$       c)  $\frac{x^{-2}}{x^{-3}}$       d)  $(-2x^2y)^3$

16. Simplify the following expressions:

a)  $\sqrt{9x^4y^3}$       b)  $\sqrt[3]{16x^6y^9}$

17. Simplify the following expressions:

a)  $(x^2 + 2x - 3) + (2x^2 - x + 7)$   
b)  $(x^2 + 2x - 3) - (2x^2 - x + 7)$

18. Expand the following expressions:

a)  $(2x - 3)(x + 4)$       b)  $(3x + 2)^2$       c)  $(2x - 3)^2$       d)  $(3x + 2)(3x - 2)$

19. Factor the following expressions:

a)  $25x^2 - 64$       b)  $3x^2 + 2x - 1$

20. Simplify the following expressions:

a)  $\frac{(xy)^{-1}}{x^{-2} + y^{-2}}$       b)  $\frac{x}{x^2 - 4} - \frac{1}{x - 2}$       c)  $\frac{x}{x^2 + 3x + 2} + \frac{1}{x + 1}$

21. Solve the following equations:

a)  $\frac{x + 2}{x} = \frac{1}{x} + 5$       b)  $x^2 + 4x - 3 = 0$       c)  $2x^2 + 3x - 2 = 0$

22. Solve the following systems of equations:

a)  $2x - y = 2$   
 $3x + y = 4$       b)  $x + 2y = -1$   
 $2x - 3y = 12$

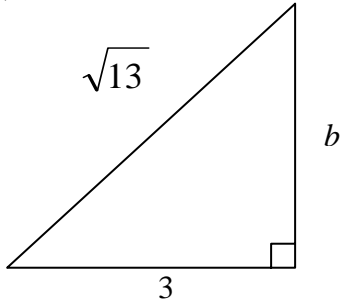
23. Solve the following inequalities:

a)  $2x + 5 < 4x + 11$   
b)  $4x + 4 < 3x + 5$   
c)  $x^2 + 5x - 6 < 0$   
d)  $x^2 - 9 > 0$

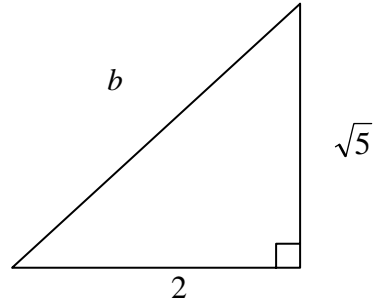
24. Find the points of intersection, if any, of
- the parabola  $y = 2x - x^2$  and the line  $y = -x - 4$
  - the parabola  $y = x^2 + 6x$  and the line  $y = 2x - 6$
25. Sketch the following graphs:
- the line  $y = 3x - 2$
  - the line  $y = 3 - 2x$
  - the parabola  $y = x^2 - 2x + 5$
  - the parabola  $y = -x^2 + 2x - 2$
  - the parabola  $x = 1 + y - y^2$
  - $y = |x - 2|$
  - $y = |x + 1| - 1$
26. If  $f(x) = 3^{-x} + x^3$ , find  $f(-1)$ ,  $f(0)$  and  $f(1)$ .
27. If  $f(x) = \frac{\log_2 x}{x^2}$ , find  $f(1/2)$ ,  $f(1)$  and  $f(4)$ .
28. If  $f(x) = 2x + 3$ ,  $g(x) = x^2$  and  $h(x) = \sqrt{2 - x^2}$ , find
- $g(f(x))$
  - $f(g(x))$
  - $f(f(x))$
  - $g(h(x))$
  - $h(g(x))$
29. Find the domains of
- $F(x) = \frac{1}{4x^2 - 9}$
  - $h(x) = \sqrt{2 - x^2}$
  - $f(x) = \ln(1 + x)$
  - $g(x) = e^{-x}$
30. Simplify the following expressions:
- $\log_3 27$
  - $\log_{10} 10,000$
  - $\log_5 4 + \log_5 50 - \log_5 8$
  - $e^{\ln 4 + \ln 3}$
  - $e^{2 \ln 5}$
  - $e^{-\frac{1}{2} \ln 3}$
31. If  $\log_a 2 \approx 0.36$ ,  $\log_a 3 \approx 0.56$  and  $\log_a 5 \approx 0.83$ , find an approximate value for each of the following:
- $\log_a 8$
  - $\log_a \frac{5}{9}$
  - $\log_a 12$
  - $\log_a \frac{\sqrt[4]{2}}{15}$
32. Solve the following equations:
- $3^x = 7$
  - $e^{2x} - 2e^x - 3 = 0$
  - $\ln(2x + 1) = 10$

33. In each of the right triangles below, find  $b$ :

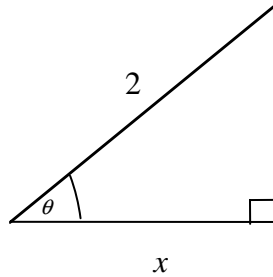
a)



b)



34. Find  $\cos \theta$ ,  $\sin \theta$ ,  $\tan \theta$ ,  $\cot \theta$ ,  $\sec \theta$  and  $\csc \theta$  where  $\theta$  is the angle shown in the figure below.



35. Find  $\sin \theta$  and  $\cos \theta$  for  $\theta = 0, \pi/6, \pi/4, \pi/3$  and  $\pi/2$ .

36. Simplify the following expressions:

a)  $\cos^2(2x) + \sin^2(2x)$

b)  $\cos^2(2x) - \sin^2(2x)$

c)  $\cos(2x)\sin(2x)$

d)  $\cot x \tan x$

e)  $\sin x \cos x \tan x$

f)  $\tan^2 x + 1$

g)  $\csc^2 x - 1$

37. Find all values of  $x$  in the interval  $[0, 2\pi]$  that satisfy

a)  $\sin^2 x + \sin x - 2 = 0$

b)  $\cos x(\sin x - 1/2) = 0$