

Practice Exam 2 with answers

1. Subtract. Simplify your answer as much as possible: $\frac{2}{x-2} - \frac{7}{x^2+3x-10}$

Answer: $\frac{2x+3}{(x-2)(x+5)}$

2. Divide. Simplify your answer as much as possible: $\frac{7a}{a+5} \div \frac{a^2-5a}{a^2+2a-35}$

Answer: $\frac{7a+49}{a+5}$

3. Solve: $\frac{5}{x-4} = \frac{77}{x^2-x-12} - \frac{11}{x+3}$

Answer: $x = \frac{53}{8}$

4. Solve: $\sqrt{x+20} - 2x = -5$

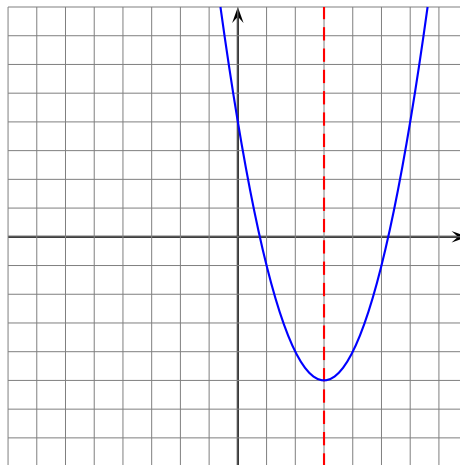
Answer: $x = 5$. (The solution $x = \frac{1}{4}$ is rejected.)

5. Simplify: $\frac{\frac{3}{y} - \frac{5}{y+2}}{\frac{2}{y^2+2y}}$

Answer: $3 - y$

6. Graph the parabola $y = x^2 - 6x + 4$. Your graph should correctly indicate the vertex, the axis of symmetry, the x -intercepts, the y -intercept and the point symmetric to the y -intercept.

Answer: The vertex is at $(3, -5)$. The x -intercepts are at $(3 \pm \sqrt{5}, 0)$. The y -intercept is $(0, 4)$, the point symmetric to it is $(6, 4)$



7. Solve: $3x^2 - 10 = 2x$

Answer: $x = \frac{1 \pm \sqrt{31}}{3}$

8. Find the center and radius of the circle with equation $x^2 + 6x + y^2 - 4y = -5$

Answer: Center is at $(3, -2)$. Radius is $2\sqrt{2}$.

9. Simplify: $\left(\frac{64x^{-13}y^{11}}{25x^3y^8}\right)^{-\frac{1}{2}}$. Assume all variables represent positive numbers. The answer should contain only positive integers as exponents.

Answer: $\frac{5x^8\sqrt{y}}{8y^2}$

10. Divide: $\frac{5i - 1}{3i + 2}$. Express your answer in the form $a + bi$ where a and b are real numbers.

Answer: $1 + i$

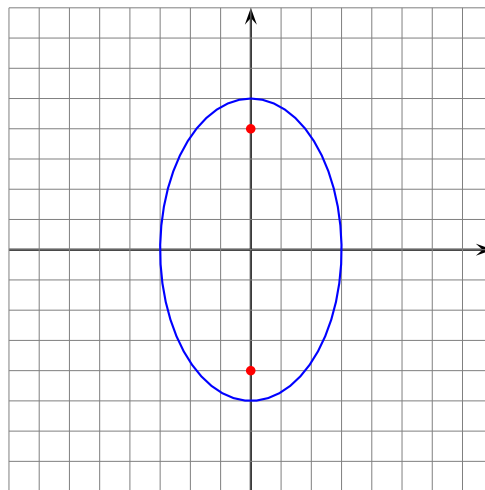
11. Find an equation of the line tangent of the circle $(x + 2)^2 + (y - 3)^2 = 5$ at the point $(-4, 4)$.

Answer: $y = 2x + 12$

12. Determine an equation of the locus of points whose distance from the point $(0, 4)$ is twice the distance from the line $y = 2$.

Answer: $x^2 - 3y^2 + 8y = 0$

13. Graph the ellipse with equation $\frac{x^2}{9} + \frac{y^2}{25} = 1$. The graph should correctly indicate the center, the foci and the major and minor axes of the ellipse.



14. Find the common points of the line $y = 2x + 1$ and the conic section $2x^2 - 3x + y^2 + 2y = 14$.

Answer: $(1, 3), \left(-\frac{11}{6}, -\frac{8}{3}\right)$

15. Simplify:

(a) $5\sqrt{50} - 2\sqrt{72} + 3\sqrt{12}$

Answer: $25\sqrt{2}$

(b) $(2 + \sqrt{5})^2$

Answer: $9 + 4\sqrt{5}$

16. In a right triangle ABC we have $B = 90^\circ$, $a = 1$, and $b = 2$ inches. Solve the triangle.

Answer: $c = \sqrt{5}$, $A = 30^\circ$, $B = 90^\circ$.

17. Find the exact value of each:

(a) $\sin 960^\circ \cdot \tan 315^\circ$

Answer: $\frac{\sqrt{3}}{2}$

(b) $\cos 1920^\circ$

Answer: $-\frac{1}{2}$

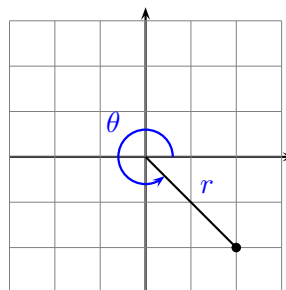
18. Find all angles θ , between 0° and 360° with $\cos \theta = 0.62$. Round your answers to the nearest tenth of a degree.

Answer: $\theta \approx 51.7^\circ$ and $\theta \approx 308.3^\circ$

19. An observer stands on level ground at a distance of 100 feet from the base of a building. How high, to the nearest foot, is the building if the angle of elevation is 25° ?

Answer: To the nearest foot the building is 47 feet high.

20. (a) Find r and θ .



Answer: $r = 2\sqrt{2}$, $\theta = 315^\circ$

- (b) Find the coordinates of the point whose distance from $(0,0)$ is 6 and whose angle of reference is 150°

Answer: $(-3\sqrt{3}, 3)$.