

Review Questions for Mathematics Placement Exam

Part A:

- 1) Add or subtract as indicated: a) $6 + (-7)$ b) $-3 - 7$ c) $-9 - (-17)$
- 2) Multiply: a) $5(-3)$ b) $-3(-7)(-2)$ c) $9(-2)^2$
- 3) Simplify: a) $-42/(-10 + 17)$ b) $-28/(-4)$
- 4) Simplify: a) $(-3)^3$ b) $3(-2)^3$ c) $4\frac{5}{8} - 2\frac{1}{4} + 3\frac{1}{2}$ d) $8\frac{2}{3} \times 2\frac{1}{2}$
- 5) Simplify each radical: a) $\sqrt[3]{-27}$ b) $-\sqrt{64}$
c) $\sqrt{100+300}$ d) $(\frac{1}{8}) \cdot \sqrt{16}$
- 6) Calculate: $6\frac{3}{4} \div 2\frac{1}{2}$
- 7) What is 75% of 80% of 200?
- 8) The peak of Mountain A is 4200 feet above sea level, whereas the lowest part of Valley B is 700 feet below sea level. What is the vertical distance between the peak of Mountain A and the low point of Valley B?
- 9) Jane gets paid a higher hourly wage for all work she does in a given work week, *beyond* the first 40 hours. Her weekly gross for a 40-hour week is \$640. Last week, Jane worked for 48 hours and earned \$816.
 - a) What is her regular hourly wage for her first 40 hours?
 - b) What was her hourly wage for each of the 8 overtime hours she worked last week?
- 10) An item on sale for 18% off, is selling for \$123.
 - a) What is the original (non-sale) price?
 - b) How much money would you save, by paying the sale price?
- 11) Factor completely: a) $4x^2 - 64$ b) $2x^2 + x - 36$ c) $3x^3 - 9x^2 - 12x$

12) Simplify completely: a) $\frac{-28(x^2)^3 x^{-1}}{-4x^8}$ b) $\frac{A^5 B^8 B^4}{A^{-3} B^5}$ c) $\frac{x^3 y}{z} \div \frac{xy^2}{z^2}$

13) Solve for t : a) $4t^2 - 9t = 9$ b) $4^{(2t-1)} = 8^{-t}$

c) $\frac{2}{3}(2t-5) = \frac{3}{4}(t+2)$ d) $\frac{2t-3}{4} = \frac{5}{t}$

14) Determine the coordinates of the minimum point of the function:

$$f(x) = 6x^2 - 18x + 21.$$

15) If $R(x) = -2x^4 + 3x + 15$, evaluate $R(2)$.

16) For what value(s) of x is $\frac{4x-5}{x^3-36x}$ not defined?

17) Divide: $\frac{5m^3h^2 + 2mh}{mh}$.

18) Multiply: a) $(-4x+2)(x^2-x)$ b) $(-3E^4)(2E^3-7E+10)$

19) Find the slope, y -intercept and x -intercept of each equation:

a) $10x - 14y = 28$ b) $2y = 3x - 4$ c) $-12x = 36$ d) $8y = 56$

20) a) If $7A = 12B + 9A - 7B + 22$, solve for A in terms of B .

b) If $PQ = 28 + 2Q + 8P$, solve for P in terms of Q .

21) Simplify: $4(8A - 2B + C) - 6(-A + 5C + 3)$.

22) Simplify: $27^{-\frac{2}{3}} + 16^{-\frac{1}{2}} - 4^{\frac{3}{2}}$.

23) Simplify: $\log_{10}\left(\frac{25}{\sqrt{8}}\right)$, if $\log_{10}(5) = 0.699$ and $\log_{10}(2) = 0.301$.

24) Solve for x and y values that satisfy both of the following equations simultaneously.

$$3x + 4y = -14$$

$$x + 8y = -38$$

25) Find the domain and range of the function $f(x)$ defined by $f(x) = 3 + \sqrt{x+1}$.

26) Divide and simplify completely $\frac{x^2 - 4}{2x + 4}$.

Part B:

27) If the lengths of the sides of a right triangle FGH are 8, 15 and 17, and $\angle F$ is the smallest angle of the triangle, find the numerical value of:

a) $\sin(\angle F)$ b) $\cos(\angle F)$ c) $\tan(\angle F)$ d) $\sin(2\angle F)$ e) $\cos(2\angle F)$

28) Determine the exact numerical value of each of the following:

a) $\cos(-120^\circ)$ b) $\tan(11\pi/6)$ c) $\cos(5\pi/4)$

29) Solve for all values of t in $[0, 2\pi]$: $4 \tan(t) + 4 = 0$.

30) If the smallest side of a 30° - 60° - 90° right triangle is 12 inches, find the lengths of the two largest sides of this triangle.

31) Solve for all values of t in $[0, 2\pi]$: $2 \sin^2(t) + 5 \sin(t) - 3 = 0$.

32) Express $\tan^2(R) + 1$ in terms of $\cos(R)$.

33) a) $3 \cos^2(15^\circ) - 3 \sin^2(15^\circ) = ?$

b) $8 \sin(22.5^\circ) \cos(22.5^\circ) = ?$

34) If $\tan(x) = -\frac{3}{2}$ and $3\pi/2 < x < 2\pi$, find $\cos(x)$ and $\sin(x)$.

35) Find the minimum and maximum values of $\cos(\theta)$, where $\pi/2 \leq \theta \leq 3\pi/2$.

36) From a distance, you are looking at the top of the chimney, on the roof of your house, via an angle of sight of 30° . If the top of your chimney is 50 feet above your line of sight, find:

a) the distance, “as the crow flies”, between you and the top of your chimney.

b) the distance between you and your house.

37) The expression $\frac{2\sin^3(\theta) + 2\cos^2(\theta)\sin(\theta)}{4\sin(\theta)}$ simplifies to what constant?